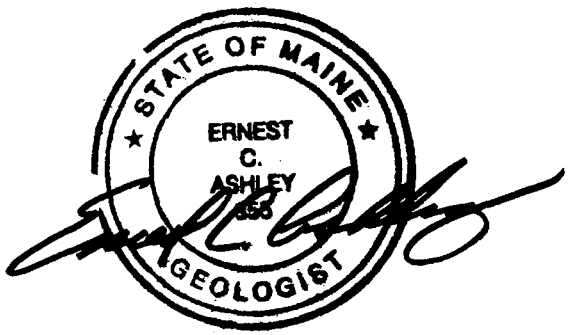
CDM

Mallinckrodt Inc.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Studies
Field Investigation Report

May 27, 2003

Revised September 19, 2003



Report

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September 24, 2003

Mr. Scott Whittier
Division of Oil and Hazardous Waste Facilities Regulation
Bureau of Remediation and Waste Management
State of Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

Mr. Ernest R.P. Waterman
United States Environmental Protection Agency – Region I
RCRA Corrective Action Section
One Congress Street
Boston, Massachusetts 02140-2023

Subject: HoltraChem Manufacturing Site, Orrington, Maine
Revised Corrective Measures Study Field Investigation Report

Dear Mr. Whittier and Mr. Waterman:

On behalf of Mallinckrodt Inc., we are forwarding to you four copies of the Corrective Measures Study Field Investigation (CMSFI) Report, dated September 19, 2003. The report has been revised in response to the comments contained in the Maine Department of Environmental Protection's (MEDEP's) letter dated July 23, 2003.

To assist in your review of this document, a response to each of MEDEP's comments and a discussion of the changes to the report is attached.

Very truly yours,

Ernest C. Ashley, P.G.
Project Manager
Camp Dresser & McKee Inc.

cc: Patricia Hitt Duft
James K. Grant
Walter T. Chaffee
J. Andrew Schlickman
Dennis Harnish
Amelia Katzen

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CMS Field Investigation Report
Comments and Responses

General

Comment:

The areal extent and depth of soil contamination has not been bounded in many of the investigated locations. Estimates of volumes requiring treatment and disposal will, accordingly, be imprecise, compounding the possible error in remediation cost estimates. The costs estimated in the CMS for certain soil treatment alternatives are very volume-sensitive while others are less so. Actual costs could vary by a much larger margin than the "plus fifty percent to minus 30 percent" desired, complicating an objective evaluation of alternatives.

Response:

The CMS Field Investigation delineated the vertical and lateral extent of soil contamination in most all areas sufficiently for CMS/conceptual design purposes. The CMS FI work plan was developed and executed based on PMPS discussions with the MEDEP and EPA, which at that time had tentatively identified a PMPS' for soil and sediment of 3.2 mg/kg with additional considerations for soil above 10 mg/kg. The onsite analytical laboratory was used to determine if additional characterization samples were needed to define the limits of soil or onsite sediment above the PMPS (at that time 3.2 mg/kg). In some instances, soil/sediment concentrations in peripheral samples exceed the PMPS. However, based on consistent concentration attenuation trends or geologic considerations (presence of clay or bedrock), CDM is confident in the adequacy of the data for the CMS. Conservative assumptions have been applied as necessary to account for the uncertainties that remain in the characterization data.

Comment:

The significance of the 10 mg/kg criterion, which is cited often, is not clear. A 2.2 mg/kg PMPS has been chosen for mercury in soils and sediments.

Response:

As stated above, 10 mg/kg was a concentration criteria that was considered applicable by EPA, MEDEP, and Mallinckrodt for assessing the disposition of soil at the time the CMS FI was implemented and tabulated. This was based on data developed during the SI that demonstrated that soil below 13 mg/kg would not be likely to leach mercury at concentrations greater than the PMPS for groundwater (also the MCL, or drinking water standard).

Comment:

Data quality for this project is unknown. It is unclear what laboratory analyzed samples for this investigation, and what the quality control specifications were. There is no presentation of data quality issues, nor is any original laboratory data associated with the report. This may be due to the lack of a Quality Assurance Project Plan [QAPP] for the field investigation. A QAPP is recommended for any future site work that includes sampling and analysis. Documentation of data quality for this field investigation may still be possible, and is recommended. Laboratories should be identified for all analyses, and any quality control information, such as sample handling and

laboratory QC [method blanks, instrument calibrations, laboratory control samples and duplicates] should be evaluated and presented.

Response:
All analyses used for contaminant distribution characterization were performed by a MEDEP-certified laboratory, Alpha Analytical Labs of Westborough, Massachusetts, which as been used as an approved laboratory throughout the SI and is currently the laboratory specified in the Quality Assurance Project Plan for cell process dismantling. Sampling quality control requirements were the same as those specified in the SI Work Plan and were described in the Corrective Measures Studies Field Investigation Work Plan and the plan for Test Pit Excavations of the Industrial Sewer. A data consistency and data useability review was performed by the project manager prior to compilation of the CMS FI Report. A data quality assessment is provided as Appendix E of the revised CMS FI Report.

Comment:
It would be helpful to have chemical data included on a map such as Figure 2-1 to review contaminant distribution.

Response:
Through the combination of plans and profiles in the CMS Field Investigation Report, CDM has endeavored to portray the lateral and vertical distribution of contamination at the site. Because data have been collected at many depth intervals and many discrete areas it is not feasible to represent the distribution of chemical data on one figure. For this reason, the CMS report presents representations of the areas where soil concentrations exceed the soil PMPS'.

Specific Comments

Comment:
It is difficult to reconcile the mercury concentrations shown in Figure 2-9 for SB3-1A with the values in Table 2-1. From the borehole log, refusal was encountered at shallow depth on the first try and a second borehole was put in a few feet away. It appears that Figure 2-9 is meant to show only the first boring, but the Table 2-1 values for certain intervals are either missing or incorrectly entered.

Response:
After reaching refusal at 13 feet below ground surface, Boring SB3-01 was continued 10 feet to the west. There was no recovery in the 15 –17' interval and sample characterization continued from 17 to 29.5' bgs. The mercury concentrations and depth intervals presented in Table 2-1 are correct. A revised Figure 2-9, which shows the complete analytical data set available for the cross section, is included in the revised CMS FI Report.

Comment:
Table 2-8 includes "totals" for VOC. However these total results do not include values listed as >2000 or >1

Response:
Table 2-8 has been revised.

Comment:
2.1 - Retort Building [Area 1]
It is unclear how we know that the mercury did not infiltrate the underlying till. Were any samples taken in the till to confirm this?

Response:
The cross sections presented as Figures 2-3 through 2-7 illustrate the vertical and lateral extent of mercury in the vicinity of the Retort Building. These figures also depict the soil types encountered in the borings. It is apparent from the distribution of mercury in the various soil types that mercury concentrations are below the PMPS of 2.2 mg/kg in the samples collected of the till beneath the area of the Retort Building.

Comment:
Both the HCM on-site lab and Alpha Analytical Laboratories analyzed a split sample. RPD for the results is calculated to be 106%. In subsequent split samples RPD is lower, but there is a trend toward higher results at Alpha Analytical as compared to HMC lab. Has an overall evaluation of results/ analytical methods been done? It would be important to make sure all labs performing analyses do comparable analyses.

Response:
A review of the results of the test pits conducted for evaluation of elemental mercury around the industrial sewer and the retort building identified that the HMC lab results appeared to be biased low. However the results are generally comparative and corrective action to address the potential bias was addressed as part of a subsequent audit of the HMC lab. The vast majority of samples from the Retort Building assessment were analyzed at the offsite contract laboratory, Alpha Labs. A quality assessment of laboratory data is provided in the revised CMS FI Report.

2.2 - Former Equipment Storage Area [Area 2]
Comment:
In this section and elsewhere throughout the report, mercury in soil results are characterized as "less than 10 mg/Kg." This does not appear to be a useful characterization since the PMPS is 2.2 mg/Kg.

Response:
The CMS FI work plan was developed and executed based on PMPS discussions with the MEDEP and EPA, which at that time had tentatively identified a PMPS' for soil and

sediment of 3.2 mg/kg with additional considerations for soil above 10 mg/kg. The SI Report also documented that soils unimpacted by large brine releases would not leach mercury at concentrations above the groundwater PMPS if their total mercury concentration was below 13 mg/kg. Comparisons of soils concentrations to 10 mg/kg are still useful. Comparisons to PMPS of 2.2 are also provided.

2.3 - Landfill Ridge Area [Area 3]
Comment:
The site of the interim stabilization measures in the Landfill Ridge Area noted in Section 2.3 (and identified in Table 2-1 by soil samples ISMSS 1 through 7) are not located on Figure 2-8.

Response:
Figure 2-8 has been revised to provide the information.

2.4 & 2.5 - Scrap Metal and Coal Filter Storage Areas [Areas 4 & 5]
Comment:
Describe the observations and conditions that drove the variance from the work plan. Explain how conditions in the field were used to select sample locations? Explain why no samples were collected of the peat. The high organic content of the peat might be expected to retain mercury that had traveled through sandier overlying materials. Samples of the peat will be required in the project design phase.

Response:
The original approach for Area 4 proposed the excavation of five test pits as trenches extending into the scrap metal area. The first test pit, TP4-A, was excavated as a trench. It became apparent during the excavation of that trench that discrete test pits would allow better coverage of the area to be investigated (there were may obstacles such as tanks to work around), limit the amount of excavation open at any one time, and permit more accurate documentation of soil conditions and sampling locations. During the CMS field investigation, five additional test pits were excavated to better define the extent of mercury containing soils in the area.

The CMS work plan originally proposed the advancement of direct push soil borings in the area of fill. Instead soil borings were advanced in this area using hollow stem augers because of the potential that fill material would result in poor recoveries or refusal with the Geoprobe unit. Additionally, three direct push borings were advanced to the west of the fill area to evaluate the vertical extent of mercury containing soils where surface soil sampling had identified mercury during the SI.

Analytical soil samples were collected based on conditions encountered in the field to most accurately characterize the material and the area. For example, samples were collected of a horizon of dark or stained soil if observed and of the soil below it. Samples were collected of the peat (TP4-B3, 2.4 mg/kg Hg; TP4-D3, 1.1 mg/kg Hg; and, SB4-2 sample from 8-10 feet, 1.2 mg/kg Hg). The peat deposit is interpreted to represent the

pre-filling soil horizon. Sampling documented that it is lower in mercury than portions of the overlying fill. The existing data are sufficient for the CMS.

2.6 - Nitromethane Building [Area 6]
Comment:
Are the results for the graphite samples collected in the building, the same graphite materials that appeared to have mercury vapors associated with them as evidenced by Lumex data collected by DEP staff on 7/19/01?

Response:
We assume so. Samples were collected of each of the three storage container types observed in the Nitromethane Building at the time of sampling.

2.8 - Cell Building [Area 8]
Comment:
The high mercury detections in till at SB8-02 suggest that soil characteristics will not be a consistently reliable guide to where mercury has, and has not, migrated. The detailed design of any remedy involving excavation of plant area soils needs to consider what field screening guides and confirmation sampling are necessary to guide excavation work.

Response:
The location of SB8-02 is adjacent to a sump structure that may have contributed to the amount of mercury recorded at depth there. The boring log indicates the sample was collected at the interface of the base of sand and the top of dense silt. This interface may be the place where mercury accumulated. Significant attenuation is apparent between the 7.5 to 9.5 sample interval and the 9.5 to 11 interval. In addition, significant attenuation is apparent between the overlying intervals and the till sampled in borings SB8-3, 7, & 8. Based on these observations, it is reasonable to assume that the top of the till is an appropriate conceptual design criterion for excavation of soils in the vicinity of the Cell Building. Development of an appropriate field screening and post-excavation sampling program will be part of remedial design.

2.9 - Southerly Stream [Area 9]
Comment:
Sampling of stream sediments do indicate that the Southerly stream is generally cleaner upgradient of the manufacturing area but there is no clear vertical or horizontal gradient to the sampling transects sufficient to pre-guide excavation. The detailed design of any remedy involving excavation of plant area soils needs to consider what field screening guides, confirmation sampling and site conditions (e.g. bedrock) are necessary to guide excavation work.

Response:
The Corrective Measures Implementation design process will consider the method of confirming removal of the sediment exceeding the PMPS.

2.10 - Southern Cove [Area 10]
Comment:
Clarify whether the sediment sampling results expand the anticipated footprint of active remediation or change the perception of sporadic distribution of mercury in the sedge beds?

Response:
Ten Southern Cove sediment samples contained concentrations greater than or equal to 2.2 mg/kg. These samples were located in the same general area as the SI sample, which contained 41 mg/kg. Concentrations less than 2.2 mg/kg were documented in the sedge deposits closer to the shore. These results did not change the anticipated area of sediment removal and confirmed the perception that the sedge beds do not contain more than sporadic sediment concentrations above the PMPS.

2.11 - Northern Ditch [Area 11]
Comment:
Sampling work does not appear to have bounded the horizontal or vertical limits of mercury contamination in the area of the Northern Ditch. This does not appear to be a significant enough error to invalidate the comparison of remedy options in the CMS Report but will need to be resolved to support detailed design work on the selected remedy.

Response:
Hand augered sampling on the North Ditch alone did not identify the vertical and lateral extent of elevated mercury concentrations. Additional characterization was performed with test pit excavation. Fill material was documented adjacent to the lower portions of the North Ditch. The CMS conservatively estimated the volume of material associated with the North Ditch and adjacent fill and post-excavation confirmation sampling can be used to document the adequacy of remediation efforts.

Mallinckrodt Inc.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Studies
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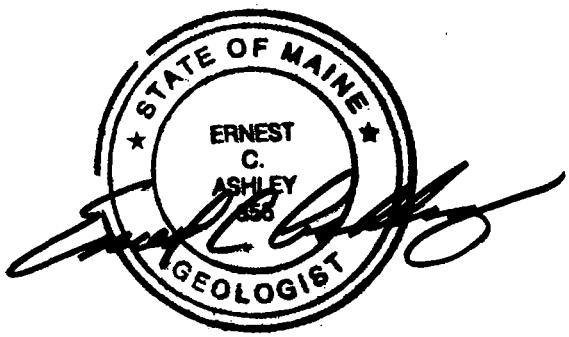

Report

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Section 1
Introduction

1.1 Document Intent

This Corrective Measures Studies Field Investigation Report documents the methodology and results of field investigations conducted as part of the Corrective Measures Study (CMS) for the HoltraChem Manufacturing site, located in Orrington Maine. The data obtained from this investigation will supplement existing data and support the evaluation and implementation of corrective action measures at the site. The investigation was performed in accordance with the Work Plan for Corrective Measures Field Investigation submitted to EPA and MEDEP on October 19, 2001. MEDEP provided approval and comments in a letter dated November 2, 2001. EPA provided approval with comments in a letter dated November 14, 2001. Copies of these letters are provided as Appendix A.

1.2 Purpose

The purpose of this investigation was to further delineate the horizontal and vertical extent of soil and sediment contamination to support evaluation of the proposed corrective measures. Groundwater sampling was conducted to monitor groundwater quality and to provide supplemental data to evaluate treatment requirements. Geotechnical evaluations were performed where necessary to evaluate potential corrective measures such as a slurry wall and siting of a Corrective Action Management Unit (CAMU) for consolidation of excavated soil and sediment and building demolition debris.

Previous investigations have identified mercury as the primary contaminant of concern (COC) in site soil, sediment, and groundwater. Chlorinated volatile organic compounds (VOCs) are also present in site groundwater. The potential presence of polychlorinated biphenyls (PCBs) in the vicinity of electrical equipment was also evaluated as part of this investigation.

1.3 Investigation Areas

Soil and sediment sampling was conducted in 17 areas. These included those areas for which MEDEP requested additional characterization and areas where delineation of contamination greater than PMPS is required for corrective measures studies. The areas were numbered as follows, starting at the northwestern side of the plant, moving in a clockwise direction:

- Area 1 - Retort Building: Located in northern corner of the central plant area, to the south of the Chloropicrin Building.
- Area 2 - Former Equipment Storage Area: Located in the northern corner of the central plant area, near monitoring well MW-403-01.

- **Area 3 - Landfill Ridge Area:** Located north of the central plant area, and north of Landfills 3 and 4.
- **Area 4 - Scrap Metal Area:** Located to the east of the central plant area, adjacent to the Coal Filter Storage Area.
- **Area 5 - Coal Filter Storage Area:** Located north and east of the central plant area and south of Landfill 4.
- **Area 6 - Nitromethane Building:** Located southeast of the plant area.
- **Area 7 - Transformer Area:** Located within the plant area, south and east of the Cell Building.
- **Area 8 - Cell Building:** Located in the central area of plant, south of the Sodium Chlorate Building.
- **Area 9 - Southerly Stream:** Stream begins in the northeastern area of the site where the flooded gravel pit is located. The stream flows west and south and ultimately discharges to the Southern Cove via the Southerly Stream Outfall.
- **Area 10 - Southern Cove:** Located south of the central plant area; receives discharge from the Southerly Stream.
- **Area 11 - Northern Ditch:** Located north of the Southerly Stream and flows east to west; the northern ditch ultimately discharges to the Penobscot River via the Northern Stormwater Outfall.
- **Area 12 – Former Equipment Storage/End of Railroad Loading Area:** Located west of the end of the railroad car loading area and south of the paved sump.

In addition to the contaminant delineation sampling of the areas described above, geotechnical investigations were performed in three areas of the site.

- **Area 13 - Proposed Slurry Wall Alignment:** Located at the base of Landfill Area 1 extending from the bedrock outcrop adjacent to the MW-401 cluster to southeast of the B-316 cluster.
- **Area 14 - Potential CAMU Site:** Located north of the Nitromethane Building and south of Landfill 2.
- **Area 15 - Potential CAMU Site:** Located north of the plant office building and west of the Nitromethane Building.
- **Area 16 - Industrial Sewer:** Located within the manufacturing plant area between the Cell Building and the Southerly Stream.

- Area 17 – Landfill 2: Located northeast of the manufacturing plant adjacent to the southerly stream.

Groundwater sampling was conducted at wells downgradient of known and potential source areas and in those areas where groundwater collection and treatment is anticipated. Groundwater samples were analyzed for parameters, which may impact groundwater treatment. The list of monitoring wells to be sampled was communicated to MEDEP and U.S. Environmental Protection Agency (EPA) during the development of a Memorandum of Understanding between MEDEP, EPA and Mallinckrodt, Inc., the former owner/operator of the Orrington facility, upon the dissolution of the HoltraChem Manufacturing Corporation (HMC).

1.4 Document Organization

The field program methodology, procedures, sampling locations, quantities and results are discussed in Section 2. Tables and Figures are presented at the end of the section. MEDEP and EPA work plan approval letters are provided as Appendix A. Soil boring logs are provided as Appendix B. Test pit excavation logs are provided as Appendix C. Geotechincal testing results are provided as Appendix D. A data Quality Assessment is provided in Appendix E.

Section 2
Investigation Methodology and Results

This section presents the field sampling methodology and results of the field sampling activities. The subsections are arranged by the area investigated and organized with the following structure: objectives, methodology, variances from the work plan, and analytical results. Tables and figures are provided at the end of the section.

2.1 Area 1 - Retort Building

Objectives

Investigate the potential presence of mercury in soil surrounding the former mercury retort building. If mercury is found, determine the vertical and lateral extent. Evaluate the contents of, and backfill around, an abandoned drain line that reportedly extends from the Retort Building to the Lined Process Lagoon.

Methodology

A total of eighteen soil borings (SB1-1 through SB1-18) were advanced in the area surrounding the Retort Building. The soil borings were advanced in a grid pattern on the east and west sides of the building. The locations of the soil borings are presented on **Figure 2-1**. Five soil borings were advanced to the east of the building (SB1-1 through SB1-5) and thirteen soil borings (SB1-6 through SB1-18) were advanced to the west of the building. The soil borings were advanced using direct push technology and advanced until till was encountered or until refusal.

Continuous soil samples were collected as the soil borings were advanced. The samples were screened for organic vapors and mercury vapors using an organic vapor monitor (OVM) and a Jerome mercury vapor analyzer, respectively. Upon completion of field screening, the soil samples were visually classified and jarred for analytical testing. Analytical samples were collected from 2-foot intervals and submitted for laboratory analysis for total mercury.

Variances from the Work Plan

The originally proposed approach for Area 1 called for the excavation of two test pits, one on each side of the retort building where doors are located and one additional test pit between the retort building and the lined process lagoon. To more accurately define the horizontal and vertical extent of mercury containing soils, a series of Geoprobe soil borings were advanced on the sides of the building where the doors were located. The work plan also anticipated the excavation of a section of drain line pipe. If the pipe was encountered, the pipe was to be removed and samples of its contents collected. Geoprobe borings were advanced in the vicinity of the drain line pipe, but the pipe was not encountered during the field activities. One test pit was excavated immediately west of the Retort Building in November 2002 at the same time that test pits were excavated to investigate the industrial sewer.

Results

The overburden materials encountered during soil boring advancement were described as medium to fine sand and silt underlain by till. Till was encountered in ten of the eighteen soil borings at depths ranging from 4 feet below ground surface (bgs) to 8 feet bgs. Bedrock was not encountered in any of the soil borings. The soil boring logs are presented in Appendix B. Stratigraphic cross sections of the soil borings were developed to provide visual representations of subsurface soil conditions. The cross section location plan and cross sections are presented as **Figures 2-2** through 2-7.

A total of 66 analytical soil samples were collected from the soil borings advanced at the Retort Building. Five duplicate samples were also collected. The analytical results are presented on **Table 2-1**. Mercury concentrations and sampling intervals are also presented on the cross sections.

Total mercury was present at detectable concentrations in 57 of the 66 samples. The three highest detected mercury concentrations were in samples collected from soil borings SB1-09 (4-6 feet) at 150 mg/kg, SB1-11 (0-2 feet) at 110 mg/kg, and SB1-04 (0-2 feet) at 77 mg/kg. Of the 57 samples with detectable concentrations of mercury, 31 contained mercury above 2.2 mg/kg and 14 contained mercury at concentrations above 10 mg/kg. In general, the highest mercury concentrations were found in the surficial soil samples and concentrations decreased with depth. As shown in the cross sections, it appears that the vertical extent of mercury containing soils was identified in all of the soil borings. The greatest depth at which mercury was detected above 2.2 mg/kg was in soil boring SB1-08 in the sample collected from 5.5 feet to 7.5 at a concentration of 11 mg/kg. The horizontal extent of mercury at concentrations greater than 10 mg/kg was delineated. As illustrated in cross sections A-A′ and E-E′ mercury was not detected above 10 mg/kg in any of the samples collected from the easternmost and westernmost soil borings.

One test pit was excavated west of the Retort Building on November 19, 2002 (HMC – ISTP-9). This test pit was excavated to visually inspect the soil beneath the asphalt paving and to look for a pipe that might lead from the Retort Building to the Lined Process Lagoon. Test pit logs are provided in Appendix C. An approximately 3-inch layer of asphalt was underlain by approximately 6 inches of wet, brown fine-medium sand. Free, elemental mercury was not observed in soil beneath the asphalt. The excavation was continued to approximately three feet below grade but no pipe was located. At approximately 1 foot below grade the stratigraphy changed to dense fine sand, some silt and gravel. The CDM and MEDEP geologists present at the time agreed that the soil appeared to be native and did not appear disturbed. Samples were collected for mercury analysis from immediately below the asphalt (HMC-ISTP-9-3″) and from a depth of 2 feet. The sample from 3 inches analyzed by Alpha Analytical Laboratories contained 8.1 mg/kg Hg and the split of this sample analyzed

at the HoltraChem Lab contained 2.5 mg/kg Hg. The sample collected at 2 feet was analyzed by the HoltraChem Lab and contained 0.056 mg/kg Hg.

2.2 Area 2 - Former Equipment Storage Area

Objectives

Evaluate the potential presence of mercury in soil associated with a used equipment storage area. Investigate to a depth of low permeability or natural soil horizon. If mercury is found, determine the vertical and lateral extent.

Methodology

Four test pits (TP2-A through TP2-D) were excavated in the used equipment storage area. The test pits were excavated along the edge of the pavement. The locations of the test pits are presented on Figure 2-1. The test pits were excavated using a Liebherr R914 rubber tire excavator to depths of approximately 2 to 6 feet bgs.

Analytical soil samples were collected from the test pits based on observations made by the field geologist. The soil samples were submitted to Alpha Analytical Labs (Alpha) of Westborough, Massachusetts for analysis of total mercury.

Variances from The Work plan

The approach for Area 2 originally proposed the excavation of three test pits. A total of four test pits were excavated during the CMS field investigation to better characterize the extent of mercury containing soils and provide coverage of the entire area. The work plan originally proposed the collection of three soil samples per test pit for mercury analysis. During the CMS field program only two samples were collected from test pits TP2-B and TP2-C as this sampling program was considered to be adequate and appropriate based on the conditions encountered in the field.

Results

Test pit logs are presented in Appendix C. A total of ten analytical soil samples were collected from the test pits based on field observations. Two duplicate samples were also collected. The analytical results are presented in Table 2-1.

Soil stratigraphy encountered in the test pits varied across the used equipment storage area. In TP2-A, asphalt was underlain by approximately five feet of compact, narrowly graded fine sand which, based on its very loose appearance after excavation, appeared to be a mechanically compacted fill. A dark brown, medium to coarse sand with gravel, which was interpreted to be native soil, was encountered at 5 feet. No lower permeability layer was encountered. Samples were collected immediately below the asphalt, at two feet below ground surface and of the native soil at 5 feet.

TP2-B was excavated north of the edge of asphalt paving adjacent to the B-315 monitoring well cluster. This excavation was limited in depth to two feet to avoid damaging the monitoring wells. To provide additional characterization of the presence or absence of mercury, Mr. John Beane of MEDEP surveyed the area using a Lumex mercury vapor analyzer prior to, during and at the maximum extent of excavation. Mr. Beane did not record elevated mercury readings with the Lumex. Soils encountered in this excavation appeared to be native.

TP2-C was excavated through interbedded sand and silt to a depth of four feet where bedrock was encountered. Samples were collected of the surficial soil (0-6"), which contained some organic material, and at one foot below ground surface. The interbedded sand and silt layers were interpreted to constitute low permeability layers. Mercury was detected at a concentration of 2 mg/kg in the surficial soil sample but was non-detect in the sample from one foot bgs.

TP2-D was excavated through interbedded fine to coarse sand to a depth of five feet where bedrock was encountered. A low permeability silt was noted at four feet below ground surface. Samples were collected of the surficial soil (0-6"), at one foot below ground surface and immediately above the silt at four feet. Mercury was detected at a concentration of 24 mg/kg in the surficial soil sample but was non-detect in both of the deeper samples.

As described above and shown in Table 2-1, total mercury was observed at detectable concentrations in just two of the soil samples. Total mercury was detected at a concentration of 2 mg/kg in the 0.5-foot sample collected from test pit TP2-C and 24 mg/kg in the 0.5-foot sample collected from TP2-D. As mercury was not detected in any of the deeper soil samples collected from the test pits, the vertical extent of mercury containing soils was delineated at the used equipment storage area.

The area where mercury may be present in soil above 2.2 mg/kg appears to be very limited. Three test pits were also excavated in the vicinity of the used equipment storage area during the Site Investigation (SI) to investigate an abandoned leach field. Soil samples collected during those excavations contained low concentrations of mercury (less than 10 mg/kg). The leach field, which was reportedly constructed of hemlock planks, was not located and is assumed to have been excavated when utility work was performed in this area. This information serves to limit the potential extent of mercury containing soils to the south. The presence of the exposed bedrock limits the extent of to the north.

2.3 Area 3 - Landfill Ridge Area

Objectives

Evaluate the vertical and lateral extent of fill placed in a former gravel pit on the north side of the landfill ridge and determine the mercury concentrations in the soil of that fill.

Methodology

The portion of the CMS field program conducted at the landfill ridge area included the advancement of two soil borings (SB3-01 and SB3-02), the excavation of three test pits (TP3-A through TP3-C), and the collection of ten surface soil samples (SS3-1 through SS3-10). A description of each of the investigation methods is presented below.

Soil Borings

The soil borings were advanced through the northern side of the fill where it was expected to be thickest to determine the extent of fill and mercury containing soils. The locations of the soil borings are presented on Figure 2-1 and on **Figure 2-8**. The soil borings were advanced using hollow stem augers to depths of 29.5 feet bgs (SB3-01) and 22 feet bgs (SB3-02).

Continual soil samples were collected as the soil borings were advanced. The soil samples were screened for organic vapors and the presence of mercury vapor using an OVM and a Jerome mercury vapor analyzer, respectively. Upon completion of field screening, the soil samples were visually classified and jarred for analytical testing. Analytical samples were collected at two-foot intervals and submitted for total mercury analysis.

Test Pits

Three test pits were excavated on the southern side of the fill to locate the vertical and lateral limits of the fill material. Observations of large trees and tree stumps, which pre-existed the former gravel pit excavation and filling were also used to help delineate the southern extent of fill. Test pits were excavated using a Liebherr R914 rubber tire excavator to depths of 8 feet bgs (TP3-A), 3 feet bgs (TP3-B), and 6 feet bgs (TP3-C). The locations of the test pits are shown on Figure 2-1.

Soil samples were collected from each of the test pits and submitted to Alpha for laboratory analysis for total mercury.

Surface Soil Samples

Surface soil samples were collected in an area where the embankment had slumped toward the Penobscot River to evaluate the presence (or absence), and extent of mercury containing soil. Ten surface soil samples were collected based on field observations and submitted for total mercury analysis.

An Interim Stabilization Measure was performed in July 2002 to move fill material from the top of the slope. Upon the completion of earthwork, seven surficial soil samples were collected to measure mercury concentrations in the soil that was relocated.

Variances from The Work plan

The approach for Area 3 did not originally include the collection of surface soil samples. As described above, soil samples were collected to evaluate the presence of mercury in the material that had slid towards the Penobscot River.

Results

Soil Borings

Two soil borings were advanced in the landfill ridge area. The soil boring logs are presented in Appendix B. The overburden materials encountered during soil boring advancement were generally described as medium to fine silt and sand. Based on field observations made during soil boring advancement the extent of fill materials was identified. A stratigraphic cross section was prepared using new and existing soil borings. The location of the cross section is shown on Figure 2-8, and the cross section detail is presented on **Figure 2-9**.

Soil samples were collected at two-foot intervals and analyzed for total mercury. A total of 25 analytical samples were collected from the two soil borings. Three duplicate samples were also collected. Table 2-1 presents the analytical results.

Total mercury was observed at detectable concentrations in 14 of the 25 samples. Of the 14 soil samples with detectable concentrations only four contained mercury at levels above 10 mg/kg. Total mercury was detected in soil boring SB3-01 at concentrations of 12 mg/kg (0-2 feet bgs) and 14 mg/kg (12-12.7 feet bgs) and at SB3-02 at concentrations of 72 mg/kg (4-6 feet bgs) and 39 mg/kg (8-10 feet bgs). In general, the highest mercury concentrations were found at shallow depths. The greatest depth at which mercury was observed above the method detection limit was in the sample collected from 12 to 12.7 feet bgs (14 mg/kg) at SB3-01 and in the sample collected from 14 to 16 feet bgs (0.93 mg/kg) at SB3-02.

Test Pits

Three test pits were excavated in the landfill ridge area to evaluate the extent of fill and mercury containing soils. The test pit logs are presented in Appendix C. The fill materials encountered during the test pit excavations were described as brown, fine to coarse sand and silt with little to some gravel and little to some clay. Test pit TP3-B is included in the stratigraphic cross section presented on Figure 2-9. This test pit encountered native material along the west edge, which was described as dry, brown, medium to coarse sand, some gravel. Based on visual observations, it appears that the extent of fill materials was encountered at test pit TP3-A at a depth of 6 feet bgs, in the eastern half of test pit TP3-B at 3 feet bgs, and at 6 feet bgs at TP3-C.

Soil samples were collected from the test pits and submitted for laboratory analysis for total mercury. A total of 8 analytical samples were collected. One duplicate sample was also collected. The results of the soil sampling are presented in Table 2-1.

As shown in the table, total mercury was present at detectable concentrations in samples collected from all three of the test pits. Total mercury was detected above 10 mg/kg in the surficial samples collected from test pit TP3-A only. The samples collected at a depth of 1-foot bgs from the eastern and western portions of the test pit contained total mercury at concentrations of 14 mg/kg and 11 mg/kg. In general, mercury concentrations were highest in the shallow samples and decreased with depth.

Surface Soil Samples

Ten surface soil samples were collected from the embankment slope and the intertidal area at the foot of the slump in November 2001. The samples were collected from 0 to 0.5 feet bgs. The results of the surface soil sampling are presented in Table 2-1.

Total mercury was observed at detectable concentrations in just two of the soil samples. Soil samples SS3-4 contained mercury at a concentration of 0.56 mg/kg and soil sample SS3-7 contained mercury at a concentration of 0.38 mg/kg. Total mercury was not detected above 1 mg/kg in any of the embankment slope samples.

After completion of the Interim Stabilization Measure, seven surficial soil samples (0-6") were collected from the soil pile prior to it being covered with topsoil and seeded. Soil sample analytical results are presented on Table 2-1. Total mercury concentrations in the soil pile sampled ranged from 5 to 70 mg/kg and averaged 33 mg/kg.

2.4 Area 4 - Scrap Metal Area

Objectives

Evaluate the potential presence of mercury in soil associated with a former scrap metal accumulation area. Investigate down to a low permeability or natural soil horizon. If mercury is found, determine the vertical and lateral extent.

Methodology

Ten test pits (TP4-A through TP4-J) were excavated and five soil borings (SB4-1 through SB4-5) were advanced in the scrap metal area as part of the CMS field program. A description of each of the investigation methods is presented below.

Test Pits

The test pits were excavated using a Leibherr R914 rubber tire excavator. The test pit locations are presented on Figure 2-1.

Soil samples were collected from the test pits based on field observations made by the geologist. Analytical samples were submitted to the Alpha for analysis for total mercury.

Soil Borings

Two of the soil borings (SB4-01 and SB4-02) were advanced using hollow stem augers, and three of the soil borings (SB4-03 through SB4-05) were advanced using direct push technology (Geoprobes). The locations of the soil borings are on Figure 2-1. Soil borings SB4-01 and SB4-02 were advanced until a layer of low permeability was encountered. Soil borings SB4-03 through SB4-05 were each advanced to 4 feet bgs.

Soil samples were collected as the soil borings were advanced. The samples were screened for organic vapors using an OVM and for mercury vapor using a Jerome mercury vapor analyzer. Analytical soil samples from soil borings SB4-01 and SB4-02 were collected at two-foot intervals. Analytical soil samples from soil borings SB4-03 through SB4-05 were collected from 0 to 0.5 feet and 1 to 1.5 feet bgs. Analytical soil samples were submitted to Alpha for analysis of total mercury.

Variances from The Work plan

The original approach for Area 4 proposed the excavation of five test pits. During the CMS field investigation, five additional test pits were added to better define the extent of mercury containing soils in the area. The work plan proposed the collection of three soil samples from the 0 to 1 foot interval and the collection of two samples at depth. Instead, analytical soil samples were collected based on conditions encountered in the field to most accurately characterize the material and the area.

The CMS work plan originally proposed the advancement of direct push soil borings in the area of fill. Instead, soil borings were advanced in this area using hollow stem augers because of the potential that fill material would result in poor recoveries or refusal with the Geoprobe unit. Three additional direct push borings were advanced to the west of the fill area to evaluate the vertical extent of mercury containing soils where surface soil sampling had identified mercury during the SI.

Results

Test Pits

The test pit logs are presented in Appendix C. Overburden materials encountered during the excavation of the test pits were described as generally consisting of medium to fine sand and silt. Peat was encountered in test pits TP4-A, TP4-B, TP4-C, TP4-D, and TP4-E at depths of 5 to 7 feet bgs. Debris and rubble material was encountered in test pits TP4-A, TP4-F, TP4-H, and TP4-I. Stratigraphic cross sections were prepared for the test pits. **Figure 2-10** presents the cross section locations and **Figures 2-11** through **2-14** present the cross section details.

Analytical soil samples were collected from the test pits and submitted for total mercury analysis. A total of 36 soil samples were collected from the ten test pits. Four duplicate soil samples were also collected. The results of the soil sampling are presented in Table 2-1.

Total mercury was detected in 30 of the 36 soil samples. Total mercury above 10 mg/kg was detected in 13 soil samples. The three highest mercury concentrations were detected in samples collected from TP4-C at a concentration of 180 mg/kg (1 foot), TP4-D at a concentration of 380 mg/kg (0.5 foot) and at TP4-H at a concentration of 160 mg/kg (1 foot). The sample collected at 6 feet bgs from the western end of test pit TP4-A contained mercury at a concentration of 18 mg/kg. Test pit TP4-J was only excavated to a depth of 1-foot bgs. One of the samples collected at one foot from TP4-J detected mercury at a concentration of 40 mg/kg.

Soil Borings

Soil boring logs are presented in Appendix B. The soils encountered during soil boring advancement generally consisted of brown, medium to fine sand and silt. Stratigraphic cross sections for the soil boring logs are presented on Figures 2-11 through 2-14.

Analytical soil samples were collected from the soil borings and analyzed for total mercury. A total of 20 samples were collected from the five soil borings. The analytical results are presented on Table 2-1.

Total mercury was detected in 15 of the soil samples. Of the 15 samples with detectable concentrations, three samples exceeded 10 mg/kg. All three of the samples were collected from soil boring SB4-01. Total mercury was detected at a concentration of 26 mg/kg in the sample collected from 0 to 2 feet bgs, at 39 mg/kg in the sample collected from 4 to 6 feet bgs, and at 11 mg/kg in the sample collected from 6 to 8 feet bgs. The deepest sample collected from soil boring SB04-01 (6 to 8') contained mercury at a concentration of 11 mg/kg. In general, the higher mercury concentrations are detected at shallow depths and decrease with depth.

2.5 Area 5 - Coal Filter Storage Area

Objectives

Evaluate the potential presence of mercury in soil associated with a storage area containing five coal-filled brine filters. Investigate down to a low permeability or natural soil horizon. If mercury is found, determine the vertical and lateral extent. Collect samples to document the concentrations of mercury present in and around the coal filters.

Methodology

Test pits were excavated in the Coal Filter Storage Area as part of the Area 4 – Scrap Metal Area investigation described previously. Four additional samples were collected from four of five of the coal-filled brine filters and submitted to Alpha for total mercury analysis as part of the Area 5 investigation.

Variances from The Work plan

The work plan originally proposed the excavation of three test pits in the Coal Filter Storage Area. The test pits were excavated in the Coal Filter Storage Area as part of the Scrap Metal Area investigation.

Coal samples were to be collected from each of the coal-filled brine filters (Coal Filters). During the fieldwork it was determined that only four of the five tanks were accessible, therefore, only four coal samples were collected.

Results

Discussion of test pits excavated in the vicinity of the coal filters was included in the previous discussion of the Area 4 - Scrap Metal Area. In summary, the results were similar as those observed throughout the rest of the Scrap Metal Area fill and do not indicate that the Coal Filters have resulted in additional contamination.

Four samples were collected of coal contained in the brine filters and submitted for total mercury analysis. The results of the coal sampling are presented in **Table 2-2.** As shown, mercury was detected above at concentrations of 2.4 mg/kg, 24 mg/kg, 68 mg/kg, and 55 mg/kg.

2.6 Area 6 - Nitromethane Building

Objectives

Evaluate if equipment storage around the Nitromethane Building has resulted in a release of mercury to the soil and, if so, determine the vertical and lateral extent. Evaluate if materials stored in the Nitromethane Building contain mercury.

Methodology

Six hand augered soil borings (SS6-1 through SS6-6) were advanced in the area of the Nitromethane Building. Three of the soil borings (SS6-1 through SS6-3) were advanced to the east of the building and three of the soil borings (SS6-4 through SS6-6) were advanced to the west of the building. The locations of the soil borings are shown on Figure 2-1. Each of the soil borings was advanced to a depth of 1.5 feet bgs.

Soil samples were collected from the soil borings and submitted to Alpha for total mercury analysis. The analytical samples were collected from 0 to 0.5 feet bgs and number 1 to 1.5 feet bgs.

In addition, samples of the graphite material stored in drums in the Nitromethane Building were collected. Samples were collected from each of the types of storage containers observed (small metal drums, medium size metal drums and wooden boxes).

Variances From The Work plan

The approach for the investigation at the Nitromethane Building originally proposed the collection of three analytical soil samples from each of the hand augered soil borings. To be consistent with the rest of the CMS and SI investigations, two analytical soil samples were collected from each of the six soil borings.

Results

Twelve analytical soil samples were collected from the six hand augered soil borings advanced the Nitromethane Building. Soil boring locations are presented on **Figure 2-15**. The results of the soil sampling are presented in Table 2-1. As shown in the table, total mercury was detected in seven of the 12 samples. Total mercury was not detected above 1 mg/kg in any of the samples.

Four samples were collected of graphite contained in drums and wood boxes stored in the Nitromethane building. The results of the graphite sampling are presented on Table 2-2. As shown in the table, mercury was not detected in any of the four graphite samples analyzed.

2.7 Area 7 - Transformer Area

Objectives

Evaluate if releases of dielectric fluid from electrical equipment has resulted in PCB contamination of soil and/or sediment.

Methodology

Twelve hand augered soil borings (SS7-01 through SS7-12) were advanced in the Transformer Area. Four of the soil borings (SS7-1 through SS7-4) were advanced near individual transformers located along the Cell Building. Boring locations were selected where exposed soil was present within the fenced and largely paved transformer enclosures. Three soil borings (SS7-5, SS7-6, & SS7-7) were advanced in an unpaved triangular area north of the transformers adjacent to the Cell Building. Three of the soil borings (SS7-8 through SS7-10) were advanced inside the fenced transformer yard located to the east of the Cell Building and soil borings SS7-11 and SS7-12 were advanced in surface drainages to the northeast and to the southeast of the transformer yard. The locations of the soil borings are presented on **Figure 2-16**. Each of the soil borings was advanced to a depth of the 1.5 feet bgs.

Soil samples were collected from the hand augered soil borings and analyzed for PCBs. Analytical soil samples were collected from 0-0.5 feet and 1-1.5 feet bgs. An additional soil sample was collected from the 1.5-2 foot interval in soil boring SS7-05.

Variances from The Work plan

The work plan originally proposed the advancement of eight hand augered soil borings. A total of 12 hand augered soil borings were advanced during the CMS field

investigation to provide adequate coverage of the areas where the presence of PCBs might be anticipated based on field observations.

Results

A total of 23 analytical soil samples were collected from the hand augered soil borings advanced at the Transformer Area and analyzed for PCBs. Three duplicate samples were also collected. The analytical results are presented in **Table 2-3.**

As shown, PCBs were detected in five of the 23 samples. PCBs were detected in samples collected from soil borings SS7-01, SS7-03, and SS7-04. These soil borings were located adjacent to transformers along the southeast wall of the Cell Building. Detected concentrations ranged from 0.51 mg/kg to 14 mg/kg. At each of these locations, the highest PCB concentrations were detected in the 0 to 0.5 foot interval and concentrations decreased to less than 1 mg/kg in the 1 to 1.5 foot interval (averaging the parent and duplicate samples from SS7-4).

2.8 Area 8 - Cell Building

Objectives

Evaluate the potential presence of mercury in soil beneath and in the vicinity of the Cell Building. Investigate down to a layer of low permeability or to a maximum depth of 10 feet bgs.

Methodology

Eight soil borings were advanced around the perimeter of the Cell Building. The locations of the soil borings are presented on Figure 2-1. The soil borings were advanced using direct push technology. The soil borings were advanced until a material of low permeability was encountered or until refusal.

Continuous samples were obtained from a 1-inch diameter, acetate-lined Geoprobe sampler and screened for organic vapors and mercury vapors using an OVM and Jerome mercury vapor analyzer. Upon completion of field screening, the soil was logged and visually classified. Analytical soil samples were collected at 2-foot intervals and submitted to Alpha for total mercury analysis.

Results

Soil boring logs are presented in Appendix B. The overburden soil materials in this area generally consisted of coarse to fine sand and silt underlain by till. Where technically feasible, the soil borings were advanced until the till layer or another layer of low permeability was encountered. Till was encountered in four of the eight borings, at depths ranging from 4 to 8 feet bgs. Stratigraphic cross sections were generated for the soil borings advanced at the Cell Building. The locations of the cross sections are presented on Figure 2-16 and the cross section details are presented on **Figures 2-17** through **2-20.**

Soil samples were collected at 2-foot intervals and analyzed for total mercury. A total of 41 analytical samples were collected from eight soil borings. Three duplicate soil samples were also collected and analyzed. The analytical results are presented in Table 2-1 and on the cross sections.

Mercury was detected in 39 of the 41 analytical samples at concentrations ranging from 0.27 mg/kg to 2,500 mg/kg. Mercury was detected above 10 mg/kg in 29 of the samples and above 2.2 mg/kg in 32 of the samples. The three highest mercury concentrations were found in soil boring SB8-02 at concentrations of 2,200 mg/kg (0-2 feet), 1,100 mg/kg (2-4 feet), and 2,500 mg/kg (7.5-9.5 feet). Soil boring SB8-02 was located on the north side of the Cell Building near an in-ground sump.

Mercury was detected above 2.2 mg/kg in soil samples collected from all of the soil borings with the exception of SB8-06. Soil boring SB8-06 was advanced approximately 30 feet off of the western corner of the Cell Building. The highest mercury concentration detected in samples collected from SB8-06 was 1.30 mg/kg.

In general, the highest mercury concentrations were detected in the surficial sands encountered in all of the soil borings. As shown in the cross sections, the sand unit was thicker in the soil borings located along the northern wall of the Cell Building (0 to 8 feet bgs) and decreases in the borings located along the western and southern walls (0 to 3.7 feet bgs). Of the 29 samples with mercury concentrations above 10 mg/kg, 15 were collected from this shallow sand unit. Three additional samples exceeding 10 mg/kg were collected from sand and silt (SB8-04) and one sample was collected from a sand and till interface (SB8-02).

Soil samples collected from the less permeable units were generally detected at lower concentrations. Of the 8 samples collected from till, only two samples were detected above 10mg/kg. Two samples were collected from a clay layer encountered in soil boring SB8-01. Although the 8-10 foot sample contained mercury at 16 mg/kg, the sample collected from 10 to 12 feet bgs detected mercury at 3 mg/kg.

With the exception of soil borings SB8-02 and SB8-07, the mercury concentrations decrease with depth. Mercury concentrations below 10 mg/kg were observed in the deepest samples collected from SB8-01, SB8-03, SB8-06, and SB8-07. Soil borings SB8-04 and SB8-05 encountered refusal and could only be advanced to 3.7 and 7.5 feet bgs, respectively. Although soil borings SB8-02 and SB8-08 were advanced into a till layer, mercury was still detected above the 10 mg/kg in the deepest samples.

2.9 Area 9 - Southerly Stream

Objective

Evaluate the width and depth of soil/sediment removal required to meet the PMPS of 2.2 mg/kg total mercury.

Methodology

Hand augered soil borings were advanced to evaluate the horizontal and lateral extent of mercury containing soil/sediment. The soil borings were advanced as a series 12 of transects (SD-A through SD-L) across the width of the Southerly Stream. The locations of the transects are presented on Figure 2-1. At least five hand augered soil borings were advanced at each of the transects, with the exception of SD-B where three borings were advanced because the stream channel was very narrow. Soil borings were generally advanced to a depth of 1.5 feet bgs.

Analytical samples were collected from the soil/sediment and submitted to Alpha for laboratory analysis of total mercury. Where possible, soil/sediment samples were collected from the 0 to 0.5 foot interval and the 1 to 1.5 foot interval at each of the locations.

Variances From The Work plan

The approach for the investigation conducted at the Southerly Stream proposed the collection of up to three soil samples per soil boring for mercury analysis. During the CMS and SI investigations, two samples were generally collected from each soil boring due to refusal on the hand auger.

Results

Sixty-three hand augered soil borings were advanced as 12 transects along the Southerly Stream. Soil samples were collected from the 0 to 0.5 foot and 1 to 1.5 foot intervals and analyzed for total mercury. Cross sections presenting the sampling intervals and results are presented on **Figures 2-21** through **2-23**. A total of 113 analytical soil samples were collected. Seven duplicate samples were also collected. The results of the analytical sampling are presented in **Table 2-4**.

Total mercury was detected in all of the samples collected from the Southerly Stream except six. Total mercury was detected above 2.2 mg/kg in 63 of the samples. None of the samples collected from transect SD-A, the most upstream transect (upstream of Landfill 2), contained mercury at concentrations greater than 2.2 mg/kg. At least one sample in each of the transects below that contained mercury at concentrations greater than 2.2 mg/kg. In general, the highest mercury concentrations were detected in the 0 to 0.5 foot interval. Of the 51 samples with total mercury detected above 2.2 mg/kg, 36 were collected from the shallow interval.

2.10 Area 10 - Southern Cove

Objective

Evaluate the extent of sediment requiring removal to meet the PMPS (Average < 2.2 mg/kg Hg, dry weight, averaged over no more than ¼ acre).

Methodology

Sediment samples were collected in three transects extending from the shoreline and sedge beds toward and beyond a sample location at the southern end of the Southern Cove where 41 mg/kg total mercury was detected in previous sampling. Five sediment cores were collected per transect. The transect locations are shown on **Figure 2-24**. A minimum of two sediment samples were collected per core. The -01 interval was collected of the surficial sediment (0.0 – 0.2 feet) and the -02 interval was collected from 0.8 to 1.0 feet. If the thickness of soft sediment was greater than 1.5 feet, a third sample was collected from 1.5 to 2.0 feet below the top of sediment.

Variances from the Approved Work Plan

Additional samples were collected at greater depth if sediment thickness exceeded 1.5 feet.

Results

Analytical results of the Southern Cove sediment sampling are presented on **Table 2-5**. A total of 36 sediment samples were collected. Three duplicate samples were also collected. Concentrations ranged from non-detect to 68 mg/kg dry weight. Only two samples contained concentrations greater than 10 mg/kg and ten contained concentrations greater than or equal to 2.2 mg/kg. These samples were located in the same general area as the SI sample, which contained 41 mg/kg. Concentrations less than 2.2 mg/kg were documented in the sedge deposits closer to the shore.

The percent solids of the sediment samples ranged from 22 to 89 percent. The samples with the low percent solids (<50%) represent organic rich mudflat deposits. Samples with high percent solids (>70%) represent the underlying sand deposits. Samples with percent solids in between these values (>50%, <70%) were typically collected from the transition between mudflat mud and underlying sand. In this sampling as was noted for the rest of the mudflat, the samples with relatively high percent solids content typically have low mercury concentrations.

2.11 Area 11 - Northern Ditch

Objective

Evaluate the width and depth of soil/sediment removal required to meet the PMPS of 2.2 mg/kg total mercury.

Methodology

Hand augered soil borings were advanced to evaluate the horizontal and lateral extent of mercury containing soil/sediment. The soil borings were advanced as a series 5 of transects (ND-A through ND-E) across the width of the Northern Ditch. The locations of the transects are presented on Figure 2-1. At least five hand augered soil borings were advanced at each of the transects, with the exception of ND-D and ND-E where three borings were advanced because the stream channel was very

narrow. Soil borings were generally advanced to a depth of 1.5 feet bgs, however, refusal on rip-rap was often encountered at or before 1.5 feet along transect ND-A.

Analytical samples were collected from the soil/sediment and submitted to Alpha for laboratory analysis of total mercury. Soil/sediment samples were collected from the 0 to 0.5 foot interval and the 1 to 1.5 foot interval at each of the locations.

Seven test pits (TP11-A through TP11-G) were excavated in the vicinity of the Northern Ditch to evaluate the presence and extent of fill and to collect samples to characterize the mercury content of the fill. The test pit locations are shown on **Figure 2-25**. Five test pits (TP11-A through TP11-E) were excavated on the east side of the Northern Ditch and two test pits (TP11-F and TP11-G) were excavated on the western side of the Northern Ditch. Analytical results of the mercury sampling are presented in Table 2-1 and test pits logs are provided in Appendix C.

Variances From The Work plan

It was not possible to collect the second depth interval sample at many locations along the ND-A transect due to hand-auger refusal on rip-rap. Additional samples were collected in some locations to provide additional characterization.

Based on the presence of fill adjacent to the Northern Ditch identified during the SI, test pit excavations were performed to investigate the extent of the fill and the concentrations of mercury present.

Results

Streambed Transects

Twenty-one hand augered soil borings were advanced as 5 transects along the Northern Ditch. Soil samples were collected from the 0 to 0.5 foot and 1 to 1.5 foot intervals and analyzed for total mercury. Cross sections showing the sampling intervals and results are presented on **Figure 2-26**. A total of 38 analytical soil samples were collected. Four duplicate samples were also collected. The results of the analytical sampling are presented in Table 2-4.

Mercury was detected in all of the Sediment/soil samples collected from the Northern Ditch at concentrations ranging from 1.2 mg/kg to 910 mg/kg. Concentrations above 2.2 mg/kg were detected in all but 5 of the samples analyzed. In general, the highest concentrations were detected in the surficial samples. However, in many cases the deepest sample collected was still above 2.2 mg/kg mercury. This may be due to contaminant transport beyond 1.5 feet due to infiltration of surface water through the soils (the Northern Ditch is a losing stream in its upper reaches) or it may be due to the presence of fill located in excess of 1.5 feet in the ditch and vicinity. The highest mercury concentrations were detected in transect ND-A, which is the most upgradient location. Mercury concentrations decrease in the downgradient transects.

Test Pit Excavations

On the eastern side of the ditch, fill was observed to a depth of approximately 6 feet in TP11-A and up to 8 feet in TP11-B. Fill was comprised of up to three distinct layers. The top 1.0 to 1.5 feet was characterized as dry, brown, fine to medium sand, little gravel, and little silt. This was underlain by a hard dry, mottled gray - brown fine sand and silt, which was in turn underlain by gray - brown, medium to coarse sand, with some debris fill. Sampling results indicate that only the surficial deposits contained mercury at detectable concentrations. Mercury was detected at 0.5 mg/kg (2.0 feet) in TP11-A, at 8.4 mg/kg (2.0 feet) in TP11-C, and at 14.0 (4.0) feet in TP11-E. The sample collected from the TP11-E was the only sample detected above 10 mg/kg Hg.

Two test pits were excavated west of the Northern Ditch. Surfical soils were described as dry, brown to dark brown, fine to medium sand, some gravel. Soils at depth were described as dry, mottled brown, fine to medium sand, some gravel and occasional inclusions of blue - gray silt. Native material underlying fill at a depth of 4 to 6 feet was described as dry, brown, fine to coarse sand, some fine to medium gravel. Again, sampling indicates that only the surficial samples at these locations contained elevated concentrations of mercury. As shown in the table two samples were detected above 10 mg/kg. Mercury was detected at 17.0 mg/kg (0.5 feet) in the sample collected from TP11-F and at 14.0 mg/kg (1.0 feet) in the sample collected from TP11-G.

2.12 Area 12 – Former Equipment Storage/End of Railroad Loading Area

Objectives

Evaluate the potential presence of mercury in soil associated with an area reportedly used to store equipment at the end of the Railroad Loading Area. Investigate down to a low permeability or natural soil horizon. If mercury is found, evaluate the vertical and lateral extent.

Methodology

Three test pits (TP12-A through TP12-C) were excavated in the Used Equipment Storage Area. The locations of the test pits are shown on Figure 2-1. The test pits were excavated to depths of approximately 3 to 5 feet. A total of seven soil samples were collected for mercury analysis.

Variances from the Approved Work Plan

The ground surface at the end of the Railroad Loading Area is characterized by a berm at the end of the tracks, a flat area near the industrial sewer manhole, and steep slopes to the south and west. During a site visit with representatives of EPA, MEDEP and CDM, no area where equipment could have been stored was identified. It was decided to excavate test pits on and reaching down from the top of the flat surface.

Results

Three test pits were excavated at the Used Equipment Storage/End of Railroad Loading Area. The test pit logs are presented in Appendix C. Soil at the ground surface was described as dry, brown, fine to medium sand. The surficial soils were underlain by dry, light brown, hard (dense) fine sand, some gravel, and little silt. An interbedded sand and silt layer was identified in TP12-C at a depth of 4 feet bgs.

Seven samples were collected from the three test pits based on observations made by the field geologist. The results of the mercury analysis are presented on Table 2-1. Of the seven samples only one soil sample from Area 12 contained elevated concentrations of mercury. The sample collected from 2 feet bgs from TP12-A contained 26 mg/kg of mercury.

2.13 Area 13 - Proposed Slurry Wall Alignment

Objective

Evaluate geotechnical and hydraulic properties of the soils along the proposed alignment and into which the slurry wall will be keyed into. Evaluate the suitability of soil along the alignment for use in a barrier wall slurry and for compatibility with potential slurry admixtures.

Methodology

Three soil borings (SB13-01 through SB13-03) were advanced approximately six feet into the till layer. Samples were collected of the till interval using three inch split-spoons samplers equipped with plastic liners. Grain size analyses were performed on four samples collected from soil boring SB13-01, two samples collected from AB13-02, and one sample collected from SB13-03. Permeability testing was performed on till samples from each of the soil borings.

Results

Soil boring logs are provided in Appendix B. From soil boring SB13-01 grain size analyses were performed on two samples collected from sand units (15 to 17 feet and 35 to 37 feet) and two samples collected from the till (51 to 53 feet and 57 to 59 feet). From soil boring SB13-02, grain size analyses were performed on a sample from a sand layer (40 to 42 feet) and a sample from the till (59 to 61 feet). One sample from the till observed in soil boring SB13-03 was submitted for grain size analysis. Grain size distribution profiles are provided in Appendix D. As shown in the profiles, the samples collected from units described as till were comprised of approximately 50%-60% silt/clay.

Vertical hydraulic conductivity tests were performed on till samples collected from SB13-01 (51 to 53 feet and 57 to 59 feet), SB13-02 (57 to 61 feet), and SB13-03 (37 to 39 feet). Hydraulic conductivity testing results are provided in Appendix D. Hydraulic conductivity values ranged from 3.2×10^{-07} cm/sec to 5.7×10^{-08} cm/sec.

2.14 Areas 14 and 15 - Potential CAMU Sites

Objective

Evaluate soil stratigraphy, depth to bedrock and depth to groundwater.

Methodology

Two areas were characterized: an area behind the Nitromethane Building and the area of the parking lot behind the Plant Office Building. Two test pits were excavated in the area behind the Holes Methane Buildings. Test pit TP14-A encountered refusal at 5 feet bgs and test pit TP14-B was excavated to 8 feet bgs. Three test pits (TP15-A, -B, & -C) were excavated in the area of the parking lot and two test pits (TP15-D & -E) were excavated behind the Nitromethane Building. Two of the test pits TP15-A and TP-15B were excavated to a depth of 10 feet bgs and test pit TP-15C was excavated to a depth of 6 feet bgs.

Three piezometers were also installed. Two piezometers (PZ15-2 & -3) were installed behind the plant office building and one piezometer (PZ15-1) was installed along the edge of the parking lot near the railroad tracks. Piezometer PZ15-01 was installed to a depth of 18 feet bgs and piezometers PZ15-02 & -03 were each installed to 19 feet bgs. The piezometer logs are provided in Appendix B and the test pit logs are provided in Appendix C. The locations of the test pits and piezometers are shown on Figure 2-1.

Variances from the Approved Work Plan

The approach for Areas 14 and 15 originally proposed the installation of up to seven piezometers. Based on the conditions encountered in the field, piezometers were not installed at all locations. Test pit excavations were used behind the Nitromethane Building and around the parking lot north of the plant office building to evaluate soil conditions and the presence or absence of groundwater close to the surface.

Results

Two test pits were excavated behind the Nitromethane Building. Dense till including boulders was encountered near the ground surface at each location. The excavator encountered refusal on till and boulders and the Geoprobe contractor indicated that the material was too dense for his equipment to install piezometers in this location. Groundwater was not encountered at either location.

Three test pits were excavated around the parking lot behind the plant office building. Hard silty clay was encountered from close to the ground surface to a depth of 10 feet in two of the excavations (TP15-A and TP15-B). A sample of the hard silty clay was collected for grain size and permeability analyses. Test pit TP15-C excavated in the vicinity of the plant office building encountered a layer of crushed stone at four feet below ground surface and then encountered the blue-gray silty clay. This excavation was terminated at 6 feet bgs. Although samples were moist in the silty clay material, groundwater was not observed flowing into the excavations.

Three piezometers were installed around the parking lot north of the plant office building in November 2001 (PZ-1 through PZ-3). Water levels were collected in November 2002. The water elevations ranged from 1.9 feet to 7.4 feet below ground surface (PZ-1, 7.4 bgs; PZ-2, 1.9 bgs; and PZ-3, 5.55 bgs).

2.15 Area 16 - Industrial Sewer

Objective

Investigate the presence or absence of free phase elemental mercury in the pipe bedding of portions of the Industrial Sewer.

Methodology

Test pits were excavated adjacent to selected locations of the Industrial Sewer. Excavations extended to the base of the pipe bedding associated with the Industrial Sewer. One additional test pit was excavated to the west of the Retort Building. Test pit locations are shown on **Figure 2-27**. Samples were collected from beside and/or below the invert of the industrial sewer pipe and visually inspected for the presence or absence of free phase elemental mercury. Headspace and total mercury laboratory analyses were performed on each sample.

Variances from the Approved Work Plan

Eight of the nine proposed test pit excavations adjacent to the industrial sewer were completed. Test pit location ISTP-3 was not excavated because this location had previously been excavated to cut and plug the industrial sewer.

The on-site HoltraChem laboratory was not able to provide clear jars of sufficient size to contain soil samples for visual inspection, headspace screening and subsequent laboratory analyses. Therefore, soil samples were collected in approximate one-quart plastic containers. The containers were sealed with aluminum foil for headspace screening. Aliquots for laboratory analyses were obtained from the plastic one-quart containers.

Results

Industrial Sewer test pit analytical results are provided in **Table 2-6**. Soil headspace concentrations ranged from non-detected (Jerome Meter detection limit reported as 0.001 mg/m3) to 0.216 mg/m3. Laboratory analytical results of samples from adjacent to the industrial sewer ranged from 0.11 mg/kg (ISTP-2 at 4') to 31.45 mg/kg (ISTP-8 at 4'). Headspace concentrations did not show a close correlation to on-site laboratory analytical results. Four samples were forwarded to Alpha for total mercury analysis. Alpha concentrations were similar to but slightly higher than the value reported for the corresponding sample by the HoltraChem lab.

Elemental mercury was not observed in any of the 22 soil samples collected adjacent to and/or below the industrial sewer nor in the two samples collected west of the

Retort Building. The concentrations of mercury in Industrial Sewer and Retort Building test pit soil samples are two orders of magnitude less than soil samples collected adjacent to the Cell Building were elemental mercury was observed.

2.16 Area 17 - Landfill 2 Groundwater Sampling

Objective

Evaluate if mercury is leaching out of Landfill 2 and migrating to the Southerly Stream.

Methodology

Collect groundwater samples from well points installed between Landfill 2 and the Southerly Stream. Analyze samples for dissolved mercury and dissolved sodium and chloride.

Variances from the Approved Work Plans

Well point WP-12 was damaged and could not be sampled.

Results

Samples were obtained from 16 well points located around Landfill 2. Dissolved mercury was not detected in any of the 16 samples (detection limit = 0.0005 mg/L). Sodium was detected at concentrations ranging from 21 to 220 mg/L. Chloride was detected at concentrations ranging from 9.3 to 240 mg/kg. The highest sodium and chloride concentrations were detected in well points WP-10 through WP-17.

2.17 Groundwater Monitoring

Objective

Monitor groundwater quality and provide supplemental data to evaluate treatment requirements.

Methodology

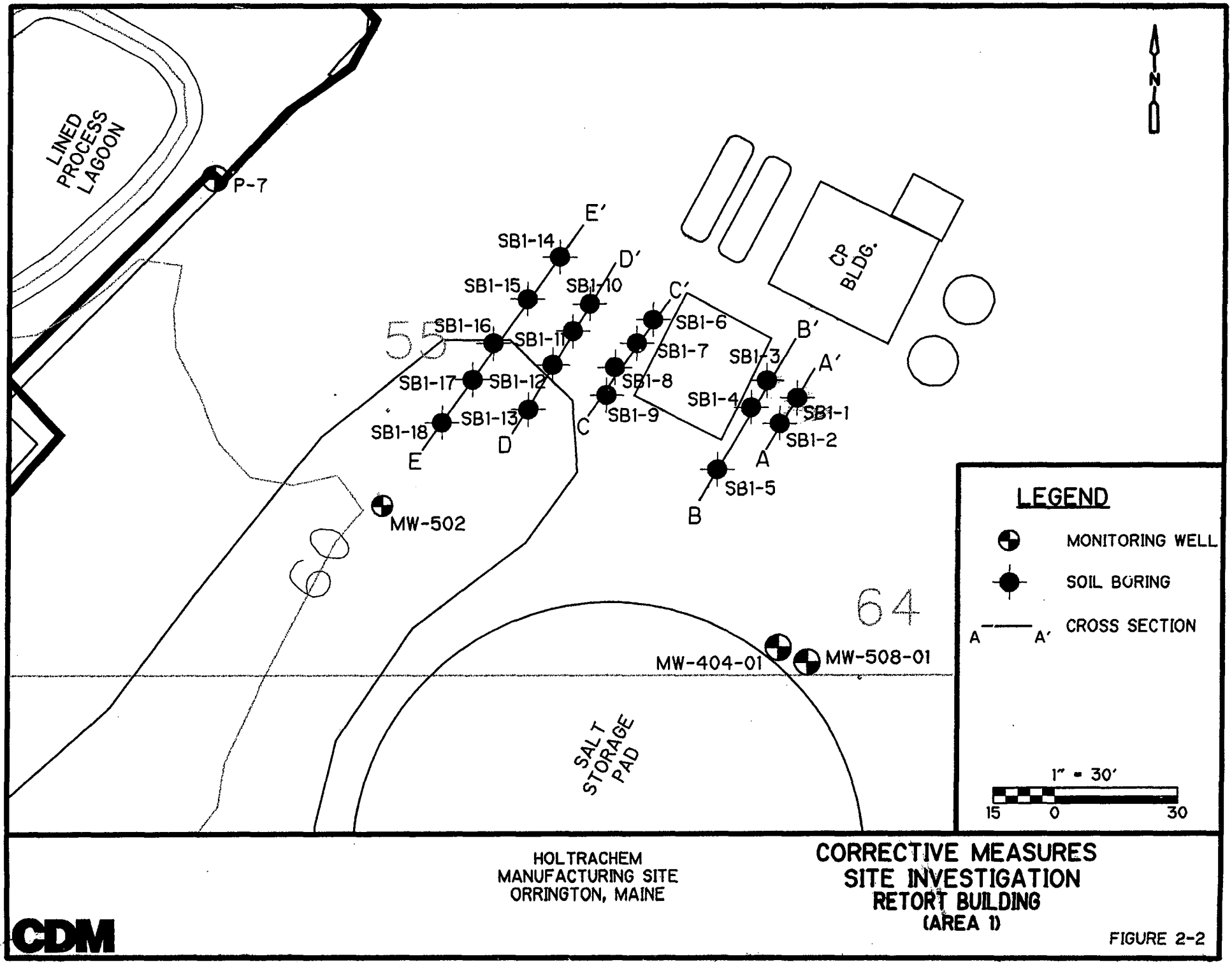
Groundwater samples were collected from 31 select wells throughout the site. All of the groundwater samples were submitted to Alpha for analysis for total and dissolved mercury. Select groundwater samples were also analyzed for the following parameters: alkalinity, chloride, total organic carbon, hardness, sulfate, dissolved iron, dissolved manganese, dissolved silica, dissolved silica, and VOCs. Field parameters including temperature, specific conductance, dissolved oxygen, pH, oxidation-reduction potential, and turbidity were measured as the wells were purged and before sampling.

Results

Groundwater samples were collected from 31 monitoring wells located throughout the HoltraChem site. Three duplicate samples were also collected. Dissolved

mercury was detected in 15 of the groundwater samples at concentrations ranging from 0.0016 mg/L to 0.3259 mg/L. The highest concentration of dissolved mercury was detected in GW-512-01. VOCs were detected in 20 of the groundwater samples. VOC concentrations ranged from 4.62 ug/L in GW-B306-B2 to 37,150 ug/L in GW-B316-01.

Figures



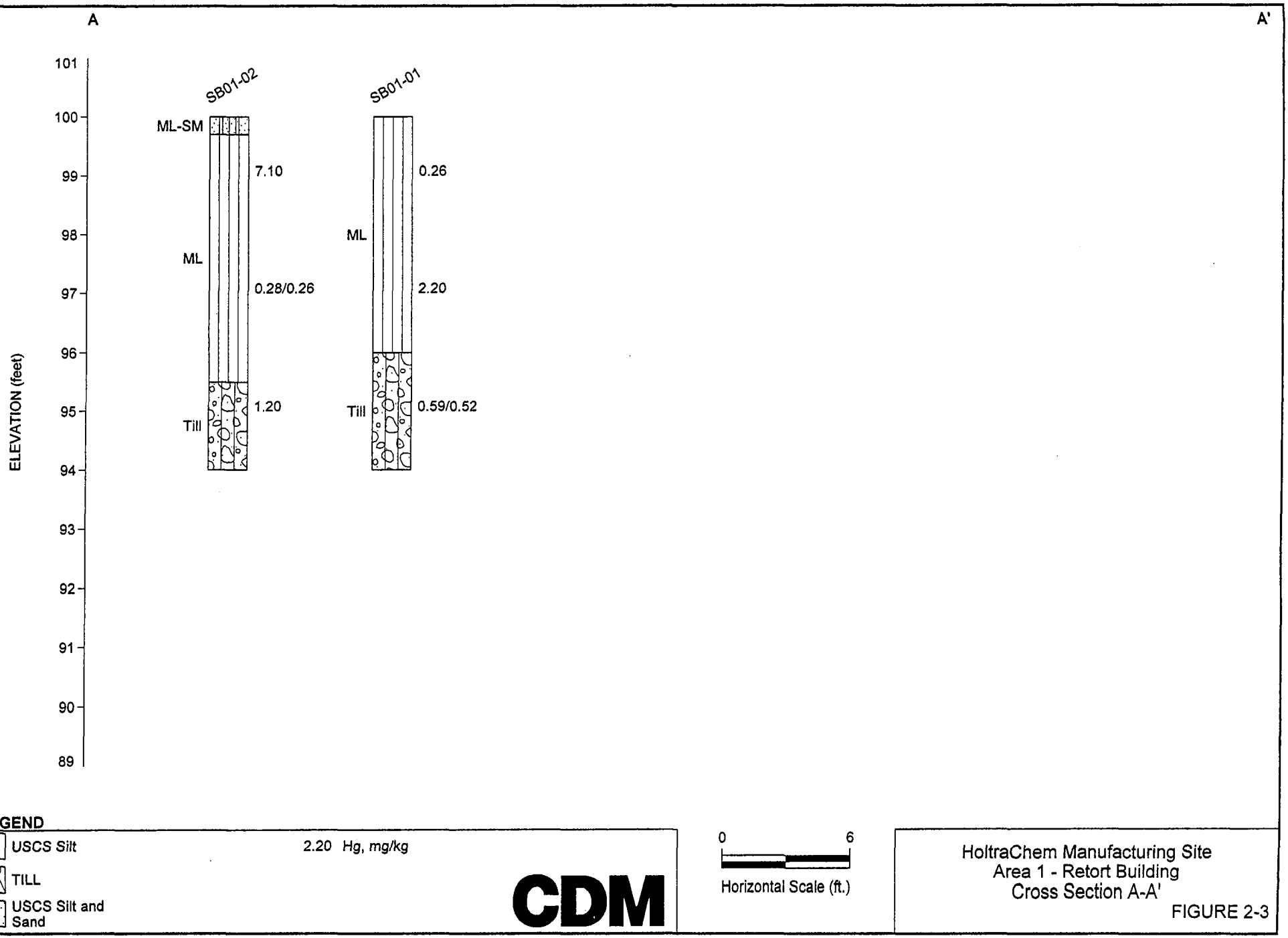
HOLTRACHEM
MANUFACTURING SITE
ORRINGTON, MAINE

CORRECTIVE MEASURES
SITE INVESTIGATION
RETORT BUILDING
(AREA 1)

FIGURE 2-2

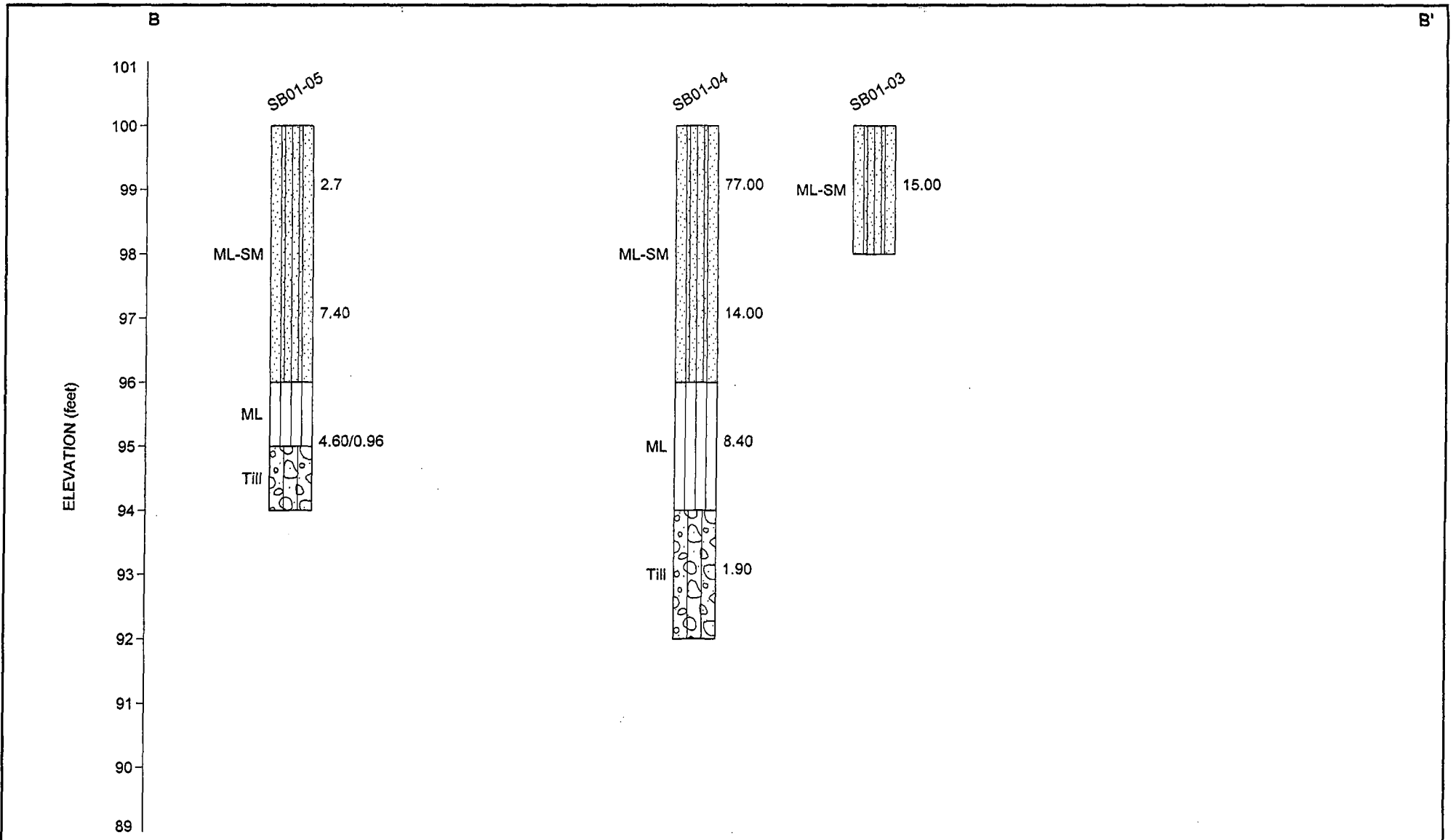
CDM

Q:\CAM_IHW\0654\FIG2-2B.DWG



HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee

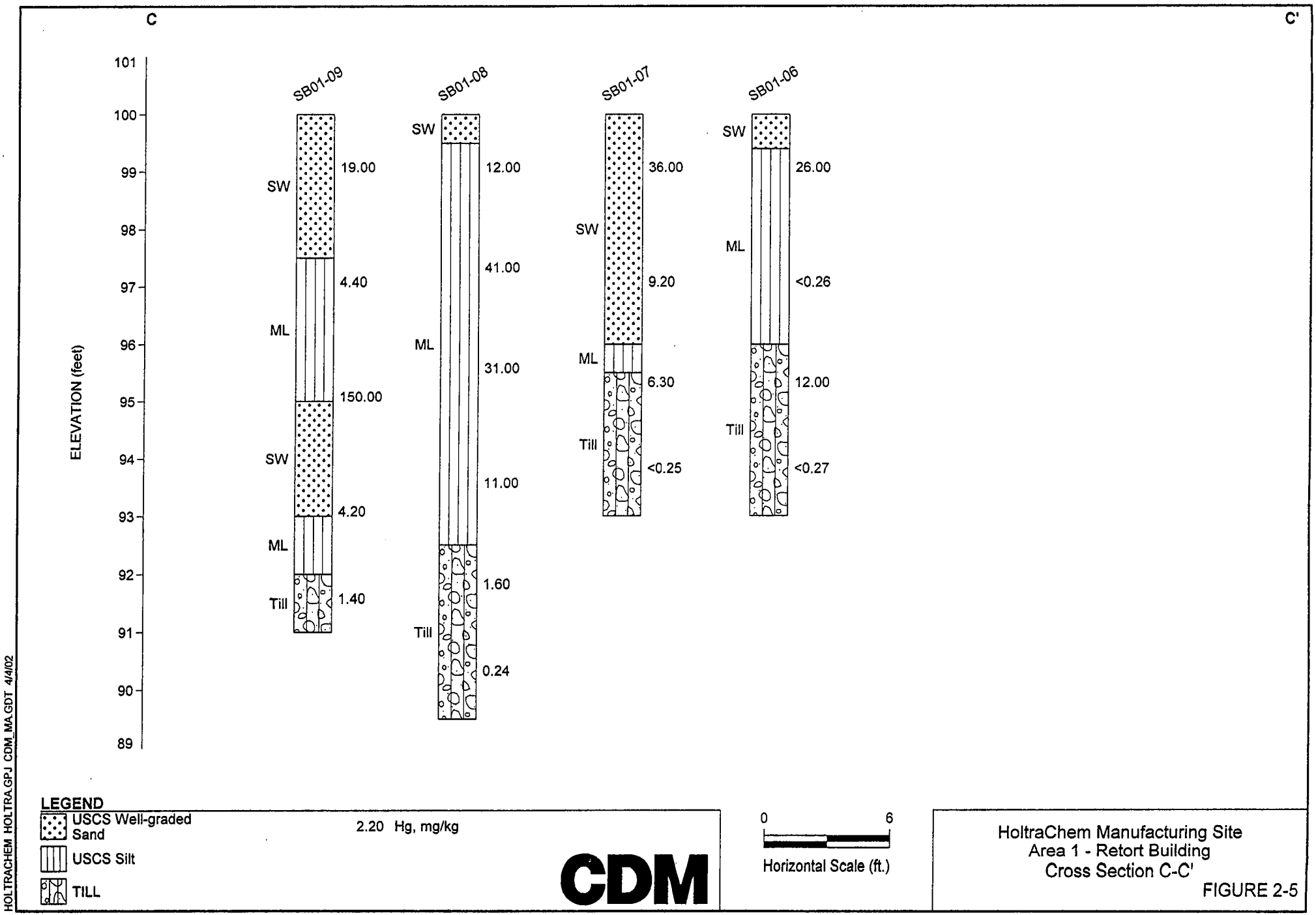


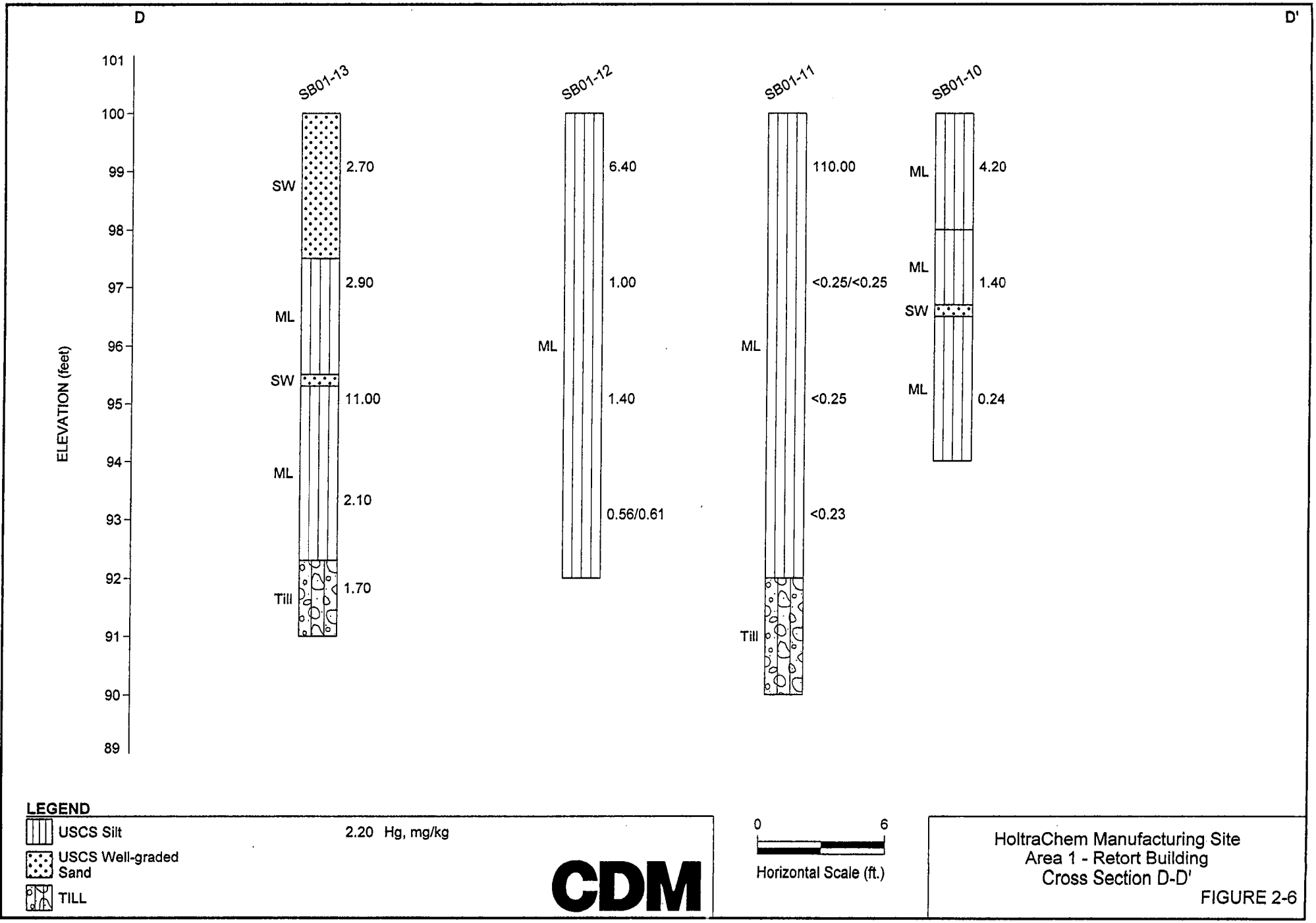
HoltraChem Manufacturing Site
Area 1 - Retort Building
Cross Section B-B'

FIGURE 2-4

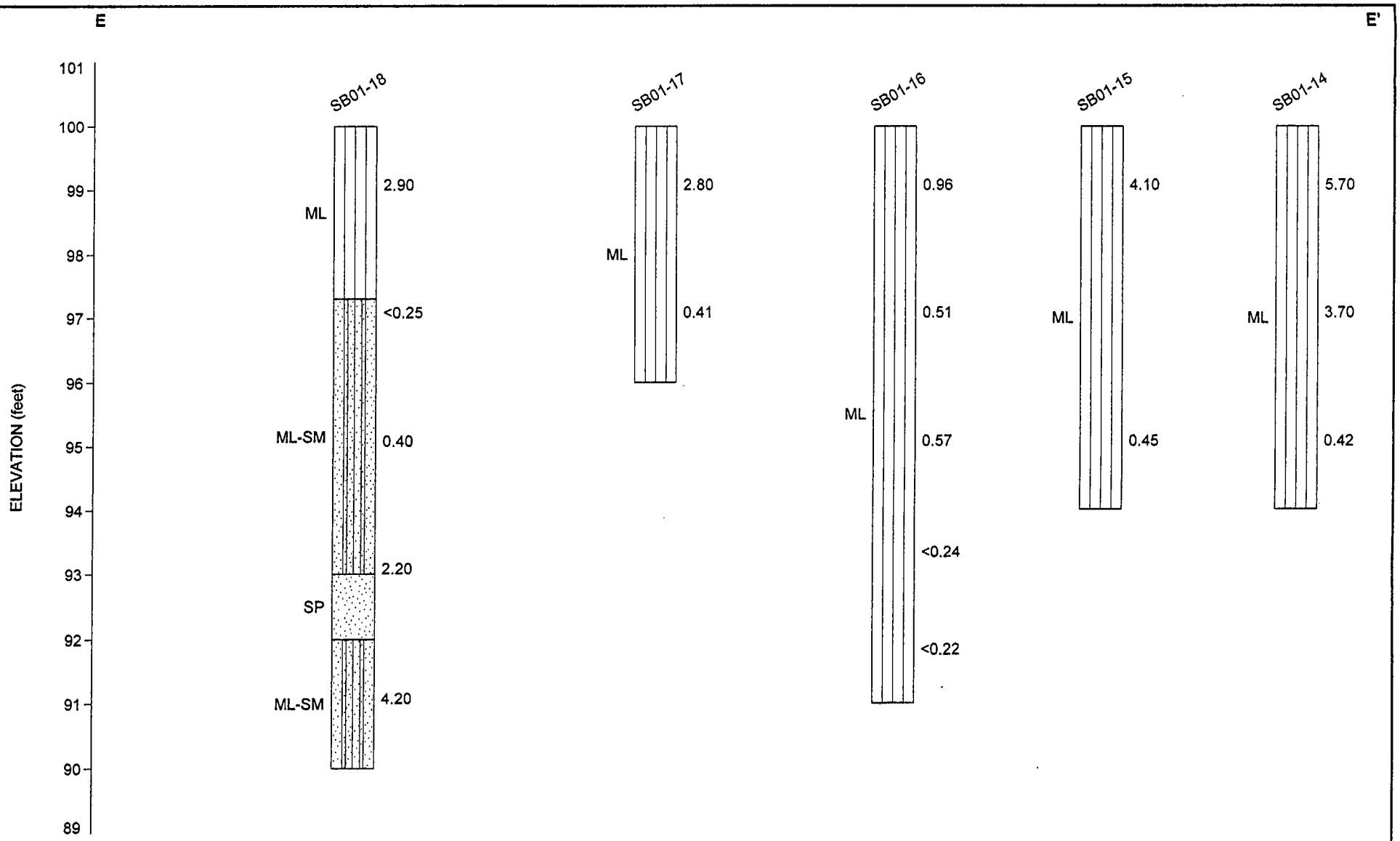
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee


C
C'
ELEVATION (feet)
101
100
99
98
97
96
95
94
93
92
91
90
89
SB01-09
SW
19.00
ML
4.40
SW
150.00
SW
4.20
ML
ML
1.40
Till
SB01-08
SW
12.00
ML
41.00
ML
31.00
11.00
Till
1.60
Till
0.24
SB01-07
SW
36.00
SW
9.20
ML
ML
6.30
Till
<0.25
SB01-06
SW
26.00
ML
<0.26
12.00
Till
Till
<0.27
LEGEND
USCS Well-graded Sand
USCS Silt
TILL
2.20 Hg, mg/kg
0
6
Horizontal Scale (ft.)
CDM
HoltraChem Manufacturing Site
Area 1 - Retort Building
Cross Section C-C'
FIGURE 2-5
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02
Camp Dresser & McKee


D
D'
ELEVATION (feet)
101
100
99
98
97
96
95
94
93
92
91
90
89
SB01-13
SW
2.70
ML
2.90
SW
11.00
ML
2.10
Till
1.70
SB01-12
ML
6.40
1.00
1.40
0.56/0.61
SB01-11
ML
110.00
<0.25/<0.25
<0.25
<0.23
Till
SB01-10
ML
4.20
ML
1.40
SW
ML
0.24
LEGEND
USCS Silt
USCS Well-graded Sand
TILL
2.20 Hg, mg/kg
0
6
Horizontal Scale (ft.)
CDM
HoltraChem Manufacturing Site
Area 1 - Retort Building
Cross Section D-D'
FIGURE 2-6
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02
Camp Dresser & McKee

CDM0012826



LEGEND

- USCS Silt
- USCS Silt and Sand
- USCS Poorly-graded Sand

2.20 Hg, mg/kg

CDM

0 6

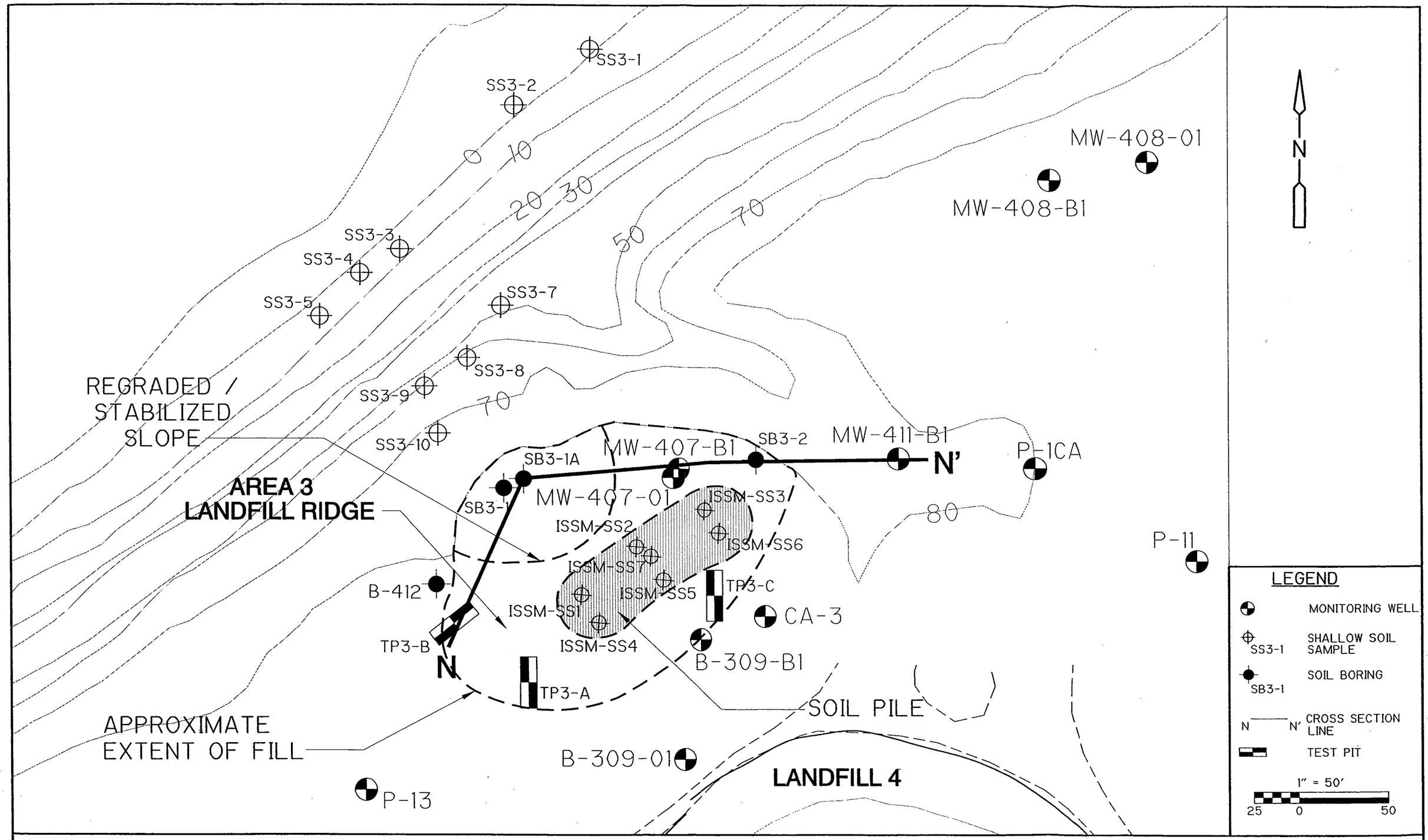
Horizontal Scale (ft.)

HoltraChem Manufacturing Site
Area 1 - Retort Building
Cross Section E-E'

FIGURE 2-7

HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee



Q:\CAM_IHW\0654\FIG2-2F.DWG

HOLTRACHEM MANUFACTURING SITE
ORRINGTON, MAINE

CORRECTIVE MEASURES SITE INVESTIGATION
LANDFILL RIDGE (AREA 3)

CDM

FIGURE 2-8

CDM0012828

Q:\CAM_IHW\0654\FIG2-2J.DWG

CDM

STRATIGRAPHIC CROSS SECTION N - N'

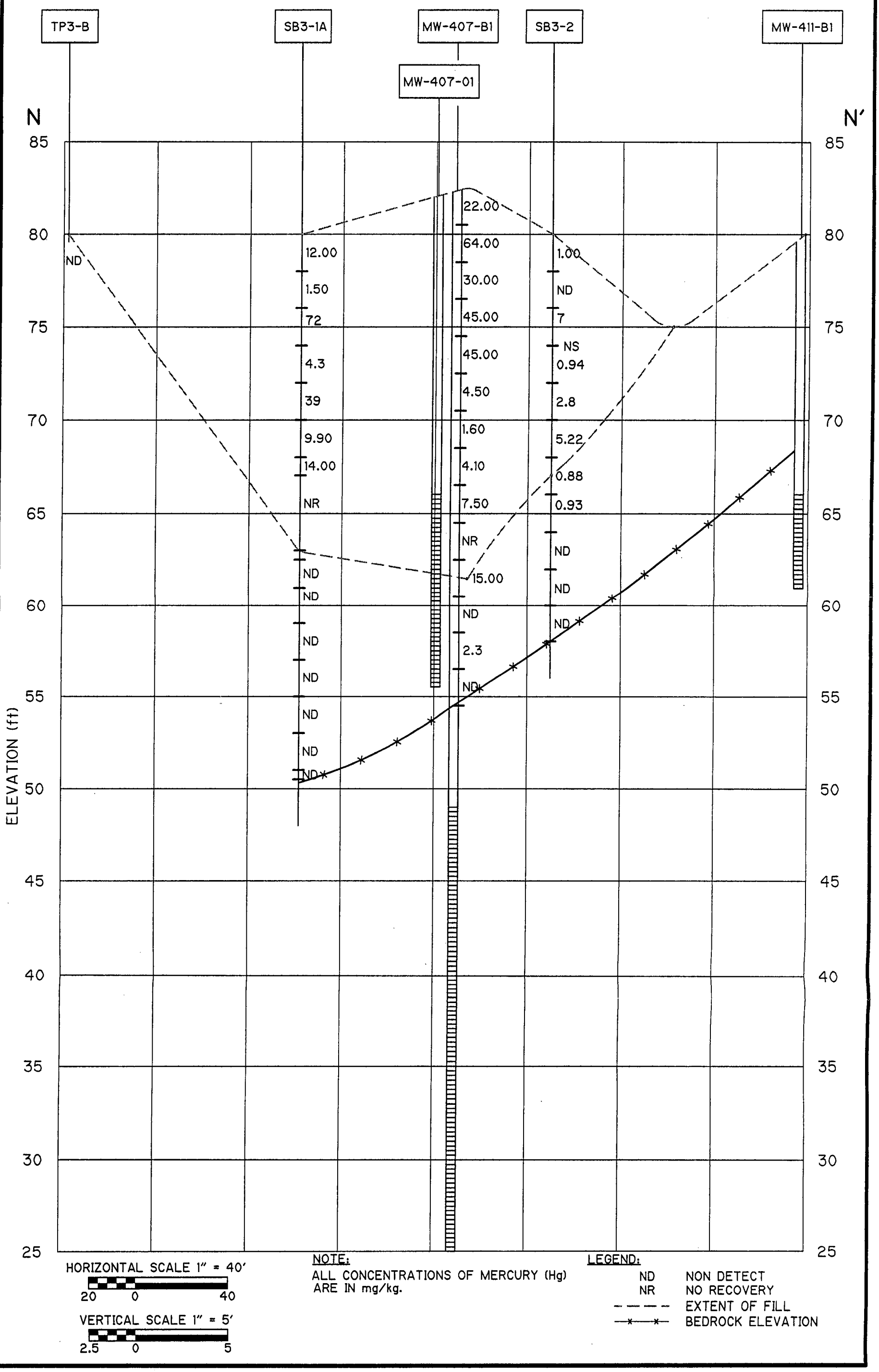
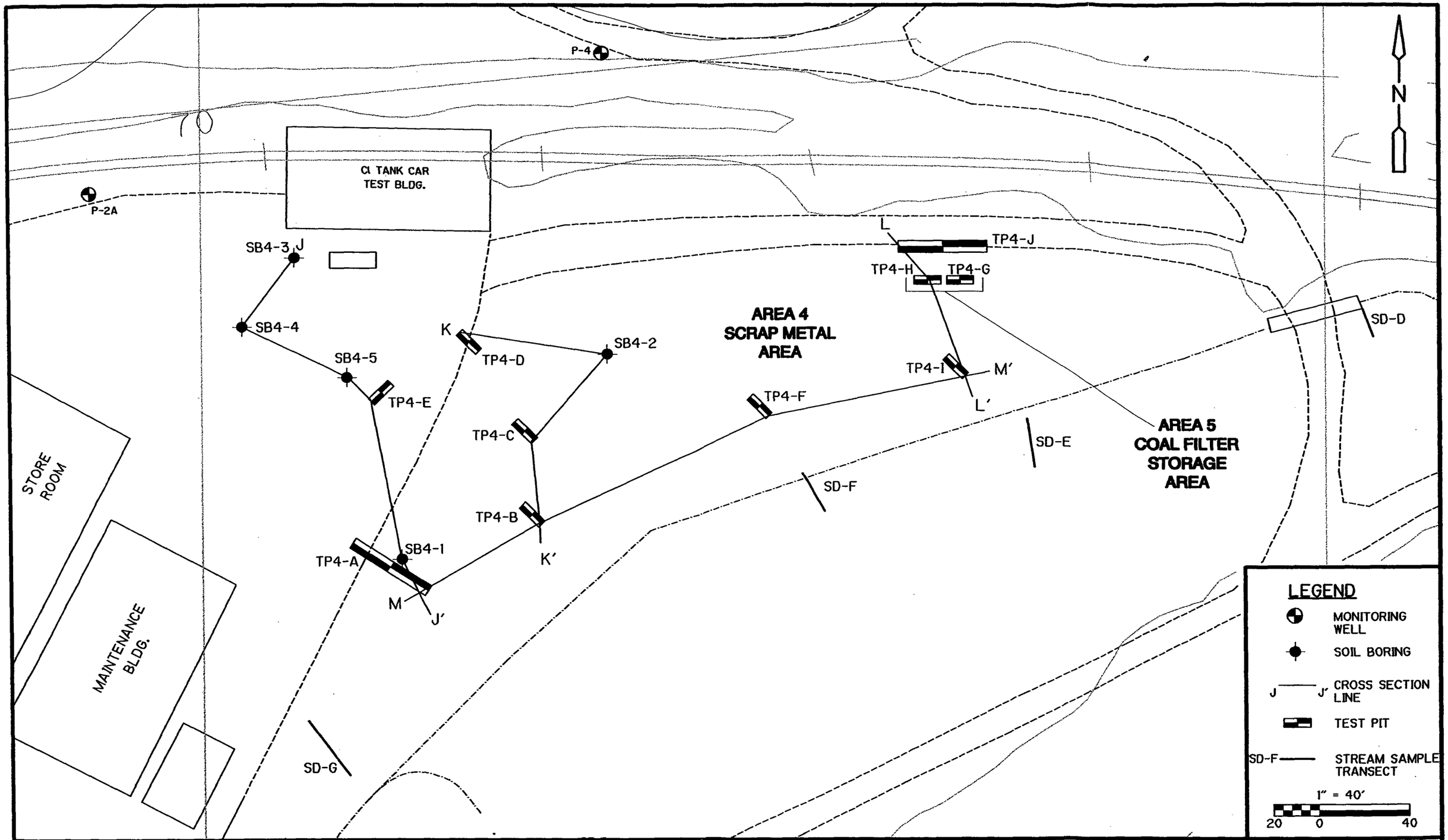


FIGURE 2-9

CDM0012829



HOLTRACHEM MANUFACTURING SITE ORRINGTON, MAINE

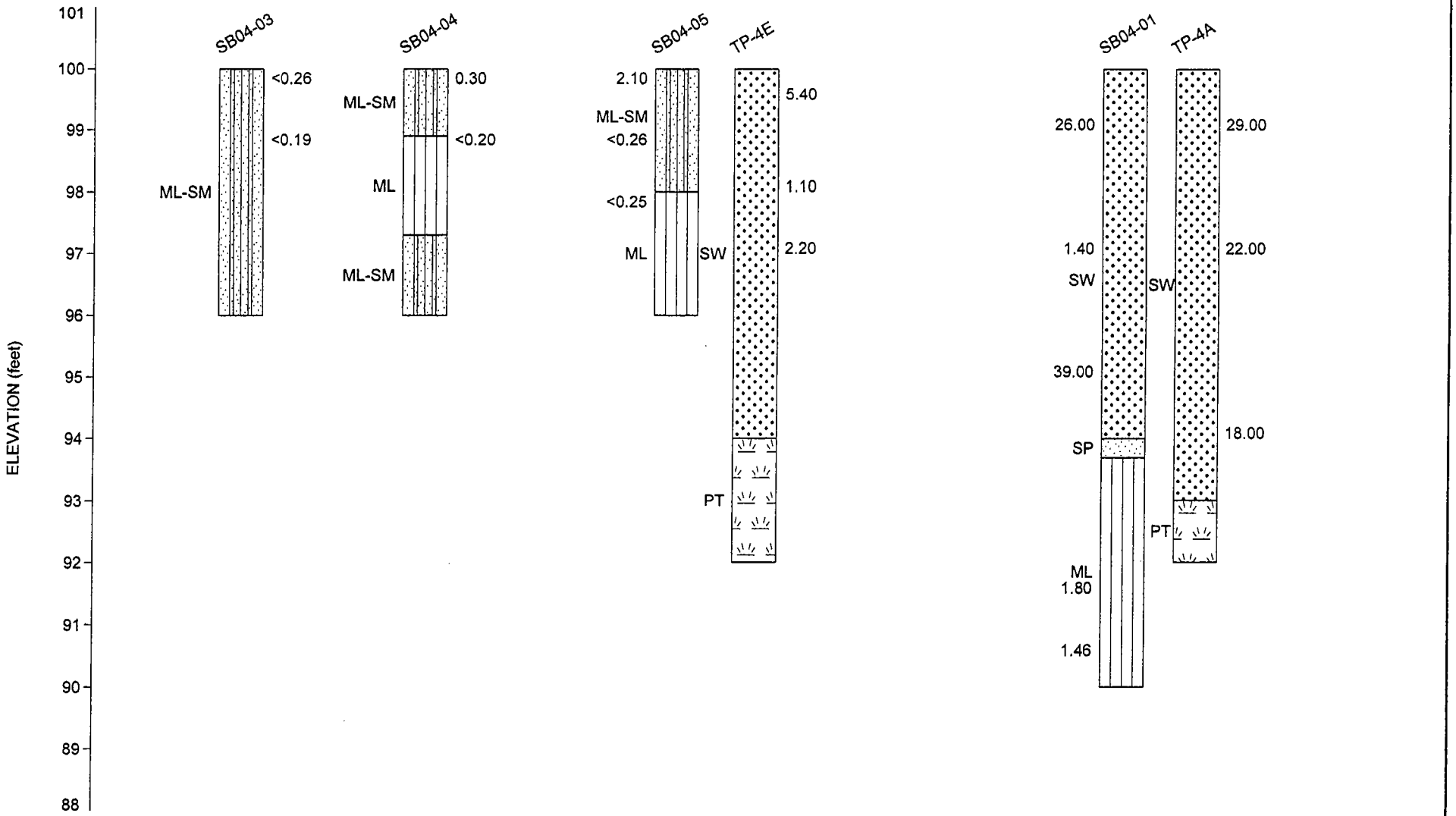
CORRECTIVE MEASURES SITE INVESTIGATION

SCRAP METAL AND COAL FILTER STORAGE AREAS (AREAS 4 & 5)

CDM

FIGURE 2-10

Q:\CAM_IHW\0654\FIG2-2D.DWG



LEGEND

- USCS Well-graded Sand
- USCS Poorly-graded Sand
- USCS Silt
- USCS Silt and Sand
- USCS Peat

2.20 Hg, mg/kg

0 30

Horizontal Scale (ft.)

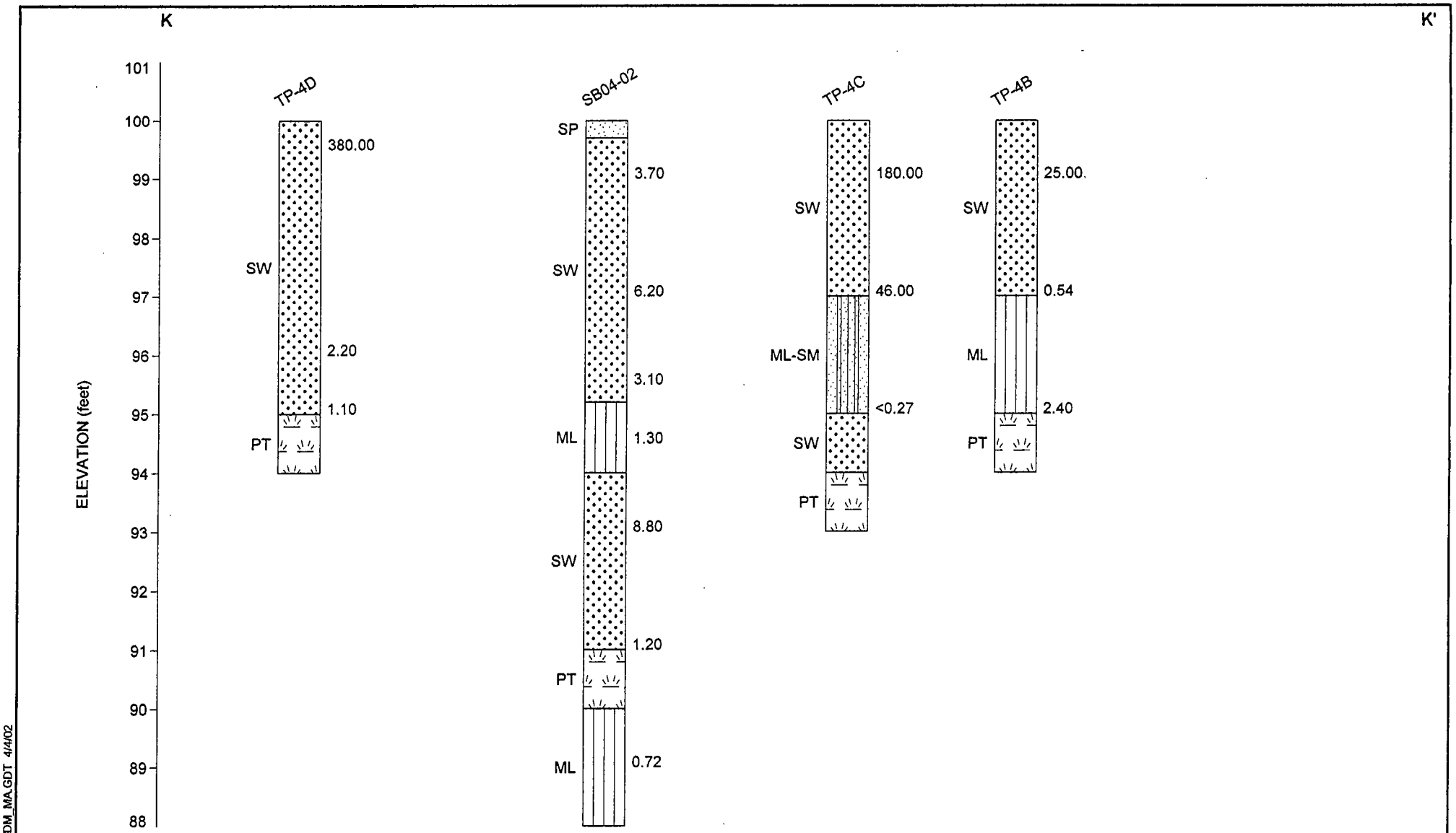
CDM

HoltraChem Manufacturing Site
Areas 4 & 5 - Scrap Metal and Coal Filter Areas
Cross Section J-J'

FIGURE 2-11

HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee



LEGEND

- USCS Poorly-graded Sand
- USCS Well-graded Sand
- USCS Silt
- USCS Peat
- USCS Silt and Sand

2.20 Hg, mg/kg

0 30

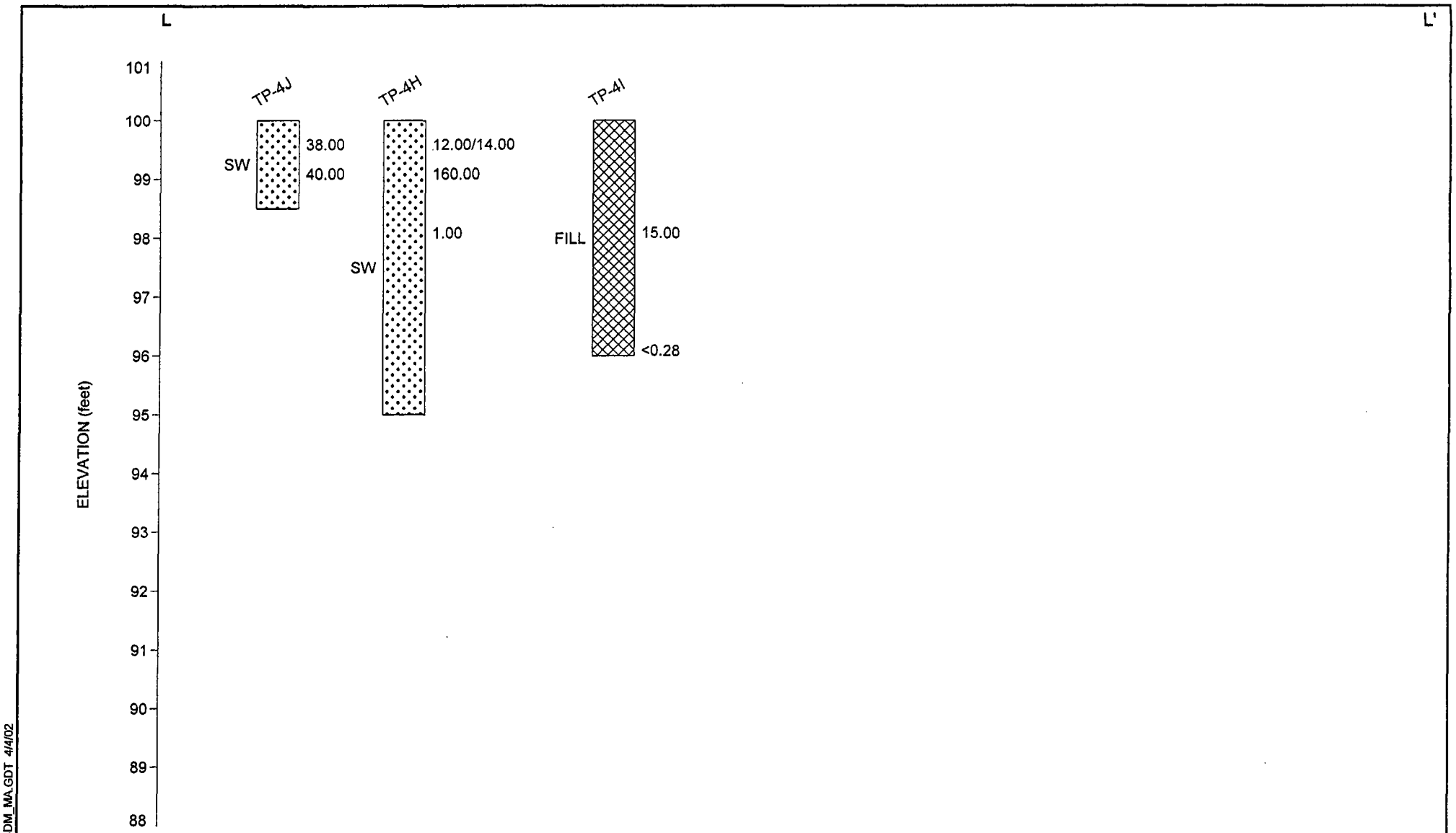
Horizontal Scale (ft.)

CDM

HoltraChem Manufacturing Site
Areas 4 & 5 Scrap Metal and Coal Filter Areas
Cross Section K-K'
FIGURE 2-12

HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee



LEGEND

USCS Well-graded Sand

Fill

2.20 Hg, mg/kg

0 30

Horizontal Scale (ft.)

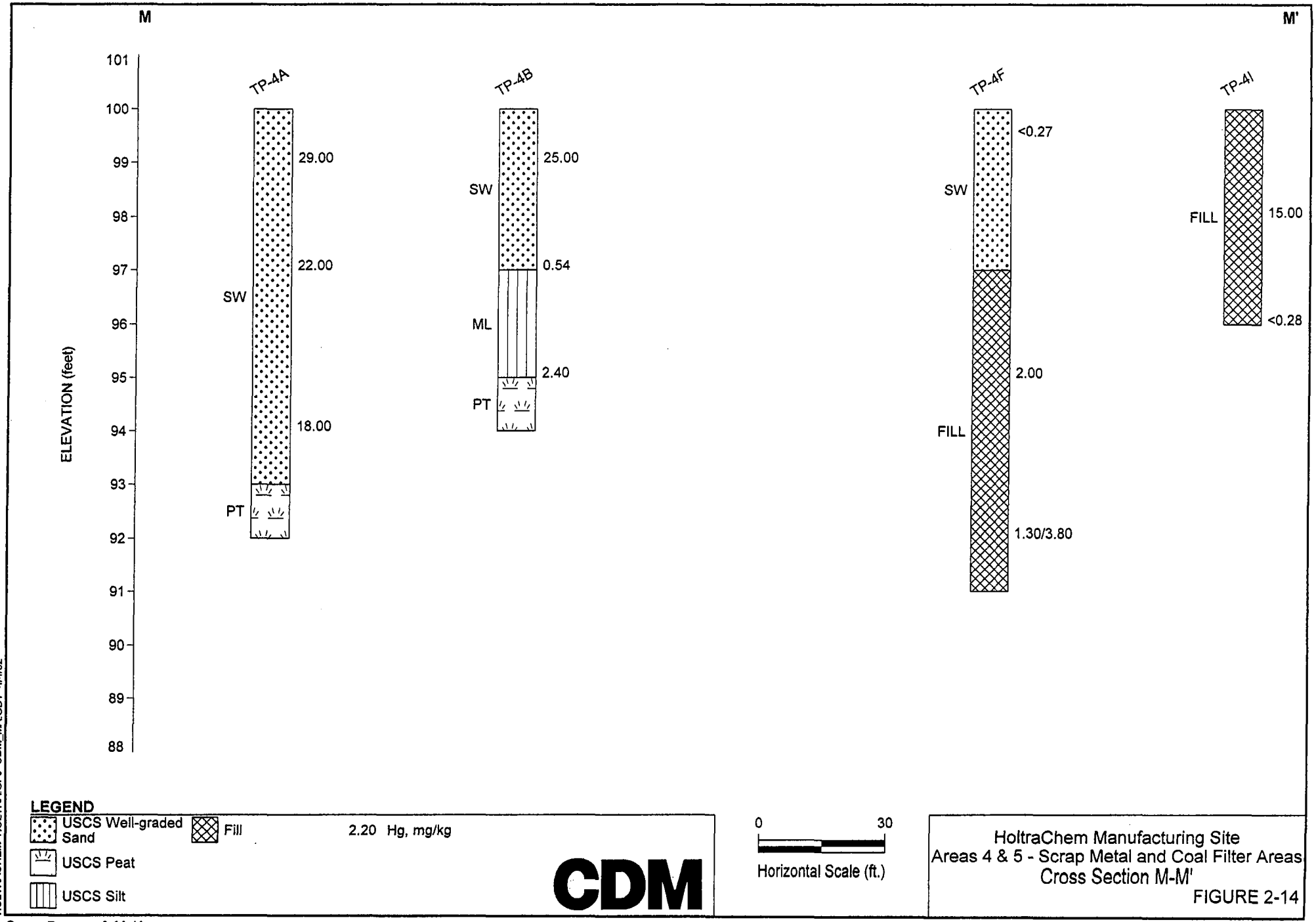
CDM

HoltraChem Manufacturing Site
Areas 4 & 5 Scrap Metal and Coal Filter Areas
Cross Section L-L'

FIGURE 2-13

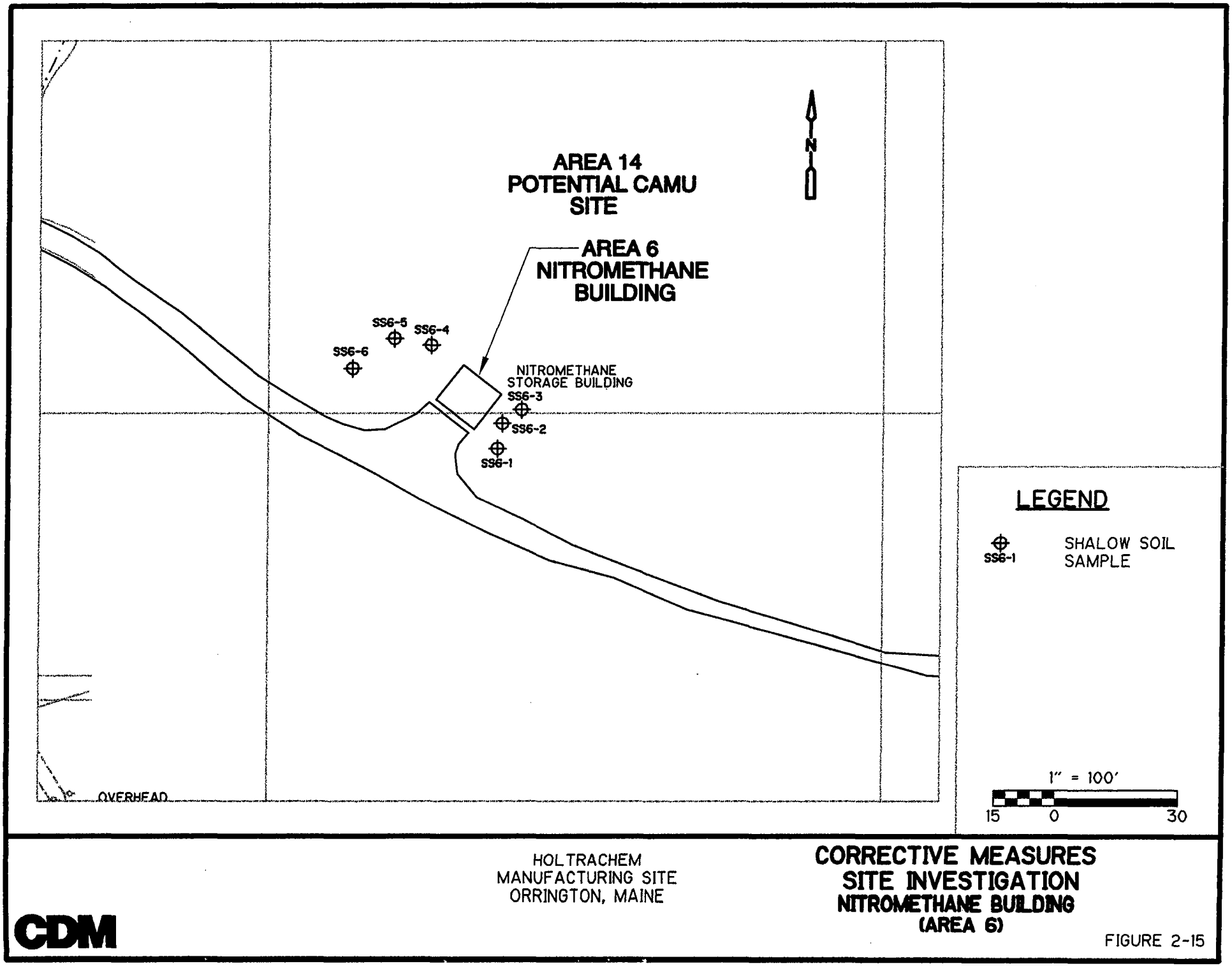
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee



HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee



HOLTRACHEM
MANUFACTURING SITE
ORRINGTON, MAINE

CORRECTIVE MEASURES
SITE INVESTIGATION
NITROMETHANE BUILDING
(AREA 6)

FIGURE 2-15

CDM

Q:\CAM_IHW\0654\FIG2-15.DWG

FARM

BOILER BLOWDOWN

UTILITY BLDG.

OIL DIKE

FORMER SODIUM CHLORATE PLANT

STORAGE ROOM

MAINTENANCE BLDG.

N

MW-507-01

H

G'

SB8-3

SB8-2

SB8-1

I'

H'

SS7-7

SB8-4

SB8-5

DEPLETED BRINE STORAGE

CELL BLDG.

SS7-6

SS7-5

SS7-4

SS7-3

SS7-2

SS7-1

AREA 7
TRANSFORMER AREA

AREA 8
CELL BUILDING

F

G

SB8-6

YORK PACK AREA

DRYING SHED

SB8-7

SB8-8

F'

I

SWITCHGEAR BLDG.

SS7-8

SS7-9

TRANSFORMER YARD

SS7-10

H2 COMPRESSOR BLDG.

HEAT EXCHR

CLARIFIER LOCATION

BRINE STORAGE TANKS

LEGEND

- MONITORING WELL
- SHALLOW SOIL SAMPLE
- SOIL BORING
- I — I' CROSS SECTION LINE

1" = 40'

20 0 40

Q:\CAM_IHW\0654\FIG2-2G.DWG

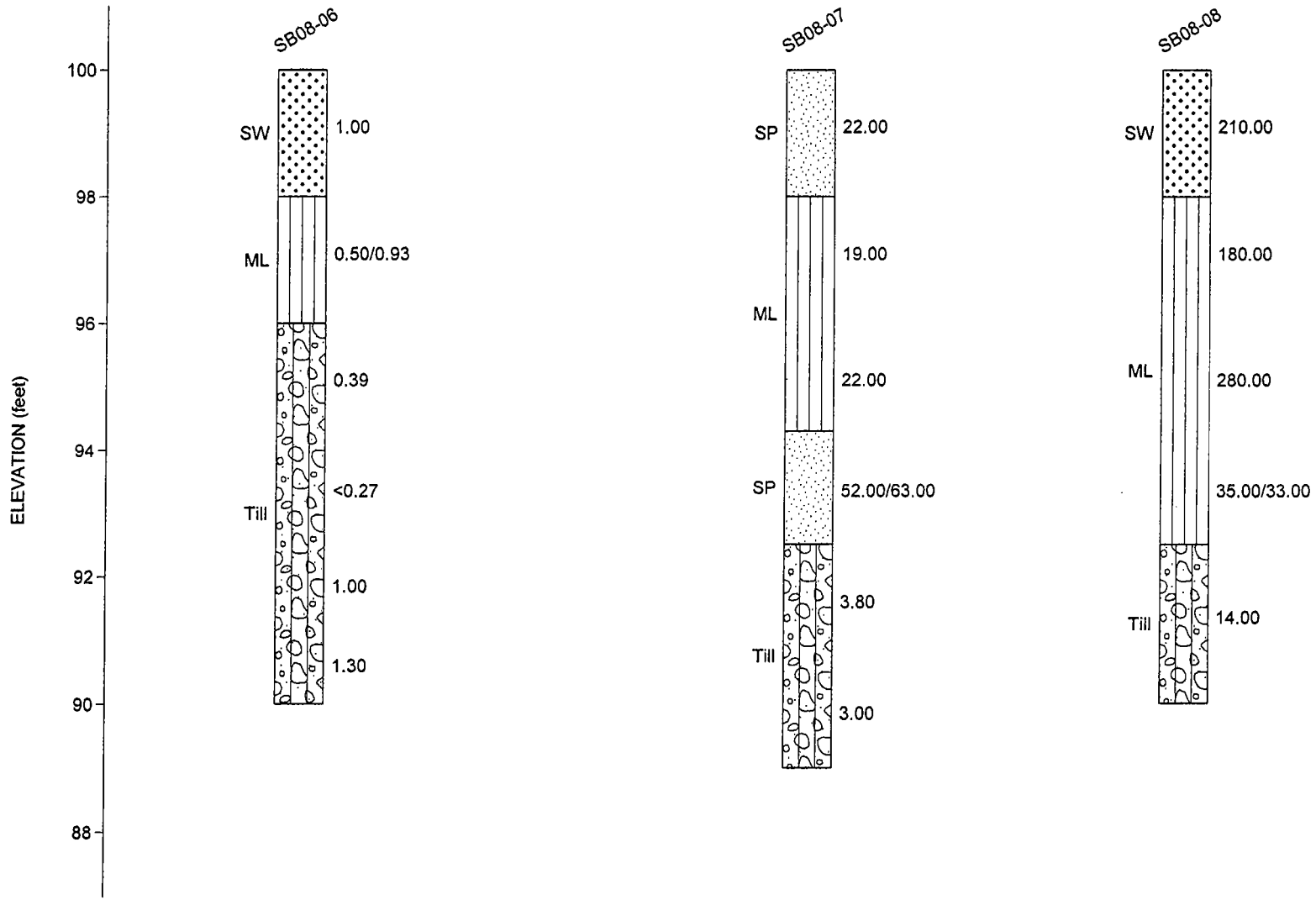
HOLTRACHEM MANUFACTURING SITE
ORRINGTON, MAINE

CORRECTIVE MEASURES
SITE INVESTIGATION
TRANSFORMER AREA (AREA 7)
CELL BUILDING (AREA 8)

CDM

FIGURE 2-16

CDM0012836



LEGEND

- USCS Well-graded Sand
- USCS Poorly-graded Sand
- USCS Silt
- TILL

2.20 Hg, mg/kg

0 35

Horizontal Scale (ft.)

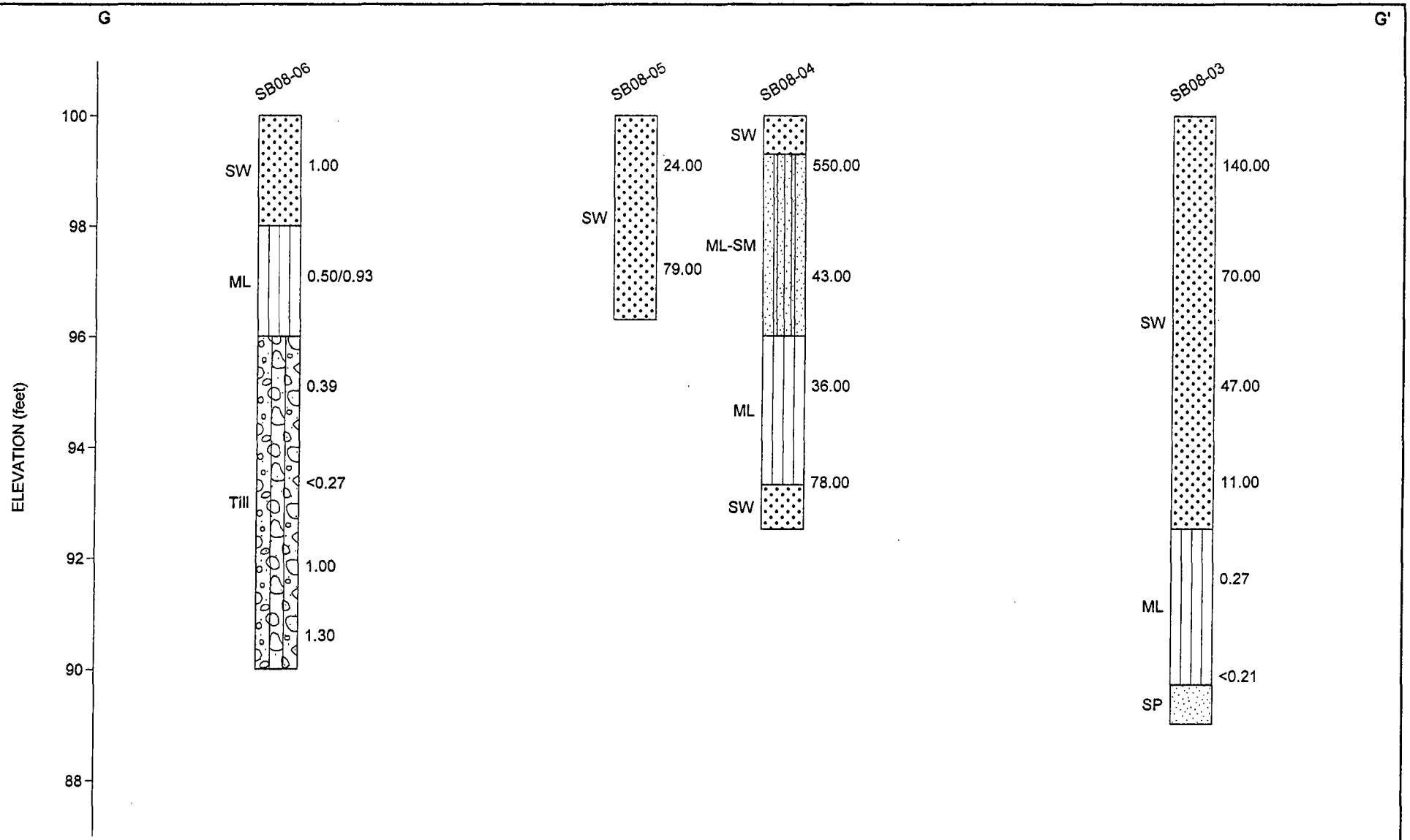
CDM

HoltraChem Manufacturing Site
Area 8 - Cell Building
Cross Section F-F'

FIGURE 2-17

Camp Dresser & McKee

HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/5/02



LEGEND

- USCS Well-graded Sand
- USCS Silt
- USCS Poorly-graded Sand
- USCS Silt and Sand
- TILL

2.20 Hg, mg/kg

0 35

Horizontal Scale (ft.)

CDM

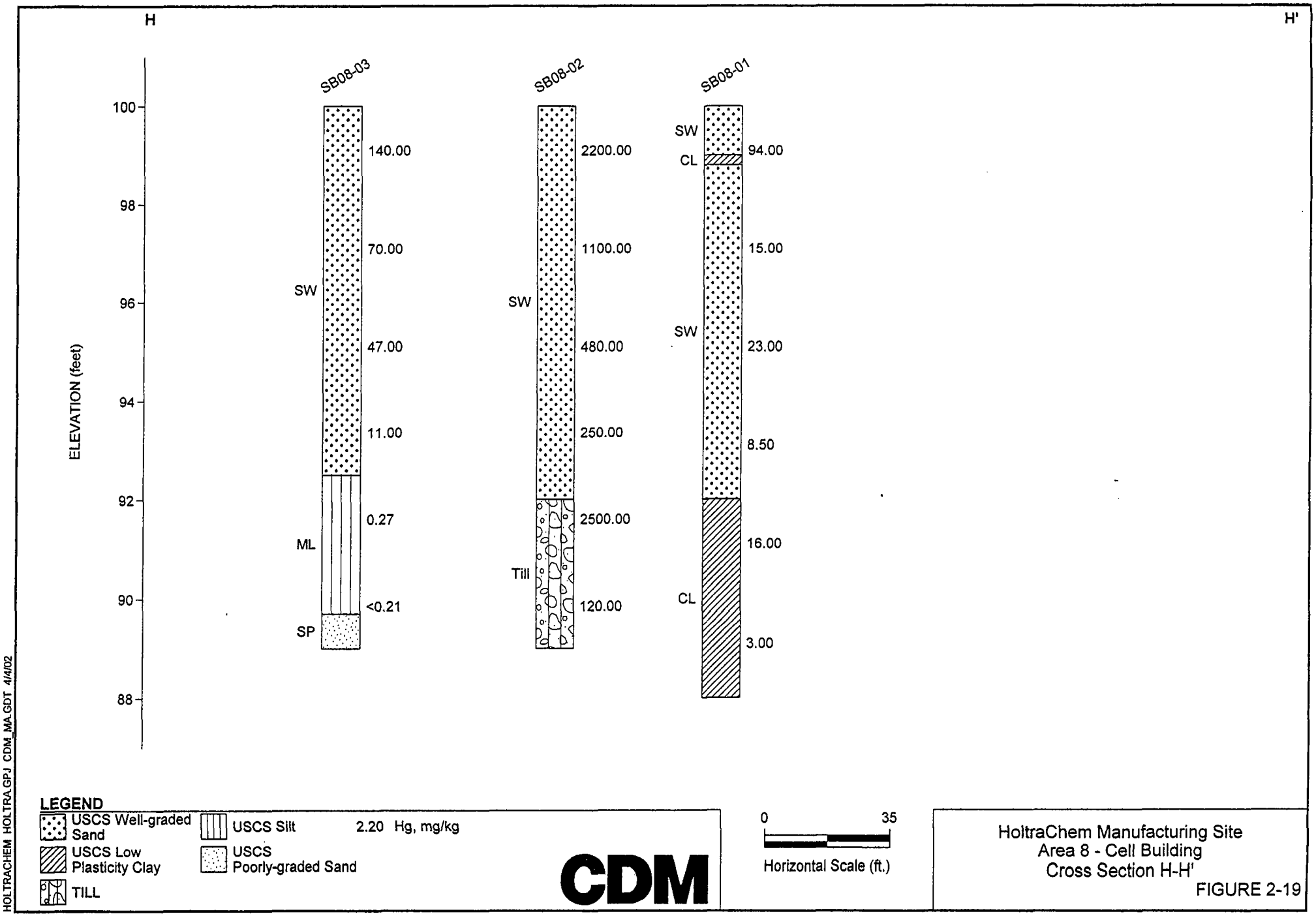
HoltraChem Manufacturing Site
Area 8 - Cell Building
Cross Section G-G'

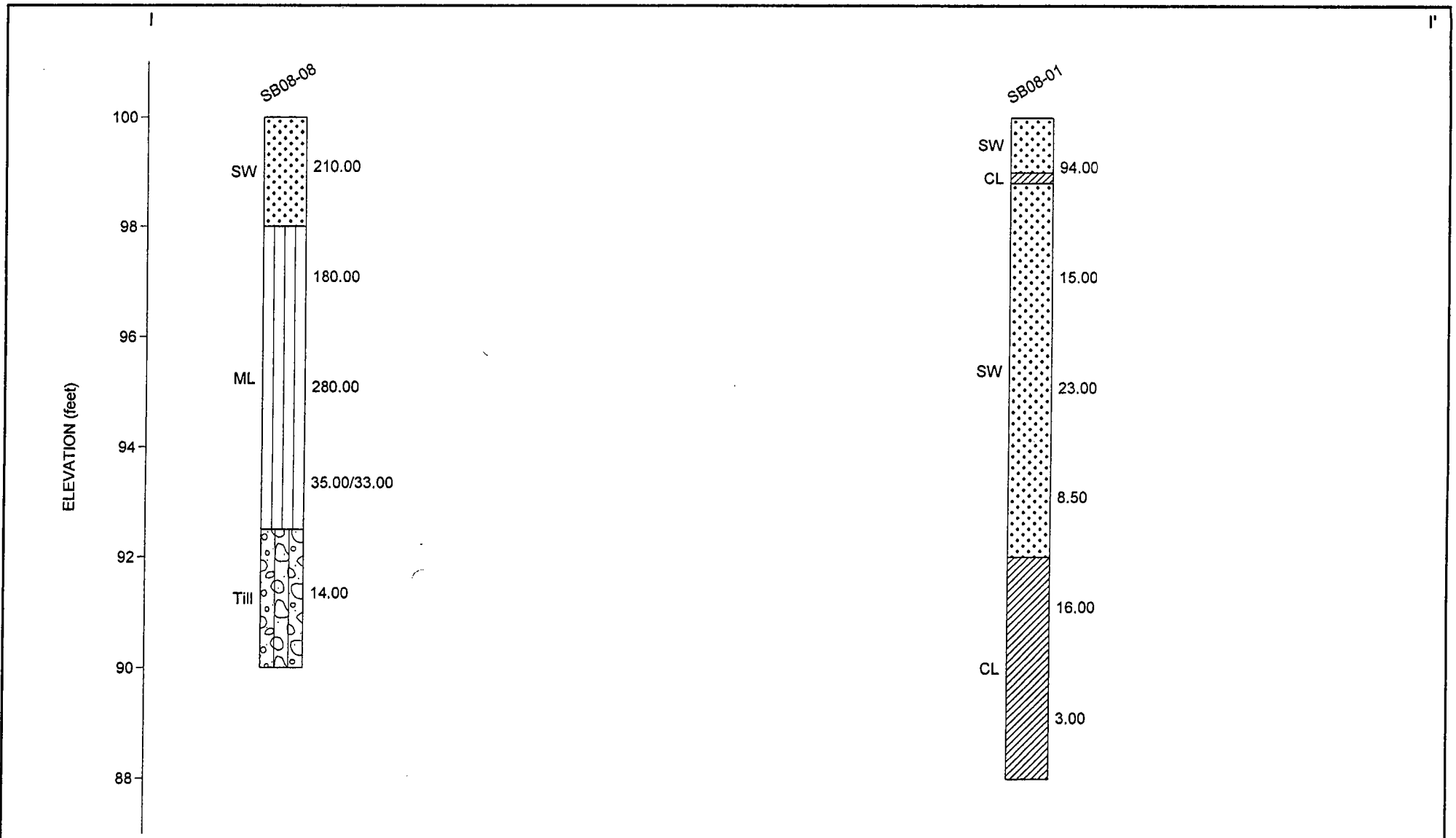
FIGURE 2-18

HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02

Camp Dresser & McKee

CDM0012838


H
H'
ELEVATION (feet)
100
98
96
94
92
90
88
SB08-03
SB08-02
SB08-01
SW
140.00
70.00
47.00
11.00
ML
0.27
<0.21
SP
2200.00
1100.00
480.00
250.00
Till
2500.00
120.00
SW
CL
94.00
15.00
23.00
8.50
16.00
3.00
LEGEND
USCS Well-graded Sand
USCS Low Plasticity Clay
TILL
USCS Silt
USCS Poorly-graded Sand
2.20 Hg, mg/kg
0
35
Horizontal Scale (ft.)
CDM
HoltraChem Manufacturing Site
Area 8 - Cell Building
Cross Section H-H'
FIGURE 2-19
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/4/02
Camp Dresser & McKee



LEGEND

- USCS Well-graded Sand
- USCS Low Plasticity Clay
- USCS Silt
- TILL
- 2.20 Hg, mg/kg

0 35

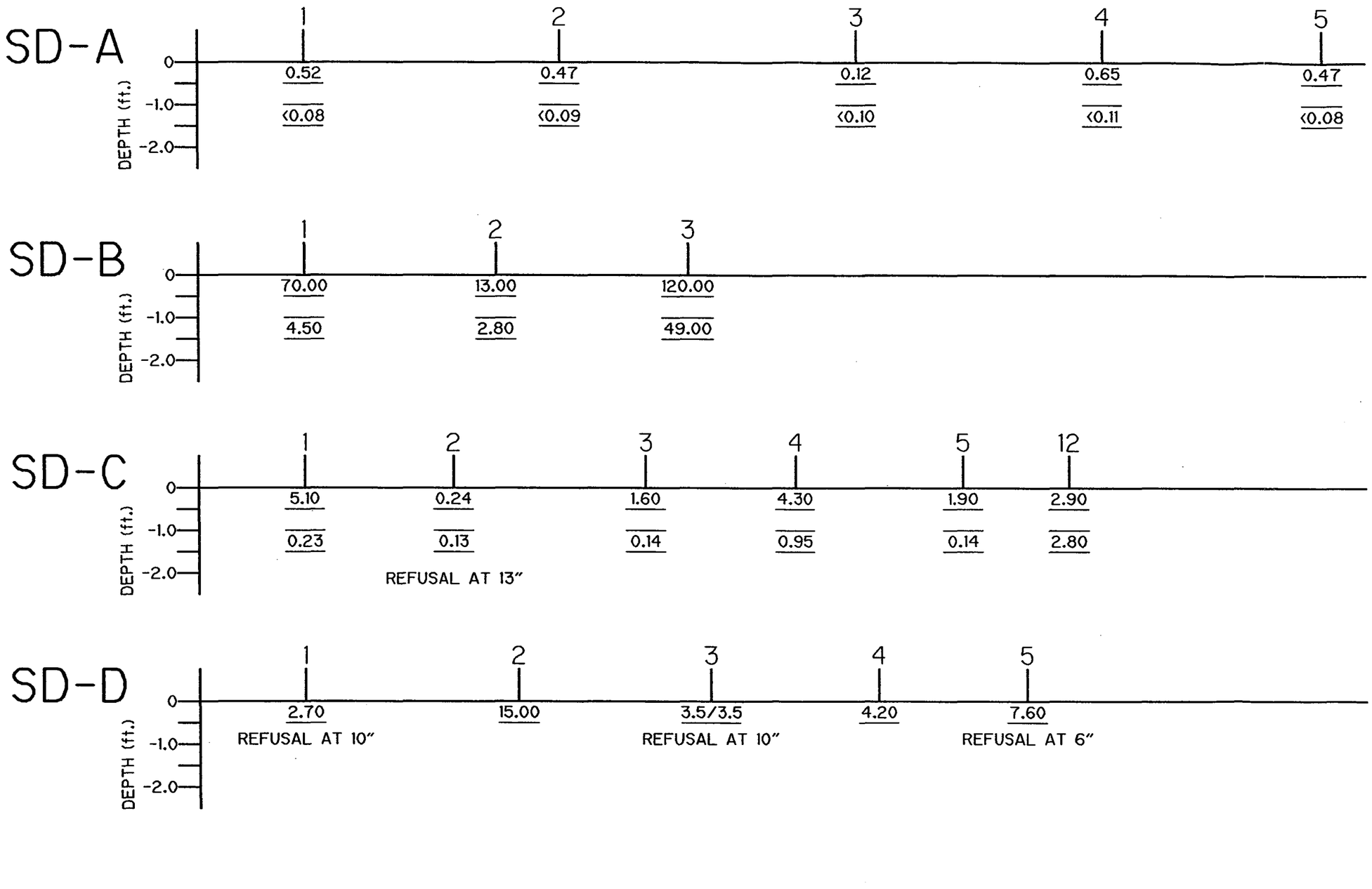
Horizontal Scale (ft.)

HoltraChem Manufacturing Site
Area 8 - Cell Building
Cross Section I-I'

FIGURE 2-20

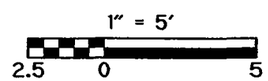
HOLTRACHEM HOLTRA.GPJ CDM_MA.GDT 4/5/02

Camp Dresser & McKee



NOTES:

1. SD-A- STREAM SAMPLE TRANSECT.
2. 0.52- CONCENTRATION OF MERCURY IN SEDIMENT (mg/kg).
3. SEDIMENT SAMPLES COLLECTED AS COMPOSITES OF 0-0.5' DEPTH INTERVAL AND 1-1.5' DEPTH INTERVAL.



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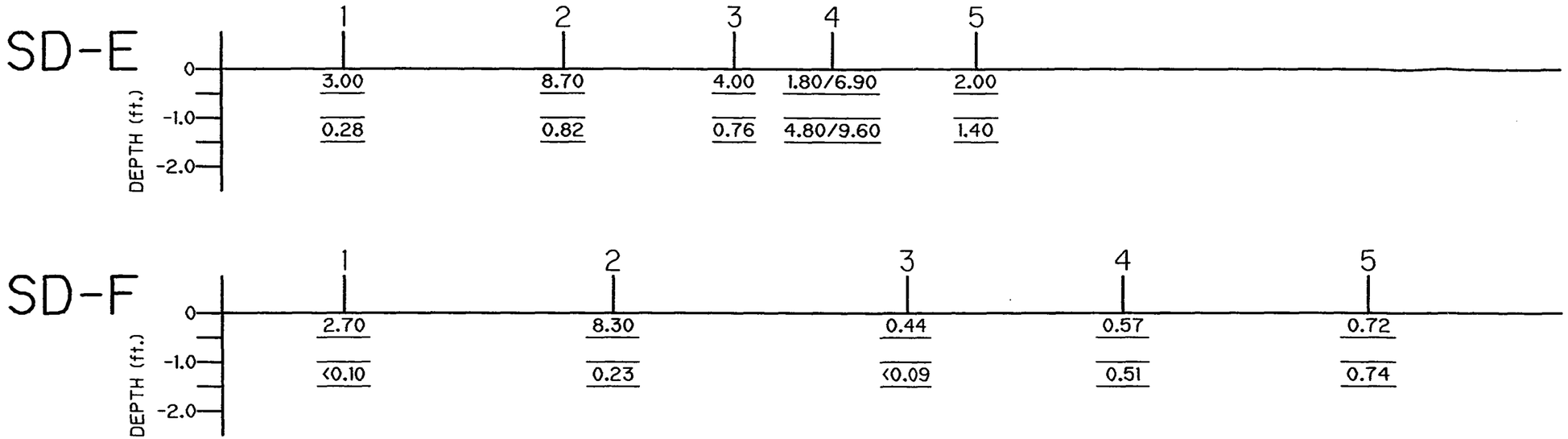
CDM

MALLINCKRODT INC.
HOLTRACHEM MANUFACTURING SITE
CORRECTIVE MEASURES STUDY

SOUTHERLY STREAM TRANSECTS SD-A THROUGH SD-D (AREA 9)

FIGURE 2-21

CDM0012841



NOTES:

1. SD-A- STREAM SAMPLE TRANSECT.
2. 0.52- CONCENTRATION OF MERCURY IN SEDIMENT (mg/kg).
3. SEDIMENT SAMPLES COLLECTED AS COMPOSITES OF 0-0.5' DEPTH INTERVAL AND 1-1.5' DEPTH INTERVAL.

1" = 5'

2.5 0 5

CDM

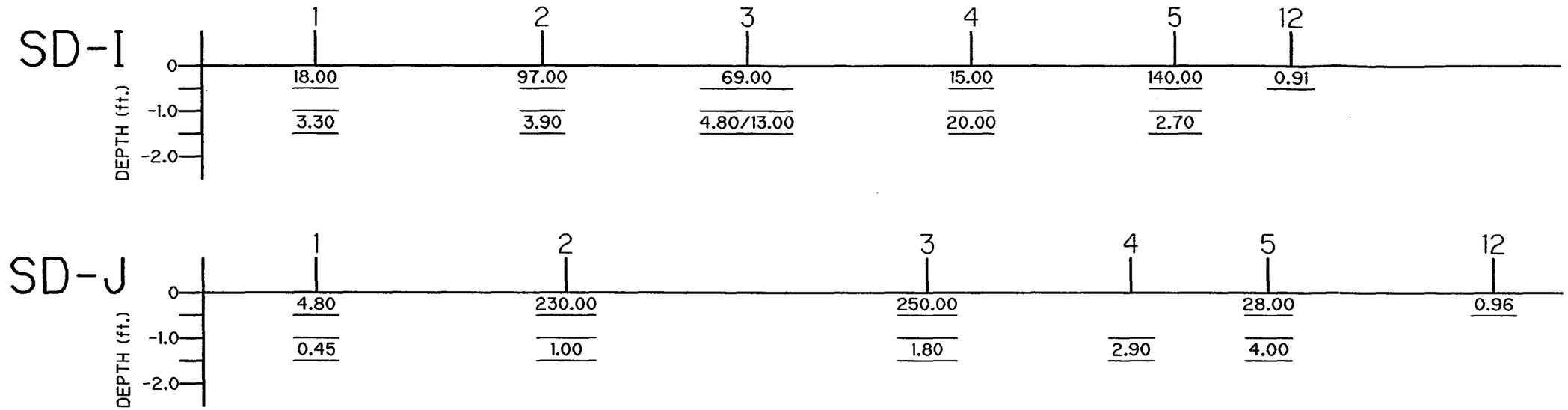
MALLINCKRODT INC.
HOLTRACHEM MANUFACTURING SITE
CORRECTIVE MEASURES STUDY

SOUTHERLY STREAM TRANSECTS SD-E THROUGH SD-H (AREA 9)

FIGURE 2-22

Q:\CAM_IHW\0654\DIAG0001.DWG

CDM0012842



NOTES:

1. SD-A- STREAM SAMPLE TRANSECT.
2. 0.52- CONCENTRATION OF MERCURY IN SEDIMENT (mg/kg).
3. SEDIMENT SAMPLES COLLECTED AS COMPOSITES OF 0-0.5' DEPTH INTERVAL AND 1-1.5' DEPTH INTERVAL.

1" = 5'

2.5 0 5

CDM

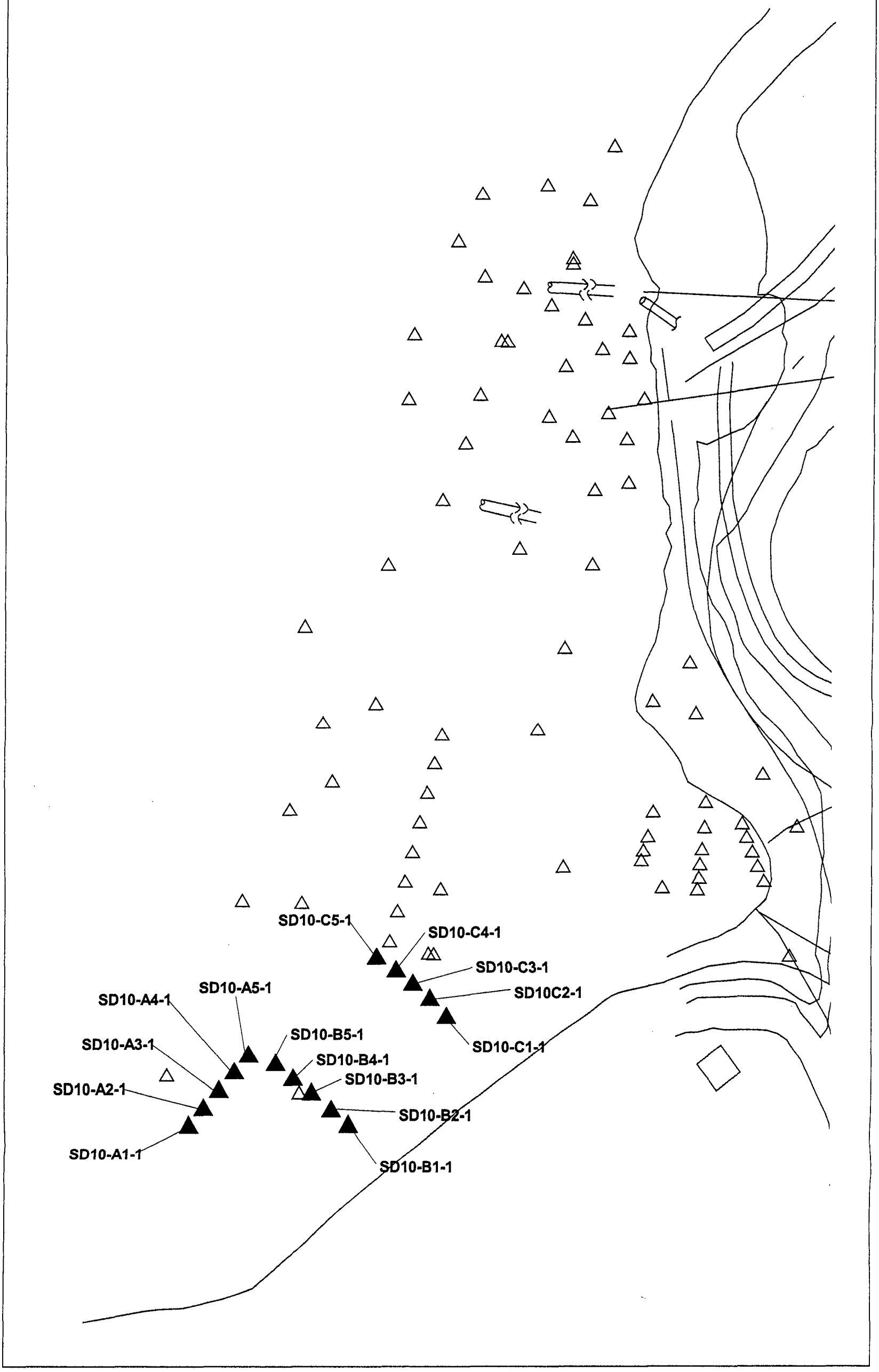
MALLINCKRODT INC.
HOLTRACHEM MANUFACTURING SITE
CORRECTIVE MEASURES STUDY

SOUTHERLY STREAM TRANSECTS SD-I THROUGH SD-L (AREA 9)

FIGURE 2-23

Q:\CAM_IHW\0654\DIAG0002.DWG

CDM0012843



Legend

- Existing Data
- Data collected in Fall 2001
- Basemap

N

100 0 100 Feet

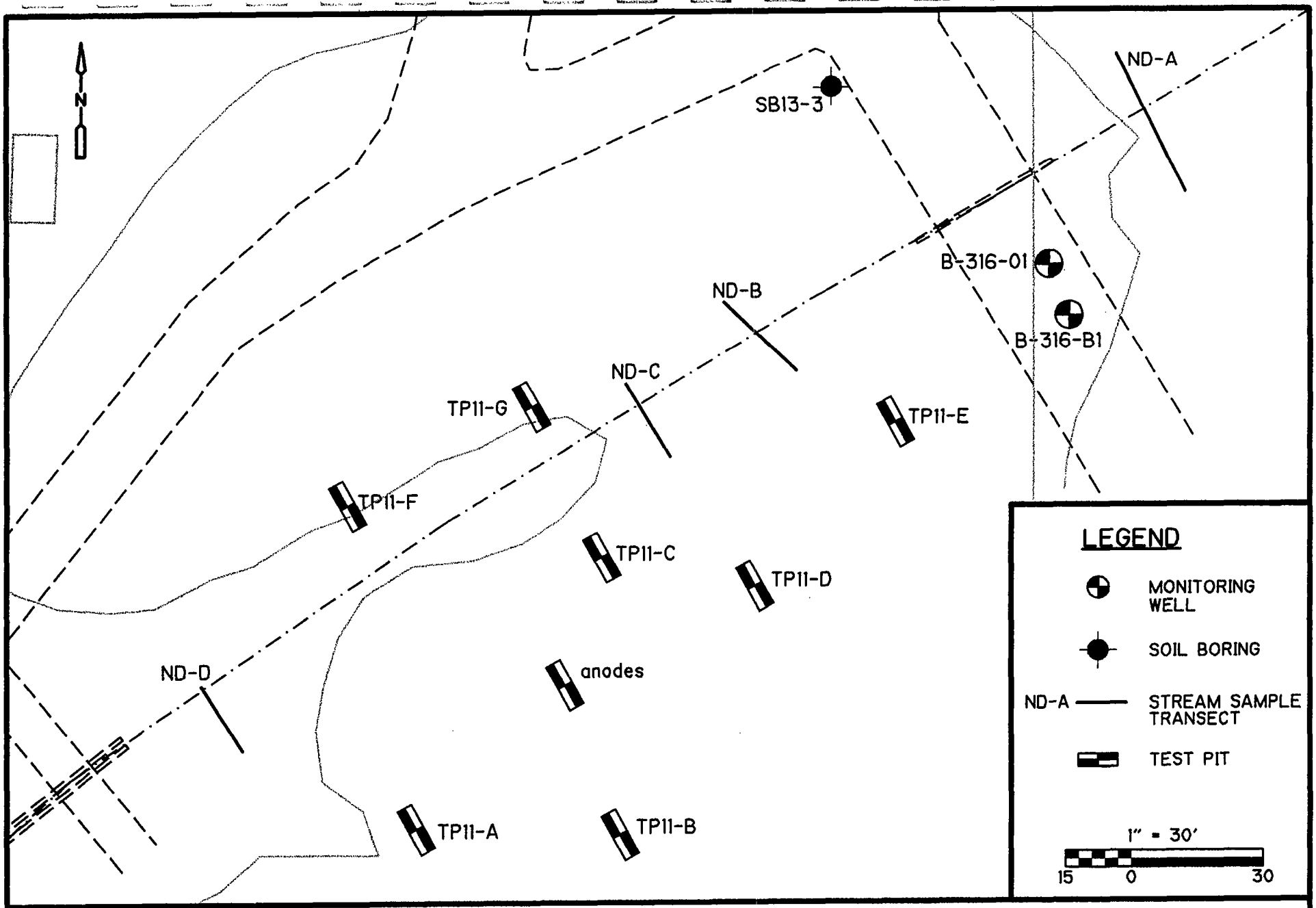
CDM

Figure 2-24

CMS Field Investigation

HoltraChem Manufacturing Site
Orrington, Maine

\\CAMD008138\D:\Projects\Holtrachemlaprs\Cove_new.apr Layout1 Date Printed: 04/15/03



HOLTRACHEM MANUFACTURING SITE
ORRINGTON, MAINE

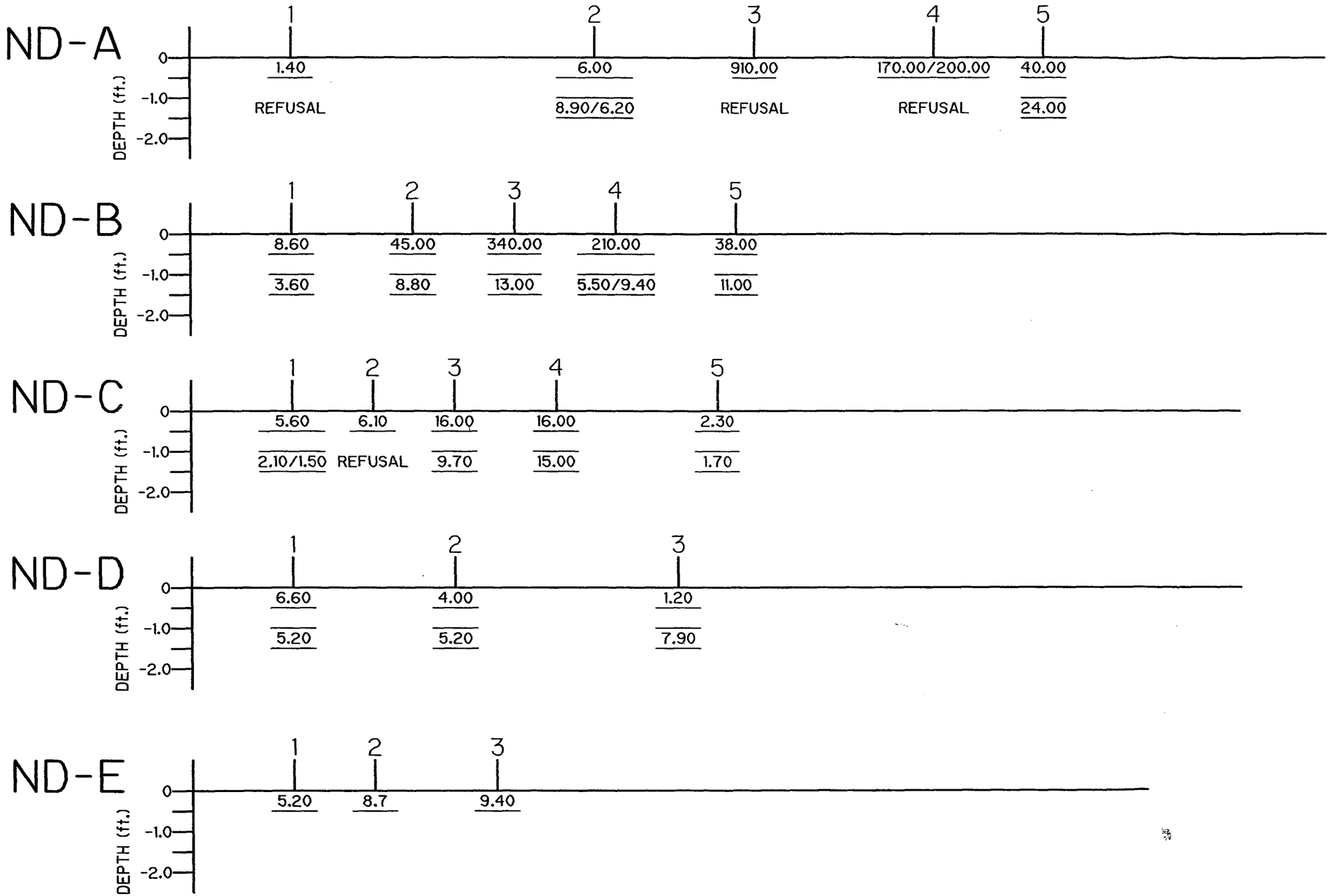
CORRECTIVE MEASURES SITE INVESTIGATION NORTH DITCH AREA (AREA 11)

FIGURE 2-25

CDM

Q:\CAM_1HW\0654\FIG2-2C.DWG

CDM0012845



NOTES:

1. SD-A- STREAM SAMPLE TRANSECT.
2. 0.52- CONCENTRATION OF MERCURY IN SEDIMENT (mg/kg).
3. SEDIMENT SAMPLES COLLECTED AS COMPOSITES OF 0-0.5' DEPTH INTERVAL AND 1-1.5' DEPTH INTERVAL.

1" = 5'

2.5 0 5

Q:\CAM_IHW\0654\DIAG0003.DWG

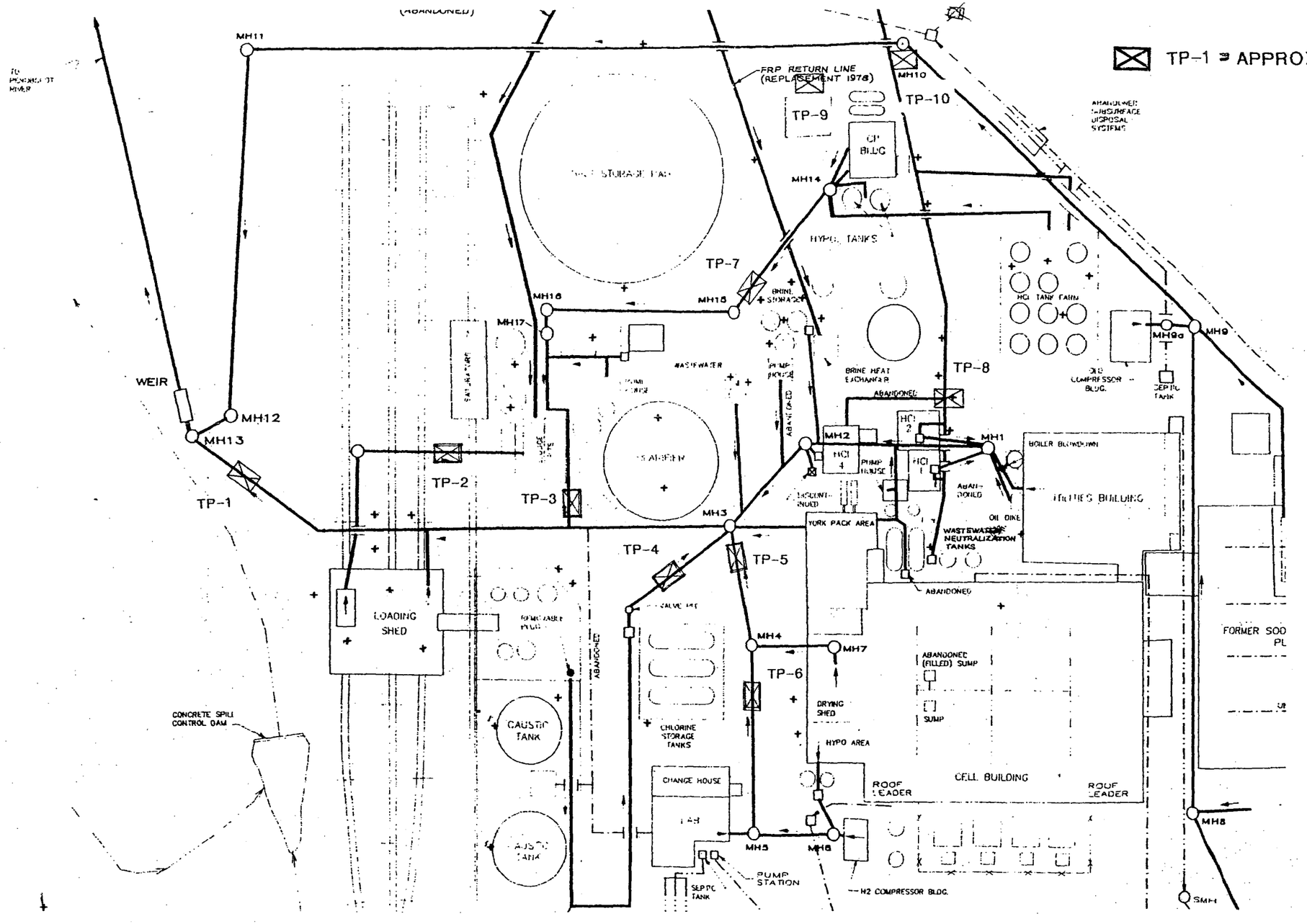
CDM

MALLINCKRODT INC.
HOLTRACHEM MANUFACTURING SITE
CORRECTIVE MEASURES STUDY

NORTHERN DITCH TRANSECTS ND-A THROUGH ND-E (AREA 11)

FIGURE 2-26

CDM0012846



LEGEND

⊠ TP-1 = APPROXIMATE TESP PIT LOCATION

HOLTRACHEM MANUFACTURING
SITE
ORRINGTON, MAINE

INDUSTRIAL SEWER
TEST PIT LOCATION PLAN

CDM

FIGURE 2-27

Tables

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
Area 1 - Retort Building				
SB1-01_0-2	14-Nov-01	0-2	0.26	91
SB1-01_2-4	14-Nov-01	2-4	2.20	91
SB1-01_4-6	14-Nov-01	4-6	0.59	92
SB1-01_4-6(D)	14-Nov-01	4-6	0.52	92
SB1-02_0-2	14-Nov-01	0-2	7.10	90
SB1-02_2-4	14-Nov-01	2-4	0.28	91
SB1-02_2-4(D)	14-Nov-01	2-4	0.26	90
SB1-02_4-6	14-Nov-01	4-6	1.20	92
SB1-03_0-2	14-Nov-01	0-2	15.00	94
SB1-04_0-2	14-Nov-01	0-2	77.00	91
SB1-04_2-4	14-Nov-01	2-4	14.00	84
SB1-04_4-6	14-Nov-01	4-6	8.40	89
SB1-04_6-8	14-Nov-01	6-8	1.90	90
SB1-05_0-2	14-Nov-01	0-2	2.70	89
SB1-05_2-4	14-Nov-01	2-4	7.40	89
SB1-05_4-6	14-Nov-01	4-6	1.60	91
SB1-05_4-6(D)	14-Nov-01	4-6	0.96	91
SB1-06_0-2	13-Nov-01	0-2	26	92
SB1-06_2-4	13-Nov-01	2-4	0.26 ND	91
SB1-06_4-5.5	13-Nov-01	4.5-5	12	90
SB1-06_5.5-7	13-Nov-01	5.5-7	0.27 ND	89
SB1-07_0-2	13-Nov-01	0-2	36	90
SB1-07_2-4	13-Nov-01	2-4	9.2	88
SB1-07_4-5.5	13-Nov-01	4-5.5	6.3	90
SB1-07_5.5-7	13-Nov-01	5.5-7	0.25 ND	92
SB1-08_0-2	13-Nov-01	0-2	12	92
SB1-08_2-3.5	13-Nov-01	2-3.5	41	91
SB1-08_3.5-5.5	13-Nov-01	3.5-5.5	31	90
SB1-08_5.5-7.5	13-Nov-01	5.5-7.5	11	91
SB1-08_9	13-Nov-01	9	1.6	93
SB1-08-9_10.5	13-Nov-01	9-10.5	0.24	92
SB1-09_0-2	13-Nov-01	0-2	19	88
SB1-09_2-4	13-Nov-01	2-4	4.4	87
SB1-09_4-6	13-Nov-01	4-6	150	88
SB1-09_6-8	13-Nov-01	6-8	4.2	91
SB1-09_8-9	13-Nov-01	8-9	1.4	90
SB1-10_0-2	14-Nov-01	0-2	4.20	92
SB1-10_2-4	14-Nov-01	2-4	1.40	92
SB1-10_4-6	14-Nov-01	4-6	0.24	92
SB1-11_0-2	13-Nov-01	0-2	110	89
SB1-11_2-4	13-Nov-01	2-4	0.25 ND	90
SB1-11_2-4(D)	13-Nov-01	2-4	0.25 ND	89
SB1-11_4-6	13-Nov-01	4-6	0.25 ND	90
SB1-11_6-8	13-Nov-01	6-8	0.23 ND	92
SB1-12_0-2	13-Nov-01	0-2	6.4	90
SB1-12_2-4	13-Nov-01	2-4	1	90
SB1-12_4-6	13-Nov-01	4-6	1.4	90
SB1-12_6-8	13-Nov-01	6-8	0.56	90
SB1-12_6-8(D)	13-Nov-01	6-8	0.61	90
SB1-13_0-2	14-Nov-01	0-2	2.70	92
SB1-13_2-4	14-Nov-01	2-4	2.90	90
SB1-13_4-6	14-Nov-01	4-6	11.00	91
SB1-13_6-7.5	14-Nov-01	6-7.5	2.10	90
SB1-13_7.5-9	14-Nov-01	7.5-9	1.70	92
SB1-14_0-2	14-Nov-01	0-2	5.70	91
SB1-14_2-4	14-Nov-01	2-4	3.70	92
SB1-14_4-6	14-Nov-01	4-6	0.42	92

Notes:
1. D - Duplicate sample.
2. ND - Not detected above laboratory detection limit.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
SB1-15_0-2	14-Nov-01	0-2	4.10	92
SB1-15_4-6	14-Nov-01	4-6	0.45	91
SB1-16_0-2	14-Nov-01	0-2	0.96	93
SB1-16_2-4	14-Nov-01	2-4	0.51	92
SB1-16_4-6	14-Nov-01	4-6	0.57	90
SB1-16_6-7.5	14-Nov-01	6-7.5	0.24 ND	91
SB1-16_7.5-9	14-Nov-01	7.5-9	0.22 ND	89
SB1-17_0-2	14-Nov-01	0-2	2.80	92
SB1-17_2-4	14-Nov-01	2-4	0.41	92
SB1-18_0-2	14-Nov-01	0-2	2.90	90
SB1-18_2-4	14-Nov-01	2-4	0.25 ND	90
SB1-18_4-6	14-Nov-01	4-6	0.40	90
SB1-18_6-8	14-Nov-01	6-8	2.20	89
SB1-18_8-10	14-Nov-01	8-10	4.20	90
Area 2 - Used Equipment Storage Area				
TP2-A-1	14-Nov-01	0.5	0.26 ND	94
TP2-A-2	14-Nov-01	2	0.22 ND	96
TP2-A-3	14-Nov-01	5	0.22 ND	95
TP2-A-3(D)	14-Nov-01	5	0.25 ND	95
TP2-B-1	14-Nov-01	0.5	0.24 ND	91
TP2-B-2	14-Nov-01	2	0.24 ND	95
TP2-C-1	14-Nov-01	0.5	2.00	91
TP2-C-2	14-Nov-01	1	0.30 ND	84
TP2-D-1	14-Nov-01	0.5	24.00	90
TP2-D-2	14-Nov-01	1	0.29 ND	87
TP2-D-3	14-Nov-01	4	0.26 ND	94
TP2-D-3(D)	14-Nov-01	4	0.26 ND	94
Area 3 - Landfill Ridge				
SB3-01_0-2	12-Nov-01	0-2	12.00	90
SB3-01_2-4	12-Nov-01	2-4	1.50	89
SB3-01_4-6	12-Nov-01	4-6	72.00	87
SB3-01_6-8	12-Nov-01	6-8	4.30	83
SB3-01_8-10	12-Nov-01	8-10	39.00	85
SB3-01_10-12	12-Nov-01	10-12	9.90	89
SB3-01_12-12.7	12-Nov-01	12-12.7	14.00	87
SB3-01_17-19	13-Nov-01	17-19	0.24 ND	95
SB3-01_19-21	13-Nov-01	19-21	0.25 ND	94
SB3-01_19-21(D)	13-Nov-01	19-21	0.26 ND	95
SB3-01_21-23	13-Nov-01	21-23	0.25 ND	94
SB3-01_23-25	13-Nov-01	23-25	0.24 ND	96
SB3-01_25-27	13-Nov-01	25-27	0.23 ND	96
SB3-01_27-29	13-Nov-01	27-29	0.27 ND	93
SB3-01_29-29.5	13-Nov-01	29-29.5	0.21 ND	89
SB3-02_0-2	13-Nov-01	0-2	1.00	88
SB3-02_2-4	13-Nov-01	2-4	0.30 ND	77
SB3-02_4-6	13-Nov-01	4-6	7.00	76
SB3-02_4-6(D)	13-Nov-01	4-6	2.90	80
SB3-02_6-8	13-Nov-01	6-8	0.94	80
SB3-02_8-10	13-Nov-01	8-10	2.80	72
SB3-02_10-12	13-Nov-01	10-12	5.20	81
SB3-02_12-14	13-Nov-01	12-14	0.88	90
SB3-02_14-16	13-Nov-01	14-16	0.93	91
SB3-02_16-18	13-Nov-01	16-18	0.10 ND	90
SB3-02_16-18(D)	13-Nov-01	16-18	0.24 ND	91
SB3-02_18-20	13-Nov-01	18-20	0.26 ND	91
SB3-02_20-22	13-Nov-01	20-22	0.24 ND	91

Notes:
1. D - Duplicate sample.
2. ND - Not detected above laboratory detection limit.
3. TP2 previously noted as TP1.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
SS3-1	15-Nov-01	0-0.5	0.24 ND	87
SS3-2	15-Nov-01	0-0.5	0.26 ND	87
SS3-3	15-Nov-01	0-0.5	0.22 ND	90
SS3-4	15-Nov-01	0-0.5	0.56	90
SS3-5	15-Nov-01	0-0.5	0.22 ND	93
SS3-6	15-Nov-01	0-0.5	0.24 ND	85
SS3-7	15-Nov-01	0-0.5	0.38	95
SS3-8	15-Nov-01	0-0.5	0.25 ND	90
SS3-8	15-Nov-01	0-0.5	0.25 ND	90
SS3-9	15-Nov-01	0-0.5	0.25 ND	95
SS3-9	15-Nov-01	0-0.5	0.25 ND	95
SS3-10	15-Nov-01	0-0.5	0.25 ND	97
TP3-A-1	13-Nov-01	1	14.00	87
TP3-A-2	13-Nov-01	1	11.00	89
TP3-A-3	13-Nov-01	3	8.40	89
TP3-A-4	13-Nov-01	7	2.60	90
TP3-B-1	13-Nov-01	0.5	0.38	92
TP3-B-1(D)	13-Nov-01	0.5	0.28	92
TP3-B-2	13-Nov-01	3	0.58	88
TP3-C-1	13-Nov-01	2	4.10	68
TP3-C-2	13-Nov-01	4	0.30 ND	82
ISMSS-1	2-Jul-02	0-0.5	30.00	86
ISMSS-2	2-Jul-02	0-0.5	20.00	88
ISMSS-3	2-Jul-02	0-0.5	70.00	87
ISMSS-4	2-Jul-02	0-0.5	34.00	88
ISMSS-5	2-Jul-02	0-0.5	31.00	88
ISMSS-6	2-Jul-02	0-0.5	42.00	87
ISMSS-7	2-Jul-02	0-0.5	5.00	90
Area 4 - Scrap Metal and Coal Filter Area				
SB4-01_0-2	12-Nov-01	0-2	26.00	93
SB4-01_2-4	12-Nov-01	2-4	1.40	91
SB4-01_4-6	12-Nov-01	4-6	39.00	93
SB4-01_6-8	12-Nov-01	6-8	11.00	81
SB4-01_8-9	12-Nov-01	8-9	1.80	55
SB4-01_9-10	13-Nov-01	9-10	0.46	82
SB4-02_0-2	12-Nov-01	0-2	3.70	95
SB4-02_2-4	12-Nov-01	2-4	6.20	91
SB4-02_4-5	12-Nov-01	4-5	3.10	89
SB4-02_5-6	13-Nov-01	5-6	1.30	74
SB4-02_6-8	12-Nov-01	6-8	8.80	89
SB4-02_8-10	12-Nov-01	8-10	1.20	22
SB4-02_10-12	12-Nov-01	10-12	0.72	50
SB4-03_0-0.5	15-Nov-01	0-0.5	0.26 ND	95
SB4-03_1-1.5	15-Nov-01	1-1.5	0.19 ND	97
SB4-04_0-0.5	15-Nov-01	0-0.5	0.30	95
SB4-04_1-1.5	15-Nov-01	1-1.5	0.20 ND	93
SB4-05_0-0.5	15-Nov-01	0-0.5	2.10	90
SB4-05_1-1.5	15-Nov-01	1-1.5	0.26 ND	94
SB4-05_2-2.5	15-Nov-01	2-2.5	0.25 ND	87
TP4-A-1	13-Nov-01	1	0.46	85
TP4-A-1D	13-Nov-01	1	0.94	87
TP4-A-2	13-Nov-01	3	22.00	90
TP4-A-3	13-Nov-01	6	3.90	90
TP4-A-4	13-Nov-01	1	29.00	92
TP4-A-5	13-Nov-01	6	18.00	85
TP4-B-1	13-Nov-01	1	25.00	95
TP4-B-2	13-Nov-01	4	0.54	81
TP4-B-3	13-Nov-01	5	2.40	30
TP4-C-1	13-Nov-01	1	180.00	92
TP4-C-2	13-Nov-01	2	46.00	92
TP4-C-3	13-Nov-01	6	0.27 ND	85

Notes:
1. D - Duplicate sample.
2. ND - Not detected above laboratory detection limit.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
TP4-D-1	13-Nov-01	0.5	380.00	90
TP4-D-2	13-Nov-01	4	2.20	88
TP4-D-3	13-Nov-01	5	1.10	23
TP4-E-1	13-Nov-01	0.5	5.40	94
TP4-E-2	13-Nov-01	2	1.10	90
TP4-E-3	13-Nov-01	2.5	2.20	86
TP4-F-1	13-Nov-01	0.5	0.27 ND	88
TP4-F-2	13-Nov-01	5	2.00	93
TP4-F-3	13-Nov-01	8	1.30	89
TP4-F-3D	13-Nov-01	8	3.80	89
TP4-G-1	13-Nov-01	0.5	9.50	88
TP4-G-2	13-Nov-01	1	0.47	94
TP4-G-3	13-Nov-01	2	0.28 ND	87
TP4-H-1	13-Nov-01	0.5	12.00	86
TP4-H-1D	13-Nov-01	0.5	14.00	87
TP4-H-2	13-Nov-01	1	160.00	85
TP4-H-3	13-Nov-01	2	1.00	88
TP4-I-1	13-Nov-01	2	15.00	93
TP4-I-2	13-Nov-01	4	0.28 ND	83
TP4-J-1	13-Nov-01	0.5	1.20	89
TP4-J-2	13-Nov-01	1.5	9.20	89
TP4-J-2D	13-Nov-01	1.5	8.20	88
TP4-J-3	13-Nov-01	0.5	4.10	90
TP4-J-4	13-Nov-01	1.5	0.30 ND	82
TP4-J-5	13-Nov-01	0.5	10.00	87
TP4-J-6	13-Nov-01	1.5	0.24 ND	87
TP4-J-7	13-Nov-01	0.5	38.00	78
TP4-J-8	13-Nov-01	1.5	40.00	83
Area 5 - Coal Filter Storage Area - See Table 2-2				
Area 6 - Nitromethane Building				
SS6-A1	8-Nov-01	0-0.5	0.95	85
SS6-A2	8-Nov-01	1-1.5	0.60	86
SS6-B1	8-Nov-01	0-0.5	0.25 ND	88
SS6-B2	8-Nov-01	1-1.5	0.28 ND	87
SS6-C1	8-Nov-01	0-0.5	0.92	85
SS6-C2	8-Nov-01	1-1.5	0.28 ND	87
SS6-D1	8-Nov-01	0-0.5	0.97	89
SS6-D2	8-Nov-01	1-1.5	0.45	91
SS6-E1	8-Nov-01	0-0.5	0.27	88
SS6-E2	8-Nov-01	1-1.5	0.44	85
SS6-F1	8-Nov-01	0-0.5	0.27 ND	86
SS6-F2	8-Nov-01	1-1.5	0.30 ND	82
Area 7 - Transformer Area - See Table 2-3				
Area 8 - Cell Building				
SB8-01_0-2	12-Nov-01	0-2	94	94
SB8-01_2-4	12-Nov-01	2-4	15	95
SB8-01_4-6	12-Nov-01	4-6	23	92
SB8-01_6-8	12-Nov-01	6-8	8.5	92
SB8-01_8-10	12-Nov-01	8-10	16	86
SB8-01_10-12	12-Nov-01	10-12	3	81
SB8-02_0-2	12-Nov-01	0-2	2200	93
SB8-02_2-4	12-Nov-01	2-4	1100	91
SB8-02_4-6	12-Nov-01	4-6	480	91
SB8-02_6-7.5	12-Nov-01	6-7.5	250	92
SB8-02_7.5-9.5	12-Nov-01	7.5-9.5	2500	88

Notes:
1. D - Duplicate sample.
2. ND - Not detected above laboratory detection limit.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
SB8-02_9.5-11	12-Nov-01	9.5-11	120	90
SB8-03_0-2	12-Nov-01	0-2	140	91
SB8-03_2-4	12-Nov-01	2-4	70	90
SB8-03_4-6	12-Nov-01	4-6	47	90
SB8-03_6-7.5	12-Nov-01	6-7.5	11	92
SB8-03_7.5-9.5	12-Nov-01	7.5-9.5	0.27	88
SB8-03_9.5-11	12-Nov-01	9.5-11	0.21 ND	88
SB8-04_0-2	12-Nov-01	0-2	550	89
SB8-04_2-4	12-Nov-01	2-4	43	84
SB8-04_4-6	12-Nov-01	4-6	36	89
SB8-04_6-7.5	12-Nov-01	6-7.5	78	84
SB8-05_0-2	12-Nov-01	0-2	24	93
SB8-05_2-3.7	12-Nov-01	2-3.7	79	89
SB8-06_0-2	12-Nov-01	0-2	1	94
SB8-06_2-4	12-Nov-01	2-4	0.5	88
SB8-06_2-4(D)	12-Nov-01	2-4	0.93	88
SB8-06_4-6	12-Nov-01	4-6	0.39	88
SB8-06_6-7.5	12-Nov-01	6-7.5	0.27 ND	88
SB8-06_7.5-9	12-Nov-01	7.5-9	1	89
SB8-06_9-10	12-Nov-01	9-10	1.3	89
SB8-07_0-2	12-Nov-01	0-2	22	93
SB8-07_2-4	12-Nov-01	2-4	19	90
SB8-07_4-6	12-Nov-01	4-6	22	87
SB8-07_6-7.5	12-Nov-01	6-7.5	52	84
SB8-07_6-7.5(D)	12-Nov-01	6-7.5	63	87
SB8-07_7.5-9.5	12-Nov-01	7.5-9.5	3.8	89
SB8-07_9.5-11	12-Nov-01	9.5-11	3	90
SB8-08_0-2	12-Nov-01	0-2	210	92
SB8-08_2-4	12-Nov-01	2-4	180	90
SB8-08_4-6	12-Nov-01	4-6	280	80
SB8-08_6-7.5	12-Nov-01	6-7.5	35	80
SB8-08_6-7.5(D)	12-Nov-01	6-7.5	33	82
SB8-08_10	12-Nov-01	8-10	14	87
Area 9 - Southerly Stream				
- See Table 2-4				
Area 10 - Southern Cove Sediment				
- See Table 2-5				
Area 11 - North Ditch Area				
- See Table 2-4				
TP11-A-1	14-Nov-01	surface	0.50	91
TP11-A-2	14-Nov-01	4	0.23 ND	86
TP11-B-1	14-Nov-01	3	0.29 ND	86
TP11-C-1	14-Nov-01	1	8.40	92
TP11-C-1D	14-Nov-01	1	8.90	93
TP11-C-2	14-Nov-01	5	0.24 ND	88
TP11-C-3	14-Nov-01	11	0.22 ND	86
TP11-D-1	14-Nov-01	2	0.26 ND	93
TP11-E-1	14-Nov-01	4	14.00	86
TP11-E-2	14-Nov-01	5	0.25 ND	95
TP11-E-2D	14-Nov-01	5	0.23 ND	96
TP11-F-1	14-Nov-01	0.5	17.00	90
TP11-F-2	14-Nov-01	4	1.40	94
TP11-F-3	14-Nov-01	6	0.23 ND	98
TP11-G-1	14-Nov-01	1	14.00	92
TP11-G-2	14-Nov-01	3	0.49	83
TP11-G-3	14-Nov-01	6	0.60	92

Notes:
1. D - Duplicate sample.
2. ND - Not detected above laboratory detection limit.

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Table 2-1 - Soil Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
Area 12 - Used Equipment Storage / End of RR				
TP12-A-1	14-Nov-01	1	26.00	88
TP12-A-2	14-Nov-01	2	0.36	90
TP12-B-1	14-Nov-01	0.5	0.26 ND	85
TP12-B-2	14-Nov-01	1	0.20 ND	92
TP12-C-1	14-Nov-01	0.5	0.83	93
TP12-C-2	14-Nov-01	2	0.22 ND	93
TP12-C-3	14-Nov-01	4	0.25 ND	82
Interim Stabilization Measure				
SS-1	2-Jul-02	SP	30.00	86
SS-2	2-Jul-02	SP	20.00	88
SS-3	2-Jul-02	SP	70.00	87
SS-4	2-Jul-02	SP	34.00	88
SS-5	2-Jul-02	SP	31.00	88
SS-6	2-Jul-02	SP	42.00	87
SS-7	2-Jul-02	SP	5.00	90

Notes:
1. SP - Stockpile samples.
2. ND - Not detected above laboratory detection limit.

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Table 2-2 - Coal and Graphite Characterization Samples

Sample ID	Sample Date	Total Mercury (mg/kg)	Total Solids (%)
Area 5 - Coal Filter Storage Area			
SMALL DRUM 4	12-Nov-01	0.25 ND	99
MED. DRUM 3	12-Nov-01	0.23 ND	100
WOOD DRUM 1	12-Nov-01	0.80	100
WOOD BOX 2	12-Nov-01	0.22 ND	100
SD5-COAL1	12-Nov-01	24.00	95
SD5-COAL2	12-Nov-01	68.00	95
SD5-COAL3	12-Nov-01	55.00	96
SD5-COAL4	12-Nov-01	2.40	94

Notes:
1. ND - Not detected above laboratory detection limit.

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Table 2-3 - Transformer Area PCB Samples

Sample ID	Sample Date	Sample Depth (feet)	Aroclor 1260 (mg/kg)	Total Solids (%)
Area 7 - Transformer Area				
SS7-01-1	11/12/2001	0-0.5	3.28	81
SS7-01-3 (D 01-01)	11/12/2001	0-0.5	2.52	85
SS7-01-2	11/12/2001	1-1.5	0.278 ND	90
SS7-02-1	11/12/2001	0-0.5	0.275 ND	91
SS7-02-2	11/12/2001	1-1.5	0.272 ND	92
SS7-03-1	11/12/2001	0-0.5	2.36	88
SS7-03-2	11/12/2001	1-1.5	0.511	91
SS7-04-1	11/12/2001	0-0.5	14	87
SS7-04-2	11/12/2001	1-1.5	1.41	93
SS7-04-3 (D 04-02)	11/12/2001	1-1.5	0.56	91
SS7-05-1	11/12/2001	0-0.5	0.269 ND	93
SS7-05-2	11/12/2001	1-1.5	0.272 ND	92
SS7-06-1	11/12/2001	0-0.5	0.269 ND	93
SS7-06-2	11/12/2001	1-1.5	0.281 ND	89
SS7-07-1	11/12/2001	0-0.5	0.272 ND	92
SS7-07-2	11/12/2001	1-1.5	0.284 ND	88
SS7-08-1	11/14/2001	0-0.5	0.278 ND	90
SS7-08-1D	11/14/2001	0-0.5	0.275 ND	91
SS7-08-2	11/14/2001	1-1.5	0.269 ND	93
SS7-09-1	11/14/2001	0-0.5	0.278 ND	90
SS7-09-2	11/14/2001	1-1.5	0.269 ND	93
SS7-10-1	11/14/2001	0-0.5	0.278 ND	90
SS7-11-1	11/12/2001	0-0.5	0.333 ND	75
SS7-11-2	11/12/2001	1-1.5	0.291 ND	86
SS7-12-1	11/12/2001	0-0.5	0.352 ND	71
SS7-12-2	11/12/2001	1-1.5	0.305 ND	82

Notes:
1. SS7-01-03 is duplicate of SS7-01-01.
2. SS7-04-03 is duplicate of SS7-04-02.
3. D - Duplicate sample.
4. ND - Not detected above laboratory detection limit.

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Table 2-4 - Streambed Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
Area 9 - Southerly Stream				
SD-A1-1	5-Nov-01	0-0.5	0.52	67
SD-A1-2	5-Nov-01	1-1.5	0.08 ND	88
SD-A2-1	5-Nov-01	0-0.5	0.47	64
SD-A2-2	5-Nov-01	1-1.5	0.09 ND	81
SD-A3-1	5-Nov-01	0-0.5	0.12	74
SD-A3-2	5-Nov-01	1-1.5	0.10	77
SD-A4-1	5-Nov-01	0-0.5	0.65	60
SD-A4-2	5-Nov-01	1-1.5	0.11	73
SD-A5-1	5-Nov-01	0-0.5	0.47	74
SD-A5-2	5-Nov-01	1-1.5	0.08 ND	88
SD-B1-1	5-Nov-01	0-0.5	70.00	78
SD-B1-2	5-Nov-01	1-1.5	4.50	86
SD-B2-1	5-Nov-01	0-0.5	13.00	76
SD-B2-2	5-Nov-01	1-1.5	2.80	86
SD-B3-1	5-Nov-01	0-0.5	120.00	66
SD-B3-2	5-Nov-01	1-1.5	49.00	74
SD-C1-1	5-Nov-01	0-0.5	5.10	59
SD-C1-2	5-Nov-01	1-1.5	0.23	83
SD-C2-1	5-Nov-01	0-0.5	0.24	57
SD-C2-2	5-Nov-01	1-1.5	0.13	85
SD-C3-1	5-Nov-01	0-0.5	1.60	51
SD-C3-2	5-Nov-01	1-1.5	0.14	80
SD-C4-1	5-Nov-01	0-0.5	4.30	61
SD-C4-2	5-Nov-01	1-1.5	0.95	81
SD-C5-1	5-Nov-01	0-0.5	1.90	69
SD-C5-2	5-Nov-01	1-1.5	0.14	84
SD-C12-1	12-Nov-01	0-0.5	2.90	69
SD-C12-2	12-Nov-01	1-1.5	2.80	72
SD-D1-1	5-Nov-01	0-0.5	2.70	74
SD-D2-1	5-Nov-01	0-0.5	15.00	66
SD-D3-1	5-Nov-01	0-0.5	3.50	80
SD-D3-1 (D)	5-Nov-01	0-0.5	3.50	79
SD-D4-1	5-Nov-01	0-0.5	4.20	78
SD-D5-1	5-Nov-01	0-0.5	7.60	87
SD-E1-1	6-Nov-01	0-0.5	3.00	46
SD-E1-2	6-Nov-01	1-1.5	0.28	57
SD-E2-1	6-Nov-01	0-0.5	8.70	31
SD-E2-2	6-Nov-01	1-1.5	0.82	28
SD-E3-1	6-Nov-01	0-0.5	4.00	30
SD-E3-2	6-Nov-01	1-1.5	0.76	21
SD-E4-1	6-Nov-01	0-0.5	1.80	40
SD-E6-1 (D E4-1)	6-Nov-01	0-0.5	6.90	88
SD-E4-2	6-Nov-01	1-1.5	4.80	61
SD-E6-2 (D E4-2)	6-Nov-01	1-1.5	9.60	87
SD-E5-1	6-Nov-01	0-0.5	2.00	68
SD-E5-2	6-Nov-01	1-1.5	1.40	28
SD-F1-1	6-Nov-01	0-0.5	2.70	55
SD-F1-2	6-Nov-01	1-1.5	0.10 ND	81
SD-F2-1	6-Nov-01	0-0.5	8.30	35
SD-F2-2	6-Nov-01	1-1.5	0.23	61
SD-F3-1	6-Nov-01	0-0.5	0.44	41
SD-F3-2	6-Nov-01	1-1.5	0.09 ND	83

Notes:
1. SD-E6-1 is duplicate of SD-E4-1.
2. SD-E6-2 is duplicate of SD-E4-2.
3. D - Duplicate sample.
4. ND - Not detected above laboratory detection limit.

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Table 2-4 - Streambed Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
SD-F4-1	6-Nov-01	0-0.5	0.57	21
SD-F4-2	6-Nov-01	1-1.5	0.51	45
SD-F5-1	6-Nov-01	0-0.5	0.72	78
SD-F5-2	6-Nov-01	1-1.5	0.74	23
SD-G1-1	6-Nov-01	0-0.5	3.10	67
SD-G1-2	6-Nov-01	1-1.5	0.36	82
SD-G2-1	6-Nov-01	0-0.5	1.30	78
SD-G2-2	6-Nov-01	1-1.5	1.60	74
SD-G3-1	6-Nov-01	0-0.5	8.00	51
SD-G3-2	6-Nov-01	1-1.5	3.40	65
SD-G4-1	6-Nov-01	0-0.5	15.00	50
SD-G4-2	6-Nov-01	1-1.5	0.43	83
SD-G5-1	6-Nov-01	0-0.5	2.40	55
SD-G5-2	6-Nov-01	1-1.5	0.30	82
SD-H1-1	6-Nov-01	0-0.5	12.00	63
SD-H1-2	6-Nov-01	1-1.5	1.70	64
SD-H6-2 (D H1-2)	6-Nov-01	1-1.5	1.90	64
SD-H2-1	6-Nov-01	0-0.5	77.00	62
SD-H2-2	6-Nov-01	1-1.5	7.50	73
SD-H3-1	6-Nov-01	0-0.5	73.00	73
SD-H7-1 (D H3-1)	6-Nov-01	0-0.5	120.00	74
SD-H4-1	6-Nov-01	0-0.5	24.00	54
SD-H4-2	6-Nov-01	1-1.5	5.40	70
SD-H4-2B (R H4-2)	12-Nov-01	1-1.5	4.60	71
SD-H5-1	6-Nov-01	0-0.5	18.00	74
SD-H5-2	6-Nov-01	1-1.5	7.40	74
SD-H12-1	12-Nov-01	0-0.5	1.90	75
SD-H12-2	12-Nov-01	1-1.5	0.30 ND	77
SD-I1-1	6-Nov-01	0-0.5	18.00	65
SD-I1-2	6-Nov-01	1-1.5	3.30	72
SD-I2-1	6-Nov-01	0-0.5	97.00	69
SD-I2-2	6-Nov-01	1-1.5	3.90	67
SD-I3-1	6-Nov-01	0-0.5	69.00	62
SD-I3-2	6-Nov-01	1-1.5	4.80	63
SD-I6-2 (D I3-2)	6-Nov-01	1-1.5	13.00	64
SD-I4-1	6-Nov-01	0-0.5	15.00	82
SD-I4-2	6-Nov-01	1-1.5	20.00	81
SD-I5-1	6-Nov-01	0-0.5	140.00	69
SD-I5-2	6-Nov-01	1-1.5	2.70	84
SD-I12-1	12-Nov-01	0-0.5	0.91	90
SD-J1-1	6-Nov-01	0-0.5	4.80	66
SD-J1-2	6-Nov-01	1-1.5	0.45	66
SD-J2-1	6-Nov-01	0-0.5	230.00	75
SD-J2-2	6-Nov-01	1-1.5	1.00	65
SD-J3-1	6-Nov-01	0-0.5	250.00	72
SD-J3-2	6-Nov-01	1-1.5	1.80	66
SD-J4-2	6-Nov-01	1-1.5	2.90	69
SD-J5-1	6-Nov-01	0-0.5	28.00	83
SD-J5-2	6-Nov-01	1-1.5	4.00	65
SD-J12-1	12-Nov-01	0-0.5	0.96	74
SD-K1-1	6-Nov-01	0-0.5	3.90	80
SD-K1-2	6-Nov-01	1-1.5	0.75	80

Notes:
1. SD-H6-2 is duplicate of SD-H1-2.
2. SD-H7-1 is duplicate of SD-H3-1.
3. SD-I6-2 is duplicate of SD-I3-2.
4. SD-H4-2B is replicate sample of SD-H4-2.
5. ND - Not detected above laboratory detection limit.

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Table 2-4 - Streambed Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
SD-K2-1	6-Nov-01	0-0.5	64.00	78
SD-K6-1 (D K2-1)	6-Nov-01	0-0.5	97.00	79
SD-K2-2	6-Nov-01	1-1.5	18.00	81
SD-K3-1	6-Nov-01	0-0.5	9.40	79
SD-K4-1	6-Nov-01	0-0.5	53.00	87
SD-K5-1	6-Nov-01	0-0.5	15.00	78
SD-K5-2	6-Nov-01	1-1.5	11.00	86
SD-K12-1	12-Nov-01	0-0.5	1.10	83
SD-L1-1	7-Nov-01	0-0.5	14.00	66
SD-L1-2	7-Nov-01	1-1.5	1.10	77
SD-L2-1	7-Nov-01	0-0.5	40.00	79
SD-L2-2	7-Nov-01	1-1.5	12.00	81
ND-L3-1	7-Nov-01	0-0.5	53.00	81
SD-L4-1	7-Nov-01	0-0.5	2.70	81
SD-L4-2	7-Nov-01	1-1.5	1.50	79
SD-L5-1	7-Nov-01	0-0.5	1.90	79
SD-L5-2	7-Nov-01	1-1.5	1.20	85
Area 11 - North Ditch				
ND-A1-1	7-Nov-01	0-0.5	1.40	79
ND-A2-1	7-Nov-01	0-0.5	6.00	83
ND-A2-2	7-Nov-01	1-1.5	8.90	84
ND-A7-2 (D A2-2)	7-Nov-01	1-1.5	6.20	87
ND-A3-1	7-Nov-01	0-0.5	910.00	45
ND-A4-1	7-Nov-01	0-0.5	170.00	57
ND-A6-1 (D A4-1)	7-Nov-01	0-0.5	200.00	60
ND-A5-1	7-Nov-01	0-0.5	40.00	82
ND-A5-2	7-Nov-01	1-1.5	24.00	86
ND-B1-1	7-Nov-01	0-0.5	8.60	91
ND-B1-2	7-Nov-01	1-1.5	3.60	89
ND-B2-1	7-Nov-01	0-0.5	45.00	80
ND-B2-2	7-Nov-01	1-1.5	8.80	86
ND-B3-1	7-Nov-01	0-0.5	340.00	65
ND-B3-2	7-Nov-01	1-1.5	13.00	87
ND-B4-1	7-Nov-01	0-0.5	210.00	70
ND-B4-2	7-Nov-01	1-1.5	5.50	83
ND-B6-2 (D B4-2)	7-Nov-01	1-1.5	9.40	84
ND-B5-1	7-Nov-01	0-0.5	38.00	80
ND-B5-2	7-Nov-01	1-1.5	11.00	83
ND-C1-1	7-Nov-01	0-0.5	5.60	86
ND-C1-2	7-Nov-01	1-1.5	2.10	87
ND-C6-2 (D C1-2)	7-Nov-01	1-1.5	1.50	86
ND-C2-1	7-Nov-01	0-0.5	6.10	87
ND-C3-1	7-Nov-01	0-0.5	16.00	85
ND-C3-2	7-Nov-01	1-1.5	9.70	89
ND-C4-1	7-Nov-01	0-0.5	16.00	79
ND-C4-2	7-Nov-01	1-1.5	15.00	82
ND-C5-1	7-Nov-01	0-0.5	2.30	88
ND-C5-2	7-Nov-01	1-1.5	1.70	88
ND-D1-1	7-Nov-01	0-0.5	6.60	88
ND-D1-2	7-Nov-01	1-1.5	5.20	86
ND-D2-1	7-Nov-01	0-0.5	4.00	90
ND-D2-2	7-Nov-01	1-1.5	5.20	88
ND-D3-1	7-Nov-01	0-0.5	1.20	88
ND-D3-2	7-Nov-01	1-1.5	7.90	87

Notes:
1. SD-K6-1 is duplicate of SDK2-1.
2. ND-A7-2 is duplicate of ND-A2-2.
3. ND-B6-2 is duplicate of ND-B4-2.
4. ND-C6-2 is duplicate of ND-C1-2.
5. ND-A6-1 is duplicate of ND-A4-2.
6. ND - Not detected above laboratory detection limit.

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Table 2-4 - Streambed Characterization Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
ND-E1-1	7-Nov-01	0-0.5	5.20	88
ND-E1-2	7-Nov-01	1-1.5	9.70	89
ND-E2-2	7-Nov-01	1-1.5	2.10	76
ND-E3-1	7-Nov-01	0-0.5	9.40	88
ND-E3-2	7-Nov-01	1-1.5	7.40	86

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Table 2-5 - Southern Cove Sediment Samples

Sample ID	Sample Date	Sample Depth (feet)	Total Mercury (mg/kg)	Total Solids (%)
Area 10 - Southern Cove Sediment Samples				
SD10-A1-1	8-Nov-01	0-0.2	1.20	27
SD10-A1-2	8-Nov-01	0.8-1	0.28 ND	83
SD10-A2-1	8-Nov-01	0-0.2	0.96	26
SD10-A2-2	8-Nov-01	0.8-1	0.22 ND	89
SD10-A3-1	8-Nov-01	0-0.2	0.81	27
SD10-A3-2	8-Nov-01	0.8-1	0.23 ND	86
SD10-A4-1	8-Nov-01	0-0.2	2.40	22
SD10-A4-2	8-Nov-01	0.8-1	0.30 ND	80
SD10-A5-1	8-Nov-01	0-0.2	2.00	23
SD10-A5-2	8-Nov-01	0.8-1	0.49	74
SD10-B1-1	8-Nov-01	0-0.2	1.80	26
SD10-B1-2	8-Nov-01	0.8-1	0.30 ND	73
SD10-B2-1	8-Nov-01	0-0.2	2.00	26
SD10-B2-2	8-Nov-01	0.8-1	0.24 ND	86
SD10-B3-1	8-Nov-01	0-0.2	2.00	25
SD10-B3-2	8-Nov-01	0.8-1	5.80	50
SD10-B3-3	8-Nov-01	1.5-2	0.32 ND	73
SD10-B6-2 (D B3-3)	8-Nov-01	1.5-2	0.32 ND	73
SD10-B4-1	8-Nov-01	0-0.2	2.50	24
SD10-B4-2	8-Nov-01	0.8-1	1.70	53
SD10-B4-3	8-Nov-01	1.5-2	5.70	42
SD10-B5-1	8-Nov-01	0-0.2	2.30	23
SD10-B5-2	8-Nov-01	0.8-1	1.80	70
SD10-B5-3	8-Nov-01	1.5-2	0.26 ND	83
SD10-C1-1	8-Nov-01	0-0.2	2.60	28
SD10-C1-2	8-Nov-01	0.8-1	0.26 ND	75
SD10-C2-1	8-Nov-01	0-0.2	2.00	26
SD10-C2-2	8-Nov-01	0.8-1	0.34 ND	71
SD10-C3-1	8-Nov-01	0-0.2	2.10	28
SD10-C3-2	8-Nov-01	0.8-1	49.00	37
SD10-C3-3	8-Nov-01	1.5-2	0.26 ND	79
SD10-C4-1	8-Nov-01	0-0.2	2.40	26
SD10-C4-2	8-Nov-01	0.8-1	3.20	37
SD10-C4-3	8-Nov-01	1.5-2	0.34 ND	73
SD10-C7-3 (D C4-3)	8-Nov-01	1.5-2	0.34 ND	72
SD10-C5-1	8-Nov-01	0-0.2	0.89 ND	23
SD10-C5-2	8-Nov-01	0.8-1	68.00	38
SD10-C5-3	8-Nov-01	1.5-2	0.52	73
SD10-C6-3 (D C5-3)	8-Nov-01	1.5-2	0.33 ND	72

Notes:
1. SD10-B6-2 is duplicate of SD10-B3-3.
2. SD10-C7-3 is duplicate of SD10-C4-3.
3. SD10-C6-3 is duplicate of SD10-D5-3.
4. ND - Not detected above laboratory detection limit.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Industrial Sewer Test Pit Samples
Table 2-6

Sample ID	Sample Depth (feet)	Headspace (mg/m^3)	Total Hg (ppm)	Percent Solids
ISTP-1_2	2	0.000	6.71	87.89
ISTP-1_8	8	0.000	2.24	84.94
ISTP-1_9	9	0.000	1.63 (3.6)	87.48 (84)
ISTP-2_2	2	0.000	0.17	93.26
ISTP-2_4	4	0.000	0.11	91.97
ISTP-4_6	6	0.002	2.87	82.22
ISTP-4_2	2	0.000	1.78	91.12
ISTP-5_5	5	0.012	12.23	87.29
ISTP-5_2	2	0.009	11.95	92.03
ISTP-5_6	6	0.000	11.07	90.52
ISTP-5_6 - Dup	6		11.16	90.52
ISTP-5_7	7	0.000	6.66	79.79
ISTP-6_2	2	0.009	20.54	93.51
ISTP-6_4	4	0.027	7.13	79.6
ISTP-6_5	5	0.170	4.69 (5.2)	78.21 (82)
ISTP-7_2	2	0.029	22.45	85.41
ISTP-7_4	4	0.069	10.44	79.34
ISTP-7_4.5	4.5	0.216	7.93 (10.0)	82.49 (88)
ISTP-8_2	2	0.000	1.32	85.46
ISTP-8_4	4	0.000	31.45	82.67
ISTP-9_3	0.25	0.005	2.55 (8.1)	86.54 (88)
ISTP-9_2	2	0.000	0.06	91.21
ISTP-9_2 -Dup	2	0.000	0.06	91.21
ISTP-10_2	2	0.000	15.48	90.94
ISTP-10_4	4	0.000	8.34	88.36
ISTP-10_6.5	6.5	0.005	0.62	86.24
ISTP-10_6.5 - Dup	6.5		0.63	86.24

Notes:

1. Total mercury values by onsite lab operated by Acheron.
2. Values in parentheses measured by Alpha Analytical Laboratories.
3. Dup - Duplicate sample.

HoltraChem Manufacturing Site
Orrington, Maine
Corrective Measures Field Investigation
Table 2-7 - Landfill 2 Groundwater Samples

Sample ID	Dissolved Hg (mg/L)		Dissolved Na (mg/L)	Chloride (mg/L)
WP-1	0.0005	ND	21	17
WP-2A	0.0005	ND	22	29
WP-4A	0.0005	ND	29	42
WP-5A	0.0005	ND	120	32
WP-6	0.0005	ND	120	9.3
WP-7	0.0005	ND	76	10
WP-8	0.0005	ND	85	27
WP-9	0.0005	ND	110	76
WP-10	0.0005	ND	220	130
WP-11	0.0005	ND	170	160
WP-12	Damaged			
WP-13	0.0005	ND	220	240
WP-14	0.0005	ND	130	80
WP-15	0.0005	ND	120	110
WP-16	0.0005	ND	140	130
WP-17	0.0005	ND	200	190
WP-18	0.0005	ND	110	63

Notes:
1. ND - Not detected above laboratory detection limit.

Orrington, Maine
Corrective Measures Field Investigation
Table 2-8 - Groundwater Samples

Well No. Date Sampled	Units	GW-P2A 6-Nov-01	GW-P13 6-Nov-01	GW-B303-B1 5-Nov-01	GW-B303-B2 5-Nov-01	GW-B304-B1 5-Nov-01	GW-B306-B1 6-Nov-01	GW-B306-B2 6-Nov-01	GW-B307-B1 6-Nov-01	GW-B307-B2 6-Nov-01	GW-B309-B1 6-Nov-01	GW-B316-01 7-Nov-01	GW-B321-B1 6-Nov-01	GW-B321-B2 6-Nov-01
Field Parameters														
Depth to water	feet	13.55	36.70	6.70	7.68	15.45	20.30	Dry	17.38	17.32	24.85	30.63	36.97	39.33
Temperature	°C	12.72	8.78	8.20	8.78	8.78	9.68		8.45	8.09	8.43	10.20	8.79	8.70
Specific Conductance	uS/cm	1794.00	1535.00	177.00	192.00	1063.00	1698.00		255.00	220.00	524.00	10975.00	4044.00	3661.00
DO	%	15.00	24.70	83.00	67.20	27.00	55.50		11.00	29.10	79.30	68.90	5.70	35.30
DO	mg/L	1.58	2.86	9.76	7.81	3.10	6.26		1.28	3.49	9.28	7.43	0.64	4.06
pH	SU	6.42	7.32	7.86	7.88	7.36	8.45		8.92	9.20	8.00	7.40	6.75	6.63
ORP	mV	264.20	245.20	263.60	268.40	165.20	246.30		216.30	209.10	238.80	236.50	263.20	269.40
Turbidity	NTU	2.64	3.77	0.00	0.16	1.41			4.64	1.05	4.84	offscale	0.26	167.00
Inorganics														
Mercury, Total	mg/l	0.0072	0.0005 ND	NA	NA	NA	0.0005 ND	NA	NA	NA	0.0005 ND	2.344	0.0005 ND	0.0059
Mercury, Dissolved	mg/l	0.0057	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0005 ND	0.0266	0.0005 ND	0.0005 ND
Alkalinity, Total	mg $CaCO_3$/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	380	NA	NA
Chloride	mg/l	NA	NA	NA	NA	180	NA	NA	2.8	3.2	NA	3800	1200	1100
Total Organic Carbon	mg/l	NA	NA	NA	NA	0.87	NA	NA	ND	ND	NA	9.1	NA	NA
Hardness	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	450	NA	NA
Iron, Dissolved	mg/l	NA	NA	NA	NA	ND	NA	NA	ND	ND	NA	ND	NA	NA
Manganese, Dissolved	mg/l	NA	NA	NA	NA	0.01	NA	NA	ND	ND	NA	0.01	NA	NA
Silica, Dissolved	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.2	NA	NA
Sodium, Dissolved	mg/l	NA	NA	NA	NA	170	NA	NA	22	26	NA	2400	NA	NA
Sulfate	mg/l	NA	NA	NA	NA	26	NA	NA	30	21	NA	NA	NA	NA
Organics														
Chloroform	ug/l	45	37	ND	ND	NA	7	3.8	NA	NA	2	81	NA	NA
Carbon tetrachloride	ug/l	78	70	ND	ND	NA	2.9	0.82	NA	NA	8.1	>1000	NA	NA
Dibromochloromethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Tetrachloroethene	ug/l	ND	0.61	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Bromodichloromethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Bromoform	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Chloromethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	69	NA	NA
Bromomethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Chloroethane	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
1,1-Dichloroethene	ug/l	ND	5.4	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
trans-1,2-Dichloroethene	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Trichloroethene	ug/l	ND	1.1	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Methyl tert butyl ether	ug/l	1.7	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
cis-1,2-Dichloroethene	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Acetone	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Carbon disulfide	ug/l	ND	88	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
2-Butanone	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
p-Isopropyltoluene	ug/l	ND	ND	ND	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA
Chloropicrin	ug/l	ND	9500	ND	ND	NA	ND	ND	NA	NA	ND	37000	NA	NA
Total VOCs	ug/l	124.7	9702.11	0	0	NA	9.9	4.62	NA	NA	10.1	38150	NA	NA

* GW-1000 = Dup of GW-B506-B1
GW-2000 = Dup of GW-326-02
GW-3000 = Dup of GW-513-01

Orrington, Maine
Corrective Measures Field Investigation
Table 2-8 - Groundwater Samples

Well No. Date Sampled	Units	GW-B326-02 7-Nov-01	GW-2000* 7-Nov-01	GW-B326-03 7-Nov-01	GW-327-01 8-Nov-01	GW-401-01 7-Nov-01	GW-402-01 7-Nov-01	GW-410-B1 6-Nov-01	GW-501-01 8-Nov-01	GW-502-01 8-Nov-01	GW-503-01 8-Nov-01	GW-505-B1 6-Nov-01	GW-505-B2 6-Nov-01	GW-506-B1 6-Nov-01
Field Parameters														
Depth to water	feet	36.85		36.31	10.29	27.76	31.60	26.40	33.60	12.03	31.95	6.76	15.33	34.00
Temperature	°C	10.48		10.05	12.28	10.05	10.86	10.03	10.67	15.70	9.96	8.53	8.50	8.99
Specific Conductance	uS/cm	3302.00		2661.00	24131.00	4072.00	12500.00	1991.00	38719.00	18876.00	18642.00	4933.00	5415.00	3110.00
DO	%	54.80		76.90	83.60	8.60	79.90	11.50	73.90	62.10	48.20	4.30	18.20	46.50
DO	mg/L	5.74		8.60	8.04	0.93	8.23	1.27	6.97	566.00	4.85	0.48	2.10	5.13
pH	SU	6.64		6.34	12.55	6.66	6.98	6.63	7.76	7.34	8.26	6.62	6.83	6.57
ORP	mV	254.80		251.80	160.90	186.90	224.20		138.90	142.90	63.00	219.50	243.30	302.20
Turbidity	NTU	6.01		46.40	80.70	16.70	33.70	1.74	335.00	6.58	242.00	0.51	2.65	2.48
Inorganics														
Mercury, Total	mg/l	0.3452	0.3567	0.1493	0.0161	0.0321	0.1866	0.0117	2.383	0.0862	0.0032	0.0005 ND	0.0005 ND	0.1029
Mercury, Dissolved	mg/l	0.2618	0.2592	0.1254	0.0036	0.0163	0.0999	0.0077	0.2979	0.0506	0.0005 ND	0.0005 ND	0.0005 ND	0.0754
Alkalinity, Total	mg $CaCO_3$/L	190	190	180	7200	230	330	NA	440	300	280	NA	NA	210
Chloride	mg/l	900	880	680	1700	1200	4300	NA	9300	6900	6400	1600	1700	910
Total Organic Carbon	mg/l	7.2	7.3	3.2	220	7.6	20	NA	24	13	14	NA	NA	7
Hardness	mg/l	220	220	260	30	420	220	NA	350	370	360	NA	NA	220
Iron, Dissolved	mg/l	ND	ND	ND	0.36	ND	ND	NA	ND	ND	0.08	NA	NA	ND
Manganese, Dissolved	mg/l	0.87	0.88	0.02	0.03	0.84	0.74	NA	0.31	0.05	0.34	NA	NA	0.04
Silica, Dissolved	mg/l	11	11	9	270	12	9.7	NA	7.9	9	4.4	NA	NA	9.4
Sodium, Dissolved	mg/l	560	550	440	3200	670	2400	NA	5200	3500	3700	NA	NA	550
Sulfate	mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics														
Chloroform	ug/l	7.6	7.4	7.5	ND	6.9	66	48	86	59	5.6	NA	NA	15
Carbon tetrachloride	ug/l	1.3	1.4	0.85	ND	2.6	>200	150	1.8	ND	ND	NA	NA	45
Dibromochloromethane	ug/l	ND	ND	ND	ND	ND	ND	ND	8.8	ND	ND	NA	NA	ND
Tetrachloroethene	ug/l	0.71	0.68	0.56	ND	ND	4	ND	3.4	0.62	ND	NA	NA	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	ND	2.6	ND	ND	ND	ND	NA	NA	ND
Bromodichloromethane	ug/l	ND	ND	ND	ND	ND	1.5	ND	7	ND	ND	NA	NA	ND
Bromoform	ug/l	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	NA	NA	ND
Chloromethane	ug/l	ND	ND	ND	ND	ND	72	ND	ND	ND	ND	NA	NA	ND
Bromomethane	ug/l	ND	ND	ND	ND	ND	8.5	ND	ND	ND	ND	NA	NA	ND
Chloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	1.1	1.2	NA	NA	ND
1,1-Dichloroethene	ug/l	ND	ND	ND	ND	ND	4.4	ND	ND	ND	ND	NA	NA	ND
trans-1,2-Dichloroethene	ug/l	ND	ND	ND	0.86	ND	ND	ND	ND	ND	ND	NA	NA	ND
Trichloroethene	ug/l	8.2	8.5	6.5	ND	8.6	4.3	ND	19	ND	1.8	NA	NA	0.64
Methyl tert butyl ether	ug/l	ND	ND	ND	6.1	1	ND	ND	ND	ND	ND	NA	NA	ND
cis-1,2-Dichloroethene	ug/l	0.53	0.51	ND	4.9	0.59	ND	ND	1.5	ND	ND	NA	NA	ND
Acetone	ug/l	ND	ND	ND	44	ND	ND	ND	ND	ND	ND	NA	NA	ND
Carbon disulfide	ug/l	ND	ND	ND	ND	ND	16	ND	ND	ND	9.6	NA	NA	ND
2-Butanone	ug/l	ND	ND	ND	5.2	ND	ND	ND	ND	ND	ND	NA	NA	ND
p-Isopropyltoluene	ug/l	ND	ND	ND	0.87	ND	ND	ND	ND	ND	ND	NA	NA	ND
Chloropicrin	ug/l	ND	ND	ND	10	ND	21000	ND	140	ND	270	NA	NA	ND
Total VOCs	ug/l	18.34	18.49	15.41	71.93	19.69	21379.3	198	281.5	60.72	288.2	NA	NA	60.64

* GW-1000 = Dup of GW-B506-B1
GW-2000 = Dup of GW-326-02
GW-3000 = Dup of GW-513-01

Orrington, Maine
Corrective Measures Field Investigation
Table 2-8 - Groundwater Samples

Well No. Date Sampled	Units	GW-1000* 6-Nov-01	GW-509-B1 8-Nov-01	GW-510-01 8-Nov-01	GW-511-B1 6-Nov-01	GW-511-B2 6-Nov-01	GW-512-01 6-Nov-01	GW-513-01 7-Nov-01	GW-3000* 7-Nov-01
Field Parameters									
Depth to water	feet		11.22	20.09	0.85	11.25	41.30	30.80	
Temperature	°C		9.80	12.26	8.45	8.90	11.09	10.45	
Specific Conductance	uS/cm		16234.00	120957.00	5628.00	5317.00	2826.00	9423.00	
DO	%		49.00	89.00	8.90	16.80	73.00	38.80	
DO	mg/L		5.13	5.32	1.02	1.91	7.94	4.19	
pH	SU		12.05	7.13	6.69	6.73	6.27	6.60	
ORP	mV		200.00	142.30	116.50	140.50	280.10	226.80	
Turbidity	NTU		7.23	offscale	5.28	26.90	29.30	4.17	
Inorganics									
Mercury, Total	mg/l	0.1016	0.002	0.1605	0.0005 ND	0.0005 ND	0.4378	0.211	0.2153
Mercury, Dissolved	mg/l	0.0785	0.0016	0.0847	0.0005 ND	0.0005 ND	0.3259	0.1701	0.1833
Alkalinity, Total	mg $CaCO_3$/L	NA	6600	220	NA	NA	180	250	250
Chloride	mg/l	NA	1600	66000	1800	1600	790	3000	3000
Total Organic Carbon	mg/l	6.8	260	NA	NA	NA	7.4	8.4	8.9
Hardness	mg/l	NA	18	4200	NA	NA	250	260	250
Iron, Dissolved	mg/l	ND	0.05	0.05	NA	NA	ND	ND	ND
Manganese, Dissolved	mg/l	0.04	ND	2.1	NA	NA	0.22	1.6	1.5
Silica, Dissolved	mg/l	9.4	2800	7.7	NA	NA	9.2	10	10
Sodium, Dissolved	mg/l	550	3500	28000	NA	NA	470	1900	1900
Sulfate	mg/l	NA	NA	NA	NA	NA	NA	NA	NA
Organics									
Chloroform	ug/l	16	ND	11	NA	NA	6.2	230	110
Carbon tetrachloride	ug/l	45	ND	ND	NA	NA	1.4	>2000	>1000
Dibromochloromethane	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Tetrachloroethene	ug/l	ND	ND	2	NA	NA	ND	ND	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Bromodichloromethane	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Bromoform	ug/l	ND	ND	3	NA	NA	ND	ND	ND
Chloromethane	ug/l	ND	ND	ND	NA	NA	ND	64	66
Bromomethane	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Chloroethane	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
1,1-Dichloroethene	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
trans-1,2-Dichloroethene	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Trichloroethene	ug/l	0.71	ND	ND	NA	NA	7.5	10	8.4
Methyl tert butyl ether	ug/l	ND	1.6	ND	NA	NA	ND	ND	ND
cis-1,2-Dichloroethene	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Acetone	ug/l	ND	68	ND	NA	NA	ND	ND	ND
Carbon disulfide	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
2-Butanone	ug/l	ND	8.4	ND	NA	NA	ND	ND	ND
p-Isopropyltoluene	ug/l	ND	ND	ND	NA	NA	ND	ND	ND
Chloropicrin	ug/l	ND	ND	1000	NA	NA	ND	14400	28000
Total VOCs	ug/l	61.71	78	1016	NA	NA	15.1	16704	29184.4

* GW-1000 = Dup of GW-B506-B1
GW-2000 = Dup of GW-326-02
GW-3000 = Dup of GW-513-01

Appendix A
MADEP and EPA Approval Letters

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

MARTHA KIRKPATRICK
COMMISSIONER

November 2, 2001

Ernest C. Ashley, P.G.
Camp, Dresser & McKee, Inc
One Cambridge Place
50 Hampshire Street
Cambridge, Massachusetts 02139

Dear Mr. Ashley:

The Maine Department of Environmental Protection has reviewed your proposal for initial Corrective Measures Study Investigation, specifically the plan dated October 19, 2001. In addition to the comments that Ernie Waterman provided you, we have the following comments.

This proposed round of investigations is intended to address some of the equipment handling and storage areas of concern to the Department, and to generate information useful in costing and scaling the corrective measures. The work planned needs to be done, it is expeditious to utilize the remainder of this field season, but it may not be complete.

Area 1 – Retort Building Area. In oral communication with you at the site on October 22, 2001, the plan for this area has changed. In order to avoid generating a large amount of potential mercury-rich waste soils from test pitting. CDM now plans to do a line of geoprobe borings on the east and west sides of the building. The change has three potential drawbacks relative to the original plan to excavate test pits. First, the borings will not expose as much of the subsurface for examination. To compensate, CDM should use at least six boring on each side of the building. Second, geoprobe refusal my limit the depth of investigation. Perhaps CDM could fall back on a convential boring rig if shallow refusals are encountered. Finally, one of the stated purposes of the investigation is to evaluate the possible drainpipe from the retort building. That will not be possible with a geoprobe. How will you identify the drainpipe with the change in the investigation plan?

Area 2 – Former Equipment Storage Area. Additional test pits in this area should be located so as not to duplicate the test pits done for the hemlock plank leachfield investigation. On site on October 22, 2001 you described a long test pit along the base of the scarp, northwest of pavement edge and behind wells B-315. As we discussed, the test

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312 CANCO ROAD
PORTLAND, MAINE 04103
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PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 764-1507

pits should be spaced to encompass the area of B-315 and to investigate the likely area of equipment storage.

Area 3 – Landfill Ridge Area. It may be difficult to differentiate the fill from the native material in this area. Perhaps historical air photos could be a good guide to locating the test pits. This is a portion of the investigation plan that John Beane would like to observe. Please notify us of the schedule for this as soon as you know it.

Area 4 – Scrap Metal Area. The real challenge here is that the area is so large that it would take many many test pits and borings to characterize the area adequately. Depending upon what you find, additional work may be needed under the CMS.

Area 5 – Coal Brine Filter Area. This section looks ok.

Area 6, - Nitromethane Building. As Ernie Waterman mentioned, the area to both sides of the Nitromethane Building have been used to store equipment including waste equipment.

Area 7 – Transformer Area. This section looks ok.

Area 8 – Cell Building. The proposed borings will be useful to characterize the soil around the Cell Building, but they will not provide useful information about the mercury contamination under the building. Given the density of mercury, it is very likely that the mercury if it were present under the building would go straight down. In addition anodes at chloralkali plants in some locations were impregnated with PCB's. It would be good to sample a couple of the soil samples for PCB's.

Area 9 and Area 11 - Each sediment sample should be described. Grain size, color and abundance of organic should be noted. This may come in useful in evaluating any outliers. In addition for Area 11, given the discussion of potential PCB use in the cell building, collecting a PCB sample from one of the sediment samples in the northern ditch would be good.

Area 10 – Southern Cove. The approach looks reasonable.

Area 12 – Former Equipment Storage Area. The sand and gravel may be quite deep at this location. CDM may have to dig pretty deep here to find the uppermost low-permeability layer.

Area 13 – No comments.

Area 14 and 15 – CDM should keep in mind that piezometers installed in test pit excavations will give only general information about the location of the water table. If accurate and precise water table depths are necessary, then the piezometers should be installed in borings.

If you have any questions regarding this letter, please feel free to call me at (207) 287-2651.

Sincerely;

Stacy A. Ladner

Stacy A. Ladner, Supervisor
Division Oil & Hazardous Waste Facilities Regulatory
Bureau of Remediation and Solid Waste Management

Cc Ernie Waterman, EPA
John Beane, DEP
Pat. Duft, Mallinckrodt

corrective measures sl

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

November 14, 2001

Ernest C. Ashley, P.G.
Camp, Dresser & McKee Inc.
One Cambridge Place
50 Hampshire Street
Cambridge, Massachusetts 02139

Dear Mr. Ashley:

Thank you for your letter outlining field activities planned for the HoltraChem site in November. EPA appreciates Mallinckrodt's initiative in working ahead of the requirements of the Consent Decree between EPA and HoltraChem to secure data that will be required for the Corrective Measures Study (CMS).

The time frame allowed before the initiation of this work prevents EPA from preparing formal and comprehensive comments on the planned work. EPA therefore reserves the right to make comments on the representativeness and the useability of the outcome of this work and to require additional work during the CMS.

EPA has been able to make a limited review of the plan you have sent to us and, as we discussed over the telephone on October 25, 2001 EPA can offer the following observations:

1. At the nitromethane storage building equipment lay down has occurred on both sides of the building and the planned grid of hand auger sampling should be shifted or expanded to cover both the western and eastern sides of the building.

2. Although EPA does not object to geotechnical information being generated at sites that Mallinckrodt feels it is likely to propose as the locations for a Corrective Action Management Unit, we feel the question of where and whether to site a CAMU at the facility is a open ended question for the CMS and that Mallincrodt must conduct a fuller review which details the siting criteria leading to any specific location proposals made to EPA and Maine DEP.

3. Based upon conditions we observed in the field during our October 22nd site visit, it appears the transect sampling at the northern ditch may need to extend a significant distance further to the east to bracket mercury contamination. Any field based analyses that you can perform to guide the limits of these transects in the field may be useful.

Additional test pits located in the area east of the Northern ditch and south of the railroad loading area may be an alternative means of meeting additional delineation needs in this area.

If you have any questions on this letter please call me at 617-918-1369.

Sincerely,

Ernest Waterman, P.G.
RCRA Corrective Action Section

cc: S. Ladner, Maine DEP
P. Duft, Mallinckrodt

Appendix B
Soil Boring Logs

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-01

Client: Mallinckrodt

Project Name: HoltraChem Manufacturing Site

Project Location: Orrington, ME

Project Number: 0654-10508

Drilling Contractor: Acheron

Surface Elevation (ft.): 100

Drilling Method/Rig: Direct Push/ATV Geoprobe

Total Depth (ft.): 6

Drillers: Paul Dorobis

Depth to Initial Water Level (ft. BGS): NA

Drilling Date: Start: 11/14/01 **End:** 11/14/01

Abandonment Method: Grout to surface

Borehole Coordinates:

Field Screening Instrument: OVM / MVA

N 10,069.83 E 19,350.33

Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/14		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, SILT, some c-f sand, little c-f gravel.
GP	2-4	24/14		0.0/0.0			2.0-4.0 ft: Dry, brown, SILT, some c-f sand, little c-f gravel.
GP	4-6(D)	24/22	95.0 5	0.0/0.0		Till	4.0-6.0 ft: Dry, dense, brown, SILT, some c-f sand, little c-f gravel.
			90.0 10				Bottom of Exploration at 6 feet BGS
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-02

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 6
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,063.49 E 19,346.13
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			ML-SM	0.0-0.1 ft: ASPHALT.
GP	0-2	24/8		0.0/0.0		ML	0.1-0.3 ft: Dry, brown, m-f SAND and SILT, some c sand, trace m-f gravel.
							0.3-0.7 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	2-4(D)	24/20		0.0/0.0			2.0-4.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
							4.0-4.5 ft: Moist, brown, SILT, some c-f sand, little c-f gravel, trace clay.
GP	4-6	24/20	95.0 5	0.0/0.0		Till	4.5-5.7 ft: Dry, hard, brown, SILT, some c-f sand, little m-f gravel.
							Bottom of Exploration at 6 feet BGS
			90.0 10				
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-03

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 2
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,074.07 E 19,342.87
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
GP	0-2	24/8	0	0.0/0.0		ML-SM	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, f SAND and SILT, little c-f gravel; phyllite in spoon tip.
							Refusal - Bottom of Exploration at 2 feet BGS
			95.0 5				
			90.0 10				
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-04

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 8
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,067.49 E 19,339.05
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			ML-SM	0.0-0.1 ft: ASPHALT.
GP	0-2	24/8		0.0/0.0			0.1-2.0 ft: Dry, brown, f SAND and SILT, little c sand, trace m-f gravel.
GP	2-4	24/4		0.0/0.0			2.0-4.0 ft: Wet, brown, m-f SAND and SILT, little c sand, trace f gravel.
GP	4-6	24/8	95.0 5	0.0/0.0		ML	4.0-6.0 ft: Wet, brown, SILT, some c-f sand, little m-f gravel & clay.
GP	6-8	24/16		0.0/0.0		Till	6.0-8.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
			90.0 10				Bottom of Exploration at 8 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-05

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 2
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,052.10 E 19,331.12
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
GP	0-2	24/4	0	0.0/0.005		ML-SM	0.0-0.1 ft: ASPHALT. 0.0-0.1 ft: Dry, f SAND and SILT, little c sand, trace m-f gravel.
GP	2-4	24/4		0.0/0.0			2.0-4.0 ft: Wet, brown, m-f SAND and SILT, some c sand, little m-f gravel.
GP	4-6	24/20	95.0 5	0.0/0.0		ML	4.0-5.0 ft: Wet, brown, SILT, some c-f sand, little m-f gravel, trace clay.
						Till	5.0-5.9 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
							Bottom of Exploration at 6 feet BGS
			90.0 10				
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-06

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 7
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,087.06 E 19,318.86
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			SW	0.0-0.1 ft: ASPHALT.
	0-2					ML	0.1-0.6 ft: Dry, brown, m-f SAND, little m-f gravel, trace silt.
							0.6-2.6 ft: Dry, brown, SILT, little m-f gravel, trace sand.
GP		48/36		0.0/0.003			
	2-4						2.6-3.0 ft: Dry to moist, grey, SILT, little c-f gravel, trace clay.
	4-5.5		95.0			Till	4.0-7.0 ft: Dry to moist, brown/grey, SILT, little c-f sand and gravel, trace clay (till).
GP		36/36	5	0.0/0.004			
	5.5-7						
							Bottom of Exploration at 7 feet BGS
			90.0				
			10				
			85.0				
			15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-07

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 11
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,081.24 E 19,314.86
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
GP	0-2 2-4	48/24	0	0.0/0.0		SW	0.0-0.2 ft: ASPHALT. 0.2-2.0 ft: Moist to wet, brown, m-f SAND, little silt, trace m-f gravel. 2.0-4.0 ft: Moist to wet, brown, m-f SAND, little silt, trace m-f gravel.
GP	4-5.5 5.5-7	36/36	95.0 5	0.0/0.005		ML Till	4.0-4.5 ft: Wet, grey, SILT, some clay, little c-f sand, trace m-f gravel. 4.5-7.0 ft: Dry, grey, SILT, little c-f sand and m-f gravel, trace clay (till). Attempted to advance to 11' bgs. Unable to retrieve sampling sleeve.
			90.0 10				Bottom of Exploration at 7 feet BGS
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Sampling sleeve stuck at 11 feet - unable to retrieve sample.
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-08

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 10.5
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,075.35 E 19,309.51
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0			SW	0.0-0.2 ft: ASPHALT.
GP	0-2	24/8		0.0/0.009		ML	0.2-0.5 ft: Dry, dark brown, m-f SAND, little silt, trace m-f gravel. 0.5-0.7 ft: Dry, brown, SILT, little m-f sand.
GP	2-3.5	18/18		0.0/0.004			2.0-3.5 ft: Dry, brown, SILT, some m-f sand, little m-f gravel, trace clay.
GP	3.5-5.5	24/10	95.0 5	0.0/0.012			3.5-5.5 ft: Dry, brown, SILT, some c-f sand, trace clay.
GP	5.5-7.5	24/10		NA			5.5-7.5 ft: Dry, brown, SILT, some c-f sand, little f gravel, trace clay.
GRAB	9	18/18		NA		Till	7.5-9.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay (till).
GP	9-10.5	18/16	90.0 10	0.0/0.003			9.0-10.5 ft: Dry, brown, SILT, little m-f sand and f gravel, trace clay (till); rock in spoon tip.
							Bottom of Exploration at 10.5 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
NA = Not Analyzed
Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-09

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 9
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,068.53 E 19,307.47
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/6		0.0/0.003		SW	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, dark brown, m-f SAND, little silt, trace m-f gravel. 2.0-2.5 ft: Moist to wet, dark brown, m-f SAND, some c sand, little silt.
GP	2-4	24/14		0.0/0.004		ML	2.5-3.2 ft: Wet, dark brown, SILT, some c-f sand, little clay. 4.0-5.0 ft: Wet, dark brown, SILT, some c-f sand, little clay, trace f gravel.
GP	4-6	24/20	95.0 5	2.8/0.003		SW	5.0-5.7 ft: Wet, dark brown, m-f SAND, little silt. 6.0-7.0 ft: Wet, brown, m-f SAND, little m-f gravel and silt.
GP	6-8	24/24		1.1/0.0		ML	7.0-8.0 ft: Moist, brown, SILT, some m-f sand, little f gravel, trace clay.
GP	8-9	12/10		NA		Till	8.0-9.0 ft: Dry, brown, SILT, little m-f sand and m-f gravel, trace clay (till).
			90.0 10				Bottom of Exploration at 9 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
NA = Not Analyzed
Ground surface set to 100' temporary datum.
The sample collected from 4-6' was screened for the presence of chloropicrin using Sensidyne detector tubes. Cholorpicrin was not detected in the sample.

Reviewed by: **Date:**

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-10

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 6
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,090.97 E 19,303.24
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/12		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
GP	2-4	24/20		0.0/0.0		ML	2.0-3.3 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
						SW	3.3-3.5 ft: Dry, brown, m-f SAND.
GP	4-6	24/20	95.0 5	0.0/0.0		ML	3.5-3.7 ft: Dry to moist, brown, SILT, little c-f gravel, trace clay. 4.0-5.2 ft: Moist, brown/grey SILT, some c-f sand, little clay and m-f gravel. 5.2-5.7 ft: Dry, brown SILT, some c-f sand, little c-f gravel.
							Bottom of Exploration at 6 feet BGS
			90.0 10				
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: Date:

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-11

Client: Mallinckrodt
Project Location: Orrington, ME
Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/13/01 End: 11/13/01
Borehole Coordinates:
N 10,084.23 E 19,299.10
Surface Elevation (ft.): 100
Total Depth (ft.): 10
Depth to Initial Water Level (ft. BGS): NA
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
GP	0-2	24/6	0	0.0/0.003		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, dark brown, SILT, some c-f sand, little m-f gravel.
GP	2-4 (D)	24/14		0.0/0.0			2.0-4.0 ft: Dry to moist, brown, SILT, some c-f sand, little m-f gravel.
GP	4-6	24/14	95.0 5	0.0/0.009			4.0-6.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	6-8	24/20		0.0/0.011			6.0-8.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel.
GRAB	8-10	24/0		NA		Till	8.0-10.0 ft: Dry, grey, SILT, little c-f sand and m-f gravel, trace clay (till).
			90.0 10				Bottom of Exploration at 10 feet BGS
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
NA = Not Analyzed
Ground surface set to 100' temporary datum.

Reviewed by: Date:

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-12

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 8
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 End: 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,075.92 E 19,294.16
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/14		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, SILT, little c-f sand and m-f gravel, trace clay.
GP	2-4	24/14		0.0/0.004			2.0-2.7 ft: Dry, brown, SILT, little c-f sand and m-f gravel, trace clay. 2.7-3.2 ft: Moist, brown, SILT, some c-f sand, little clay and m-f gravel.
GP	4-6	24/16	95.0 5	0.0/0.0			4.0-6.0 ft: Moist, brown, SILT, some c-f sand, little m-f gravel and clay.
GP	6-8(D)	24/16		0.0/0.0			6.0-8.0 ft: Moist, brown, SILT, some c-f sand, little m-f gravel and clay.
			90.0 10				Bottom of Exploration at 8 feet BGS
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-13

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 9
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 End: 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,065.04 E 19,288.24
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			SW	0.0-0.1 ft: ASPHALT.
GP	0-2	24/16		0.0/0.0			0.1-2.0 ft: Dry, brown, m-f SAND, some c sand, little silt, trace m-f gravel.
							2.0-2.5 ft: Dry, brown, m-f SAND, some c sand, little silt, trace m-f gravel.
GP	2-4	24/12		0.0/0.0		ML	2.5-3.0 ft: Moist to wet, brown, SILT, some clay, little c-f gravel.
							4.0-4.5 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	4-6	24/12	95.0 / 5	0.0/0.010		SW	4.5-4.7 ft: Dry, light brown, m-f SAND.
						ML	4.7-5.0 ft: Moist, brown, SILT, some m-f sand, little clay.
GP	6-7.5	18/12		0.0/0.0			6.0-7.5 ft: Dry to moist, brown, SILT, some c-f sand, little clay.
							7.5-7.7 ft: GRAVEL.
GP	7.5-9	18/6		0.0/0.0		Till	7.7-8.0 ft: Dry, brown, SILT, some c-f sand & m-f gravel, trace clay.
			90.0 / 10				Bottom of Exploration at 9 feet BGS
			85.0 / 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/6/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-14

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 6
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 End: 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,097.00 E 19,287.00
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/12		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
GP	2-4	24/2		0.0/0.0			2.0-4.0 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
GP	4-6	24/24	95.0 5	0.0/0.0			4.0-6.0 ft: Dry, brown SILT, some c-f sand, little c-f gravel, trace clay.
							Bottom of Exploration at 6 feet BGS
			90.0 10				
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-15

Client: Mallinckrodt
Project Location: Orrington, ME
Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/14/01 End: 11/14/01
Borehole Coordinates:
N 10,089.00 E 19,284.00

Surface Elevation (ft.): 100
Total Depth (ft.): 6
Depth to Initial Water Level (ft. BGS): NA
Abandonment Method: Grout to surface
Field Screening Instrument: OVM/MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/8		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
							2.0-4.0 ft: No recovery.
GP	4-6	24/16	95.0 5	0.0/0.0			4.0-6.0 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
							Bottom of Exploration at 6 feet BGS
			90.0 10				
			85.0 15				
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-16

Client: Mallinckrodt
Project Location: Orrington, ME
Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/14/01 End: 11/14/01
Borehole Coordinates:
N 10,081.23 E 19,279.65
Surface Elevation (ft.): 100
Total Depth (ft.): 9
Depth to Initial Water Level (ft. BGS): NA
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0 0				
GP	0-2	24/12		0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, SILT, some c-f sand, trace clay.
GP	2-4	24/4		0.0/0.0			2.0-4.0 ft: Dry, brown, SILT, some c-f sand, little c-f gravel, trace clay.
GP	4-6	24/16	95.0 5	0.0/0.0			4.0-5.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel. 5.0-5.3 ft: Dry, brown, SILT, little m-f sand and clay.
GP	6-7.5	18/16		0.0/0.0			6.0-7.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	7.5-9	18/12		0.0/0.0			7.0-8.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay. 8.0-8.5 ft: Moist, brown, SILT, some clay, little c-f sand.
			90.0 10				Bottom of Exploration at 9 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-17

Client: Mallinckrodt
Project Location: Orrington, ME

Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/14/01 End: 11/14/01
Borehole Coordinates:
N 10,072.36 E 19,274.44

Surface Elevation (ft.): 100
Total Depth (ft.): 4
Depth to Initial Water Level (ft. BGS): NA
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
GP	0-2	24/4	0	0.0/0.0		ML	0.0-0.1 ft: ASPHALT. 0.1-2.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace silt.
GP	2-4	24/16		0.0/0.0			2.0-3.0 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace silt. 3.0-3.3 ft: Dry, brown, f SAND, little silt.
			95.0 / 5				Refusal - Bottom of Exploration at 4 feet BGS
			90.0 / 10				
			85.0 / 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB01-18

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 10
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/14/01 End: 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,061.70 E 19,267.22
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			ML	0.0-0.1 ft: ASPHALT.
GP	0-2	24/6		0.0/0.0			0.0-0.1 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
							2.0-2.5 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
GP	2-4	24/14		0.0/0.0		ML-SM	2.5-2.7 ft: Dry, brown, c-f SAND, little silt.
							2.7-3.2 ft: Dry, brown SILT and f SAND.
							4.0-5.0 ft: Dry, brown SILT, some c-f sand, little m-f gravel, trace clay.
GP	4-6	24/16	95.0 / 5	0.0/0.0			5.0-5.3 ft: Moist, brown, SILT, some c-f sand and clay, little m-f gravel.
							6.0-6.3 ft: Dry, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	6-8	24/16		0.0/0.0			6.3-7.0 ft: Dry, brown, SILT and c-f SAND, some f gravel, trace clay.
						SP	7.0-7.2 ft: Wet, brown, m-f SAND, little silt.
							7.2-7.4 ft: Wet, brown, c-f SAND, little silt.
						ML-SM	8.0-8.3 ft: Moist, brown, SILT, some c-f sand, little m-f gravel, trace clay.
GP	8-10	24/12		0.0/0.0			8.3-8.6 ft: Wet, brown, SILT and c-f SAND, some m-f gravel.
							8.6-9.0 ft: Moist, brown, SILT, some c-f sand & m-f gravel, trace clay.
			90.0 / 10				
			85.0 / 15				Bottom of Exploration at 10 feet BGS
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB03-01

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Maine Test Borings Inc.
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 29.7
Drillers: Mel, Daryll
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/12/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N E
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			0					
SS	0-2	24/11		0.0	3 3 4 6		SW	0.0-2.0 ft: Dry, loose, light brown, m-f SAND, little silt & gravel, trace glass.
SS	2-4	24/8		0.0	3 3 4 5			2.0-4.0 ft: Dry, loose, light brown, f SAND, some silt, little c sand, trace gravel.
SS	4-6	24/10	5	0.0	4 8 12 14		ML-SM	4.0-6.0 ft: Dry, m dense, olive-grey, SILT and f SAND, some m-f sand, little f gravel.
SS	6-8	24/10		0.0	5 6 5 13			6.0-8.0 ft: Dry, m dense, dark grey/blue SILT and f SAND, little clay, little c sand, trace gravel.
SS	8-10	24/9		0.0	6 8 10 8		SW	8.0-10.0 ft: Dry, m dense, dark brown/olive-grey, m-f SAND, some silt & clay, little gravel, trace organic fibers.
SS	10-12	24/11	10	0.0	7 8 7 5			10.0-12.0 ft: Dry, m dense, light brown, f SAND, some c sand, little f gravel, trace silt, wood fibers in spoon tip.
SS	12-14	24/4		0.0	8 25/0.2"		ML-SM FILL	12.0-13.0 ft: Dry, v dense, olive-grey SILT and m-f SAND, some c sand, trace f gravel; orange oxidation stains on silt; little broken, oxidized phyllite in spoon tip. 13.0 ft: Refusal.
			15					
SS	15-17	24/0		0.0	15 24 100/4"			15.0-17.0 ft: No Recovery.
SS	17-19	24/12		0.0	34 18 10 9		SW	17.0-19.0 ft: Dry, m dense, light brown, f SAND, some c-m sand, trace f gravel.
					5 8			19.0-21.0 ft: Moist, m dense, brown, c-f SAND.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
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MR - Mud Rotary
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CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
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CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Refusal encountered at 13 feet BGS - Drilling continued 10 feet to the east.
D = Duplicate sample collected

Reviewed by: **Date:**

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB03-01

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	19-21(D)	24/10	20	0.0	6 8			
SS	21-23	24/10		0.03	12 20 18 19			21.0-23.0 ft: Dry, dense, brown, m-f SAND, some c sand and gravel, trace weathered phyllite.
SS	23-25	24/12		0.0	7 10 9 10			23.0-25.0 ft: Dry, m dense, brown, f SAND, little m sand.
SS	25-27	24/18	25	0.03	10 11 12 15			25.0-27.0 ft: Dry, m dense, brown, f SAND, little m sand.
SS	27-29	24/20		0.05	11 11 17 27			27.0-28.0 ft: Dry, m dense, brown, f SAND, little m sand. 28.0-28.5 ft: Moist, m dense, brown SILT, some gravel and c-f sand.
SS	29-29.5	6/1.5		0.05	75/0.4"		ML	28.5-29.5 ft: Moist, v dense, brown SILT, some gravel & c-f sand.
			30					Refusal - Bottom of Exploration at 29.5 feet BGS
			35					
			40					
			45					
			50					

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB03-02

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Maine Test Borings Inc.
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 22
Drillers: Mel, Daryll
Depth to Initial Water Level (ft. BGS): NA
Drilling Date: Start: 11/13/01 **End:** 11/13/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: Mercury Vapor Analyzer
N E
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	0-2	24/8	0	0.02	3 4 5 7		ML	0.0-2.0 ft: Moist, loose, brown SILT, some c-f sand, trace gravel.
SS	2-4	24/10		0.028	3 4 7 6			2.0-4.0 ft: Moist, m dense, brown SILT, little m-f sand, little wood fibers.
SS	4-6(D)	24/12	5	0.028	3 5 3 4			4.0-6.0 ft: Moist, loose, olive-grey SILT, some c-f sand & wood fibers.
SS	6-8	24/7		0.032	3 3 3 3			6.0-8.0 ft: Moist, loose, olive-grey/brown SILT, little clay, trace c sand & wood, few peat-like lenses.
SS	8-10	24/16		0.021	2 2 1 6			8.0-10.0 ft: Moist, v loose, olive-grey SILT, little m-f sand, trace peat lenses.
SS	10-12	24/12	10	0.026	5 4 4 4		SW	10.0-10.5 ft: Moist, m dense, grey SILT, some clay, trace c sand. 10.5-11.0 ft: Dry, m dense, brown, m-f SAND, some c sand, trace gravel.
SS	12-14	24/5		0.021	6 6 7 4			12.0-14.0 ft: Moist, m dense, brown, m-f SAND, some c sand, trace gravel.
SS	14-16	24/8	15	0.023	9 9 13 15			14.0-16.0 ft: Moist, m dense, brown, m-f SAND, some gravel & c sand, little silt.
SS	16-18(D)	24/14		0.018	23 24 15 20			16.0-17.8 ft: Moist, dense, brown, c-f SAND, some lenses of silt & f sand, some gravel.
SS	18-20	24/10		0.020	10 10 11 22			17.8-18.0 ft: Moist, brown, c-f SAND. 18.0-18.5 ft: Moist, m dense, brown, c-f SAND, little gravel. 18.5-18.9 ft: Moist, m dense, brown, m-f SAND, little gravel & silt, weathered phyllite in spoon tip.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

D = Duplicate sample collected

Reviewed by: **Date:**

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB03-02

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	20-22	24/8	20	0.026	15 21 18 50			20.0-22.0 ft: Moist, dense, brown, f SAND, little m sand, little oxidized phyllite pieces.
			25					Bottom of Exploration at 22 feet BGS
			30					
			35					
			40					
			45					
			50					

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB04-01

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor:
Surface Elevation (ft.): 100
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 10
Drillers: Mel, Daryll
Depth to Initial Water Level (ft. BGS): 4.5
Drilling Date: Start: 11/12/01 **End:** 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM
N 10,172.74 E 20,087.30
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			100.0					
			0					
SS	0-2	24/4		0.0	2 2 5 3		SW	0.0-2.0 ft: Dry, loose, brown, m-f SAND, little c sand, trace f gravel.
SS	2-4	24/6		0.0	5 5 7 14			2.0-4.0 ft: Dry, m dense, light brown, f SAND, little m sand, trace f gravel.
SS	4-6	24/6	95.0 5	0.0	11 6 5 5			4.0-4.3 ft: Moist/wet, m dense, light brown, m-f SAND, trace brick, trace f gravel. 4.3-4.6 ft: Wet, m dense, black, m-f SAND, little burnt wood, little c sand.
SS	6-8	24/5		0.0	2 1 1 1		SP ML	6.0-6.3 ft: Wet, loose, grey, c-f SAND, trace f gravel. 6.3-6.5 ft: Wet, m stiff, brown SILT, trace organics.
SS	8-9 9-10	24/10		0.0	1 2 2 4			8.0-8.3 ft: M stiff, dark brown SILT, little organics. 8.3-8.9 ft: M stiff, olive-grey SILT, little clay, trace organics.
			90.0 10					Bottom of Exploration at 10 feet BGS
			85.0 15					
			80.0					

CDMJESS_BL_HOLTRA.GPJ_CDM_MA.GDT_4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB04-02

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor:
Surface Elevation (ft.): 100
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 12
Drillers: Mel, Daryll
Depth to Initial Water Level (ft. BGS): 6
Drilling Date: Start: 11/12/01 **End:** 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM
N 10,266.79 E 20,180.41
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			100.0					
SS	0-2	24/8	0	0.0	6 5 11 12		SP SW	0.0-0.3 ft: Dry, m dense, brown, c-f SAND, trace silt, little gravel. 0.3-0.8 ft: Dry, m dense, black, m-f SAND, some c sand, little gravel.
SS	2-4	24/6		0.0	6 10 12 6			2.0-4.5 ft: Dry, m dense, light brown, f SAND, little c sand, trace gravel, trace silt.
SS	4-5 5-6	24/10	95.0 5	0.0	4 3 4 6		ML	4.5-4.8 ft: Dry, loose, brown, m-f SAND, little c sand, gravel. 4.8-5.3 ft: M stiff, grey SILT, little c sand, trace organics.
SS	6-8	24/6		0.0	4 6 2 2		SW	6.0-8.5 ft: Wet, loose, grey, m-f SAND, little silt, gravel.
SS	8-10	24/18		0.0	2 1 1 2		PT	8.5-9.0 ft: Wet, v loose, grey, m-f SAND, little silt, trace gravel. 9.0-10.0 ft: Wet, v loose, brown PEAT.
SS	10-12	24/10	90.0 10	0.0	2 2 3 3		ML	10.0-12.0 ft: Wet, loose, brown/olive-grey SILT, trace organics.
								Bottom of Exploration at 12 feet BGS
			85.0 15					
			80.0					

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB04-03

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 1.5
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/15/01 **End:** 11/15/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument:
N 10,309.57 E 20,041.63
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			100.0					
GP	0-0.5 1-1.5	24/12	0				ML-SM	0.0-2.0 ft: Dry, brown, f SAND and SILT, little m-f gravel.
GP	2-4	24/20						2.0-4.0 ft: Dry, brown, f SAND and SILT, little m-f gravel.
			95.0 5					Bottom of Exploration at 4 feet BGS.
			90.0 10					
			85.0 15					
			80.0					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB04-04

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 4
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/15/01 **End:** 11/15/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument:
N 10,278.89 E 20,018.31
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			100.0					
GP	0-0.5	24/16	0				ML-SM	0.0-1.1 ft: Dry, brown, f SAND and SILT, little m-f gravel.
	1-1.5						ML	1.1-2.0 ft: Dry, grey/brown, SILT, some c-f sand.
								2.0-2.7 ft: Dry, grey/brown, SILT, some c-f sand.
GP	2-4	24/24					ML-SM	2.7-3.7 ft: Dry, grey/brown, f SAND and SILT, some c sand, little m-f gravel.
								3.7-4.0 ft: Dry, grey/brown, f SAND, little silt.
			95.0 / 5					Bottom of Exploration at 4 feet BGS.
			90.0 / 10					
			85.0 / 15					
			80.0					

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
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MR - Mud Rotary
RC - Reverse Circulation
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JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB04-05

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 4
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/15/01 **End:** 11/15/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument:
N 10,256.41 E 20,064.88
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			100.0					
GP	0-0.5 1-1.5	24/18	0				ML-SM	0.0-2.0 ft: Dry, brown, f SAND and SILT, some c sand, little f gravel.
GP	2-2.5	24/20					ML	2.0-4.0 ft: Dry, grey/brown, SILT, some c-f sand, little c-f gravel.
			95.0 5					Bottom of Exploration at 4 feet BGS.
			90.0 10					
			85.0 15					
			80.0					

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Ground surface set to 100' temporary datum.

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-01

Client: Mallinckrodt
Project Location: Orrington, ME

Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/12/01 End: 11/12/01
Borehole Coordinates:
N 10,069.19 E 19,791.98

Surface Elevation (ft.): 100
Total Depth (ft.): 12
Depth to Initial Water Level (ft. BGS):
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.) 100.0	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			0			SW	0.0-0.5 ft: Moist, dark brown, c-f SAND, some c-f gravel, little silt.
							0.5-1.0 ft: Moist, dark brown, c-f SAND, little f gravel, trace silt.
	0-2					CL	1.0-1.2 ft: Moist, brown, CLAY, little c-f sand and silt.
SS		48/26		0.0/0.006		SW	1.2-2.2 ft: Moist, dark brown, c-f SAND, some f gravel, little silt.
	2-4						
			95.0 / 5				4.0-8.0 ft: Moist to wet, brown, c-f SAND, some silt and m-f gravel, trace clay.
SS	4-6	48/24		0.0/0.0			
	6-8						
						CL	8.0-8.6 ft: Moist to wet, stiff, brown, CLAY, some silt, little m-f sand.
	8-10						8.6-8.8 ft: GRAVEL.
SS		48/48	90.0 / 10	0.0/0.0			8.8-10.9 ft: Stiff, brown/grey, mottled, CLAY, little silt.
	10-12						10.9-11.0 ft: Wet, brown, c-f SAND, little silt.
							11.0-11.8 ft: Moist, plastic, brown, CLAY, little silt, trace f sand.
			85.0 / 15				Bottom of Exploration at 12 feet BGS
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-02

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 11
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/12/01 End: 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,090.73 E 19,750.62
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	48/24	0	0.0/0.009		SW	0.0-0.5 ft: Dry, dark brown, f SAND, some c-f gravel. 0.5-2.0 ft: Moist, brown, c-f SAND, little c-f gravel and silt, trace clay.
	2-4						
SS	4-6	42/30	95.0 5	0.0/0.0			4.0-6.2 ft: Moist to wet, brown, c-f SAND, some silt, little m-f gravel, trace clay. 6.2-6.5 ft: Wet, brown, c-f SAND, some m-f gravel, little brick.
	6-7.5						
SS	7.5-9.5	42/38	90.0 10	0.0/0.0		Till	7.5-8.0 ft: Wet, light brown, c-f SAND, some silt, little clay, trace m-f gravel. 8.0-8.7 ft: Dry, hard, brown, SILT, little m-f sand and f gravel, trace clay. 8.7-10.7 ft: Dry, hard, grey, SILT, little m-f sand and m-f gravel, trace clay.
	9.5-11						
			85.0 15				Bottom of Exploration at 11 feet BGS
			80.0				

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-03

Client: Mallinckrodt
Project Location: Orrington, ME

Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/12/01 End: 11/12/01
Borehole Coordinates:
N 10,117.98 E 19,697.98

Surface Elevation (ft.): 100
Total Depth (ft.): 11
Depth to Initial Water Level (ft. BGS):
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	48/24	0	0.0/0.0		SW	0.0-0.2 ft: Dry, brown, c-f SAND, some m-f gravel, little silt. 0.2-1.5 ft: Moist, brown, f SAND, little c sand and f gravel, trace clay.
	2-4						1.5-2.0 ft: Moist, brown, f SAND, little silt and f gravel.
SS	4-6	42/24	95.0 5	0.0/0.0			4.0-7.5 ft: Wet, brown, c-f SAND, some m-f gravel, little silt.
	6-7.5						
SS	7.5-9.5	42/36		0.0/0.0		ML	7.5-8.5 ft: Moist, brown, SILT, some clay, little c-f sand and m-f gravel. 8.5-10.3 ft: Moist, brown, SILT, little c-f sand and clay, trace gravel.
	9.5-11		90.0 10			SP	10.3-10.5 ft: Wet, brown, f SAND, some silt, little clay.
							Bottom of Exploration at 11 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-04

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 7.5
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/12/01 End: 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,048.33 E 19,622.62
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
			0			SW	0.0-0.7 ft: Dry, brown/grey, c-f SAND, some c-f gravel.
SS	0-2	48/36		0.0/0.003		ML-SM	0.7-1.7 ft: Dry, brown, f SAND and SILT, little c sand, trace clay.
	2-4						1.7-3.0 ft: Wet, grey, f SAND and SILT, little clay, trace f gravel.
			95.0 5			ML	4.0-4.7 ft: Dry, grey, SILT, little c-f sand and c-f gravel.
SS	4-6	42/42		0.0/0.0			4.7-6.7 ft: Wet, brown, SILT, some c-f gravel, little c-f sand and clay.
	6-7.5					SW	6.7-7.5 ft: Wet, brown, m SAND, some silt, little clay, trace f gravel.
							Bottom of Exploration at 7.5 feet BGS
			90.0 10				
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-05

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 3.7
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/12/01 End: 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 10,027.13 E 19,592.02
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	45/27	0	0.1/0.0		SW	0.0-1.7 ft: Dry, dark brown, c-f SAND, some c-f gravel, trace silt.
	2-3.7						1.7-2.4 ft: Wet, brown, c-f SAND, some m-f gravel, little clay; concrete in spoon tip.
			95.0 / 5				Refusal - Bottom of Exploration at 3.7 feet BGS
			90.0 / 10				
			85.0 / 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-06

Client: Mallinckrodt
Project Location: Orrington, ME

Project Name: HoltraChem Manufacturing Site
Project Number: 0654-10508

Drilling Contractor: Acheron
Drilling Method/Rig: Direct Push/ATV Geoprobe
Drillers: Paul Dorobis
Drilling Date: Start: 11/12/01 End: 11/12/01
Borehole Coordinates:
N 9,984.07 E 19,513.50

Surface Elevation (ft.): 100
Total Depth (ft.): 10
Depth to Initial Water Level (ft. BGS):
Abandonment Method: Grout to surface
Field Screening Instrument: OVM / MVA
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	48/30	0	0.0/0.003		SW	0.0-0.3 ft: Dry, dark brown, c-f SAND, some c-f gravel, little silt. 0.3-2.0 ft: Dry, light brown, c-f SAND, little c-f gravel and silt.
	2-4(D)					ML	2.0-2.5 ft: Wet, brown, SILT, some c-f sand, little clay and m-f gravel.
SS	4-6	42/42	95.0 5	0.0/0.0		Till	4.0-7.5 ft: Dry, tan/red, mottled, SILT, little c-f sand and c-f gravel, trace clay (till).
	6-7.5						
SS	7.5-9	30/30		0.0/0.005			7.5-10.0 ft: Dry to moist, brown, SILT, little c-f sand and c-f gravel, trace clay (till).
	9-10		90.0 10				
							Bottom of Exploration at 10 feet BGS
			85.0 15				
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-07

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 11
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/12/01 End: 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 9,923.23 E 19,605.48
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	48/30	0	0.0/0.009		SP	0.0-2.0 ft: Dry, dark brown, c-f SAND.
	2-4(D)					ML	2.0-2.5 ft: Wet, brown, SILT, some c-f sand and clay.
SS	4-6	42/30	95.0 5	0.0/0.0			4.0-4.7 ft: Moist to wet, light brown, SILT, some c-f sand and clay, trace c-f gravel. 4.7-5.7 ft: Wet, light brown, SILT, some c-f sand and clay, little m-f gravel.
	6-7.5					SP	5.7-6.5 ft: Wet, dark brown, c-f SAND, little silt.
SS	7.5-9.5	42/30		NA/NA		Till	7.5-11.0 ft: Wet, light brown, SILT, some c-f sand and c-f gravel, trace clay (till).
	9.5-11		90.0 10				
			85.0 15				Bottom of Exploration at 11 feet BGS
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed ahead of the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
NA = Not Analyzed
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA_GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

GEOPROBE LOG

SB08-08

Client: Mallinckrodt
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Acheron
Surface Elevation (ft.): 100
Drilling Method/Rig: Direct Push/ATV Geoprobe
Total Depth (ft.): 10
Drillers: Paul Dorobis
Depth to Initial Water Level (ft. BGS):
Drilling Date: Start: 11/12/01 End: 11/12/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: OVM / MVA
N 9,915.50 E 19,686.64
Logged By: Jill Brandon

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	OVM (ppmv)/ MVA (mg/m3)	Graphic Log	Stratum Designation	Material Description
			100.0				
SS	0-2	48/30	0	0.0/0.0		SW	0.0-2.0 ft: Dry, dark brown, c-f SAND, some m-f gravel, little silt.
	2-4					ML	2.0-2.5 ft: Dry, dark brown, SILT, little m-f sand, trace clay.
SS	4-6	42/30	95.0 5	0.0/0.0			4.0-5.3 ft: Wet, light brown, SILT, some clay, little c-f sand.
	6-7.5 (D)						5.3-6.5 ft: Moist/wet, dark brown, SILT, trace m-f sand.
GRAB	10	30/30	90.0 10	NA		Till	7.5-10.0 ft: Unable to retrieve material from sampling sleeve. Grab sample collected at 10' bgs for Mercury analysis. Dry, SILT, some c-f sand and c-f gravel, trace clay (till).
			85.0 15				Bottom of Exploration at 10 feet BGS
			80.0				

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
- HSA - Hollow Stem Auger
- SSA - Solid Stem Auger
- HA - Hand Auger
- AR - Air Rotary
- DTR - Dual Tube Rotary
- FR - Foam Rotary
- MR - Mud Rotary
- RC - Reverse Circulation
- CT - Cable Tool
- JET - Jetting
- D - Driving
- DTC - Drill Through Casing

SAMPLING TYPES:
- AS - Auger/Grab Sample
- CS - California Sampler
- BX - 1.5" Rock Core
- NX - 2.1" Rock Core
- GP - Geoprobe
- HP - Hydro Punch
- SS - Split Spoon
- ST - Shelby Tube
- WS - Wash Sample

OTHER:
- AGS - Above Ground Surface

REMARKS

For each sampling interval, the OVM reading (ppm) is listed before the Mecury Vapor Analyzer reading (mg/m3).
D = Duplicate sample collected
Ground surface set to 100' temporary datum.

Reviewed by: Date:

HOLTRA.GP HOLTRA.GPJ CDM_MA.GDT 4/5/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB13-01

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Maine Test Borings Inc.
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 59
Drillers: Mel, Daryll
Depth to Initial Water Level (ft. BGS): 34
Drilling Date: Start: 11/13/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: Mercury Vapor Analyzer
N E
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
GRAB		60/NA	0				GW	0.0-5.0 ft: M-f GRAVEL.
SS	5-7	24/15	5	0.0	10 12 16 12		ML SW	5.0-5.7 ft: Moist, m dense, brown SILT, little c sand, little phyllite & f gravel. 5.7-6.3 ft: Dry, m dense, brown, f SAND, some phyllite gravel, little silt & c sand.
SS	10-12	24/16	10		7 10 10 13			10.0-15.0 ft: Dry, m dense, light brown, f SAND, trace c sand; top 0.5" orange oxidized.
SS	15-17	24/20	15	0.0	8 11 11 15			15.0-20.0 ft: Moist, brown, f SAND, trace silt.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

NA = Not Analyzed

Reviewed by: **Date:**

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 2/1/02

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB13-01

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	20-22	24/18	20	0.0	7 7 11 14			20.0-25.0 ft: Moist, m dense, brown, f SAND, trace silt; thin silt lense at 21 feet.
SS	25-27	24/20	25	0.010	8 11 10 11			25.0-30.0 ft: Moist/wet, m dense, brown, f SAND, some m sand, trace silt.
SS	30-32	24/10	30	0.003	16 21 27 102		SP	30.0-35.0 ft: Dry, dense, brown, c-f SAND, some gravel.
SS	35-37	24/10	35		21 25 26 34			35.0-40.0 ft: Wet, dense, brown, c-f SAND, some gravel, trace silt.
SS	40-42	24/8	40		22 23 25 27			40.0-45.0 ft: Wet, dense, brown, c-f SAND, some gravel, trace silt.
SS	45-47	24/16	45		12 30 78 146/3"			45.0-47.0 ft: Wet, v dense, brown, c-f SAND, some gravel, little silt.
SS	47-49	24/10			84 53 45 50		GPS	47.0-49.0 ft: Wet, v dense, brown GRAVEL and c SAND, some m-f sand.
SS	49-51	24/10	50		5 10 11 15		ML	49.0-51.0 ft: Wet, m dense, brown/grey SILT, some f gravel, little c-f sand.
					2 5			51.0-53.0 ft: Wet, m dense, grey SILT, some clay, little f gravel,

CDMJESS_BL HOLTRA.GPJ CDM_MA.GDT 2/1/02

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Cambridge, MA 02139

BOREHOLE LOG
SB13-01

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	51-53	24/9			9 9			trace m-f sand.
SS	53-55	24/14			3 4 5 11			53.0-55.0 ft: Wet, m dense, grey SILT, little f gravel, little c-f sand, little clay.
SS	55-57	24/15	55		12 15 19 14			55.0-57.0 ft: Moist, dense, grey SILT, some m-f gravel, little c-f sand, little clay.
SS	57-59	24/24			19 25 25 23			57.0-59.0 ft: Moist, dense, grey SILT, little c-f gravel, little c-f sand, little clay.
			60					Bottom of Exploration at 59 feet BGS
			65					
			70					
			75					
			80					

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CAMP DRESSER & McKEE

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BOREHOLE LOG
SB13-02

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Maine Test Borings Inc.
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 63
Drillers: Daryll, Chris
Depth to Initial Water Level (ft. BGS): 23
Drilling Date: Start: 11/14/01 **End:** 11/14/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: Mercury Vapor Analyzer
N E
Logged By: Krista Polley

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			0					0.0-35.0 ft: No description.
			5					
			10					
			15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

NA = Not Analyzed

Reviewed by: **Date:**

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CAMP DRESSER & McKEE
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Cambridge, MA 02139

BOREHOLE LOG
SB13-02

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			20					
			25					
			30					
SS	35-37	24/22	35	NA	13 130 79 90		SP	35.0-55.0 ft: Wet, v dense, brown, c-f SAND, little c-m gravel.
SS	40-42	24/20	40	0.0	94 70 60 30			40.0-45.0 ft: Wet, v dense, brown, c-f SAND, some c-f gravel, trace silt.
SS	45-47	24/NA	45	0.0	89 133 42 45			45.0-50.0 ft: Wet, v dense, brown, c-f SAND, some c-f gravel.
SS	50-52	24/9	50	0.0	40 49 43 47			50.0-55.0 ft: Wet, v dense, dark brown, c-f SAND, some c-f gravel, little silt.

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CAMP DRESSER & McKEE
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BOREHOLE LOG
SB13-02

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
SS	55-57	24/10	55	NA	36 45 70 160		ML	55.0-57.0 ft: Wet, v dense, grey SILT, some m-f sand, little m-f gravel.
SS	57-59	24/9		NA	76 34 31 35			57.0-59.0 ft: Wet, v dense, olive-grey SILT, some c-f sand, little c-f gravel.
SS	59-61	24/10	60	NA	14 23 29 27			59.0-63.0 ft: Moist/wet, v dense, olive-grey SILT, some m-f sand, little m-f gravel.
SS	61-63	24/6		NA	70 78 66 41			
			65					Bottom of Exploration at 63 feet BGS
			70					
			75					
			80					

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CAMP DRESSER & McKEE

CDM

50 Hampshire Street
Cambridge, MA 02139

BOREHOLE LOG
SB13-03

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Drilling Contractor: Maine Test Borings Inc.
Surface Elevation (ft.):
Drilling Method/Rig: HSA/Truck Mounted
Total Depth (ft.): 43
Drillers: Daryll, Chris
Depth to Initial Water Level (ft. BGS): 29
Drilling Date: Start: 11/15/01 **End:** 11/15/01
Abandonment Method: Grout to surface
Borehole Coordinates:
Field Screening Instrument: Mercury Vapor Analyzer
N E
Logged By: Rick Jones

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			0					0.0-25.0 ft: No description.
			5					
			10					
			15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

NA = Not Analyzed

Reviewed by: **Date:**

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Cambridge, MA 02139

BOREHOLE LOG
SB13-03

Client: HoltraChem Manufacturing
Project Name: HoltraChem Manufacturing Site
Project Location: Orrington, ME
Project Number: 0654-10508

Sample Type	Sample Number	Sample Recovery (Inches)	Elev. Depth (ft.)	Field Instrument Reading (ppm)	Blows per 6 Inches	Graphic Log	Stratum Designation	Material Description
			20					
SS	25-27	24/16	25	NA	20 30 29 59		SP	25.0-30.0 ft: Moist, v dense, grey/brown, c SAND, some c-f gravel, little silt.
SS	30-32	24/20	30	NA	14 54 60 60			30.0-35.0 ft: Wet, v dense, grey/brown, c-m SAND, some c-f gravel, little silt.
SS	35-37	24/18	35	NA	63 47 38 70		ML	35.0-37.0 ft: Wet, v dense, olive-grey SILT, some m-f sand, some m-f gravel.
SS	37-39	24/18		NA	40 22 30 50			37.0-41.0 ft: Wet, v dense, olive-grey SILT, some m-f sand, little m-f gravel.
SS	39-41	24/NR	40	NA	50 39 41 37			
SS	41-43	24/14		NA	16 37 31 33			41.0-43.0 ft: Moist, v dense, olive-grey SILT, some m-f sand, little gravel.
			45					Bottom of Exploration at 43 feet BGS
			50					

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Appendix C
Test Pit Logs

50 Hampshire Street
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(617) 452-6000

CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-1
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/20/02
Project Number:		Ground Surface	~70'	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Moist, brown, fine-medium SAND, some silt, some gravel, scrap PVC @ 1'		
2	Noted some organics- roots or wood @ 2', also Geotextile layer	SAMPLE	
3			
4	2 electrical conduits		
5	Blue grey, fine SAND, some fine gravel, appears still like and undisturbed		
6	Exacavation moved West, didn't find pipe, called Gene Bridges who said move east.		
7	Resumed at location indicated by Mr, Bridges after back filling		
8		SAMPLE	
9	Found pipe 8', and gravel pipe bedding and geotextile. Collected samples @ 8' and 9'	SAMPLE	
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3+
Length (ft):	14
Depth (ft):	9
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: **Found pipe bedding and pipe @ 8', excavated to 9' using trash pump to dewater, water flowing from NE to SW corner of test pit, same alignment of pipe**

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-2
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/20/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	3" Asphalt		
1	Moist, brown, medium-coarse SAND, little gravel		
2	Moist, brown, medium-coarse SAND and GRAVEL	SAMPLE	
3	Found top of pipe @ 3', looked rusted on top, pipe is ~ 3" steel and has $^1/_2$ inch hole on top		
4		SAMPLE	
	Bottom of Exploration		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	8
Length (ft):	14
Depth (ft):	7
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: _____

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-4
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/19/02 filed
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1 11/20/02

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	3" Asphalt		
1	Moist to wet, brown, medium-coarse SAND, trace silt, some gravel fill		
2		SAMPLE	
3			
4			
5	Found sewer pipe		
6		SAMPLE	
	Dense, compact, fine-coarse SAND, some SILT, some gravel and cobbles (TILL)		
7			
	Bottom of Exploration		
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	8
Length (ft):	14
Depth (ft):	7
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Felt sewer pipe, collected sample, broke water main on next shovel pull, pumped excavation 11/20/02**
Confirmed sewer pipe and sample location

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-5
Project Name:	HoltraChem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	3" Asphalt		
1	Moist, brown, medium-coarse SAND, some gravel (fill)		
2	Becoming wet	SAMPLE	
3	Excavation caving near supports for overhead pipes		
4			
	Estimated pipe depth 5'		
5		SAMPLE	
6		SAMPLE	
	Dense, compact, fine-medium SAND, some silt, some gravel		
7		SAMPLE	
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	9
Depth (ft):	7
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Water entering pit and caving precluded locating pipe, estimated within 1-2'**

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-6
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	2'	Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	3" Asphalt		
1	Brown, medium-coarse SAND, some gravel (fill)		
2	Brown, medium-coarse SAND (no gravel), Fill	SAMPLE	
3	Water entering pit, felt pipe @ 3.5'		
	Collected samples beside and below pipe		
4		SAMPLE	
5		SAMPLE	
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	9
Depth (ft):	4.5
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: _____

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-7
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	3'	Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Asphalt		
1	Moist, brown, medium-course SAND (fill)		
	fill surface slopes down to the east		
2		SAMPLE	
3	Moist, brown, medium-coarse SAND, little silt, little gravel		
4	Found sewer pipe, collected samples beside and below pipe.	SAMPLE	
	Soil below pipe @ 4.5', sample had more silt	SAMPLE	
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	9
Depth (ft):	4.5
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Readings all spoil pile - 500 mg/m3 @ 2'**
- 900 mg/m^3 @ 4.5'

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-8
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	2'	Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	2 alphalt layers, total 6"		
1	Moist, brown, medium-coarse SAND (fill)		
2	Hit FRP Pipe drain from HCL Plant to MH-1	**SAMPLE 2'**	
3	Hit PVC Pipe running parallel to HCL foundation		
4	Excavated to 4', took sample, backfill became grey	**SAMPLE 4'**	
5			
	Bottom of Exploration		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	5'
Length (ft):	12
Depth (ft):	5'
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-9
Project Name:	HoltraChem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	3" asphalt	SAMPLE	
1	6" Wet, brown fine-medium SAND		
	@ 1' change to dense, fine sand, some silt and gravel		
2	No indication of free elemental mercury	SAMPLE	
3	Bottom of Exploration		
4			
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft): _____
Length (ft): _____
Depth (ft): _____
Vol (ft^3): _____

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in: _____
12 in-18 in: _____
18 in-24 in: _____
24 in-30 in: _____

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: _____

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CDM

Test Pit Log

Client:	Mallinckrodt	Contractor:	CDM Constructors	Test Pit No.	HMC-ISTP-10
Project Name:	HoltraChem Manufacturing Site	Equipment:	CAT 416D	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	6'	Date:	11/19/02
Project Number:		Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	3" aspalt		
2	3" - 3' Brown, moist, fine-coarse SAND, some silt, some gravel, little cobbles NON PLASTIC	SAMPLE	E
3			
4	3' Moist, brown, fine SAND, some silt, trace clay PLASTIC	SAMPLE	E
5			
6			
7	Located industrial sewer pipe bedded in stone Collected sample immediatly below the pipe	SAMPLE	
8	Water entered pit @ 6'		
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	8'
Length (ft):	12
Depth (ft):	7'
Vol (ft^3):	

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: **No elevated reading om Jerome meter**

CDM

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Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP2-A
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Asphalt pavement and fine to coarse SAND beneath asphalt.	0.5'	E
1	Sample TP2-A1 collected at 6" (beneath asphalt).		
2	Collected sample TP2-A2 at 2'.		
	Dry, light brown, fine SAND.		
3	Compact in excavation sidewall but loose in spoil pile.		
	(appears to be compacted sand backfill)		
4			
5		5'	E
	Dark brown, medium to coarse SAND, little fine gravel.		
6	Sample TP2-A3 collected at 5'.	6'	E
	Bottom of excavation at 6'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	TEST PIT PLAN	BOULDER COUNT
Width (ft):	N ⇧	6 in-12 in:
Length (ft):		12 in-18 in:
Depth (ft):		18 in-24 in:
Vol (ft^3): 0		24 in-30 in:

DESCRIPTION	EXCAVATION EFFORT
and : 35 to 50 %	E : Easy
some : 20 to 35 %	M : Moderate
little : 10 to 20 %	D : Difficult
trace : 1 to 10 %	

Remarks:

Updated On: 01/23/2002

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(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP2-B
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
0	Dark brown, fine to coarse SAND and GRAVEL. Collected sample TP2-B1 at 6".	0.5'	E
1	Dry, light brown, fine SAND, trace gravel. Collected sample TP2-B2 at 2'.		
2		2'	E
3	Bottom of excavation at 2'.		
4	Did not excavate deeper because of adjacent monitoring wells.		
5	John Beane did not note elevated readings with the MEDEP's LUMEX meter.		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft): 3
Length (ft): 25
Depth (ft): 2
Vol (ft^3): 150

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP2-C
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dark brown, fine to coarse SAND and organics. Sample TP2-C1 collected at 6".	0.5'	E
1	Sample TP2-C2 collected at 1'.		
	Dry, hard, brown to light brown, SILT with some layers of fine sand.		
2	(appears to be native undisturbed material)		
3			
4	Hit bedrock at 4'.	4'	D
	Bottom of excavation at 4'.		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	5
Depth (ft):	4
Vol (ft^3):	60

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP2-D
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dark brown, fine to coarse SAND, some gravel, trace silt.	0.5'	E
1	Sample TP2-D1 collected at 6".		
	Sample TP2-D2 collected at 1'.		
2			
	Hard, brown, interbedded fine to coarse SAND, trace to some silt.		M
3			
4	Lower permeability silt layer noted at 4'.		
	Collected sample TP2-D3 just above that layer.		
5	Hit bedrock at 5'.	5'	D
	Bottom of excavation at 5'.		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	6
Length (ft):	6
Depth (ft):	5
Vol (ft^3):	180

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: _____

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP3-A
Project Name:	HoltraChem Manufacturing Site	Equipment:		Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, fine - medium, SAND, some silt, some gravel. (fill)		
	Sample TP3-A-1 and TP3-A-2.		
2			
3		3'	E
4			
	Dry, grey - brown, fine, SAND and SILT, some gravel, little clay. (fill)		
5	Collect sample TP3-A-3 at 1'.		
6			
7	Apparent base of fill.	7'	E
	Dry, dark brown, medium - coarse SAND, some gravel, little silt.		
8	Collect sample TP3-A-4 at 3'.	8'	E
	Bottom of Excavation at 8'.		
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	8
Vol (ft^3):	0 240

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	0
12 in-18 in:	0
18 in-24 in:	0
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP3-B
Project Name:	HoltraChem Manufacturing Site	Equipment:		Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	East Half:		
	Dry, brown, medium - coarse SAND, some gravel. (appears to be native)		E
2	Collect sample TP3-B-1 at 6".		
	West Half:		
3	Dry, grey - brown, fine, SAND and SILT, some gravel, little clay. (fill)		
	Collect sample TP3-B-2 at 3'.	3'	E
4	Bottom of excavation at 3'.		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	3
Vol (ft^3):	0 90

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	0
12 in-18 in:	0
18 in-24 in:	0
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: _____

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP3-C
Project Name:	HoltraChem Manufacturing Site	Equipment:	Leibherr R914 rubber tire excavator	Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, dark brown mixed with grey, fine SAND and SILT, some gravel. (fill)		E
	Collect sample TP3-C-1 at 2'.		
2			
3		3'	E
4			
	Dry, fine, SAND and SILT, some clay, little gravel, asphalt. (fill)		
5	Collect sample TP3-C-2 at 4'.		
6		6'	E
	Bottom of excavation at 6'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	6
Vol (ft^3):	180

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	0
12 in-18 in:	0
18 in-24 in:	0
24 in-30 in:	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: _____

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-A
Project Name:	Holtrachem Manufacturing Site	Equipment:	Leibherr R914 rubber tire excavator	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	6'	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, fine to medium SAND, some silt, trace clay and organics.		
	Sample TP4-A1collected at 1' from east end of test pit.		
2	Sample TP4-A4 collected at 1' from middle of test pit where debris fill was noted.		
3	Darker layer observed 3'-6' at east end of test pit.	3'	E
	Sample TP4-A2 collected at 3'.		
4	Debris noted 2-4' in west end of pit including signs, railroad ties and one drum lid.		
	Dry, dark brown, fine to medium SAND, little silt, little gravel.		
5			
6		6'	E
	Wet, dark grey, medium to coarse SAND, some gravel, trace silt.		
7	Sample TP4-A3 collected at 6' from east end of test pit and TP4-A5 from west end of pit.	7'	E
	Dry to moist, mottled brown to dark brown PEAT.		
8		8'	E
	Bottom of excavation at 8'.		
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	25
Depth (ft):	8
Vol (ft^3):	600

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Excavated at south end of Scrap Metal Area.

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-B
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Asphalt on surface. Dry, brown, medium to fine SAND, little silt. 2-3" layer of sand blast grit observed at 1'. Sample TP4-B1 collected at 1' and included some sand blast grit.		
3		3'	E
4	Moist, blue - grey SILT, little clay, little sand and gravel. Sample TP4-B2 collected at 4'.		
5		5'	E
6	Dark brown, PEAT with logs. Sample TP4-B3 collected at 5'.	6'	E
7	Bottom of excavation at 6'.		
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	10
Depth (ft):	6
Vol (ft^3):	180

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: No non-native material observed except for asphalt at the surface and sand blast grit at 1'

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-C
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, light brown, fine to medium, SAND, little silt. Asphalt noted between 1' and 1.5'.		
	Sample TP4-C1 collected above asphalt.		
2	Sample TP4-C2 collected below asphalt.		
3		3'	E
4	Moist, blue - grey, fine SAND and SILT.		
5		5'	E
	Moist, blue - grey fine SAND, some gravel, trace silt		
6	Sample TP4-C3 collected at 6'.	6'	E
	Dark brown PEAT		
7		7'	E
	Bottom of excavation at 7'.		
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	10
Depth (ft):	7
Vol (ft^3):	210

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: No non-native material observed below asphalt at ~ 1.5'

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-D
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Rust and dark grey, fine to medium SAND, little silt. Sample TP4-D1 collected 0-6".	0.5'	
1			
2	Dry, brown, fine to medium SAND, little silt.		
	One piece of asphalt and one piece of metal observed at 3'.		
3		3'	E
4	Moist, grey, medium to coarse SAND, little to some silt.		
	Collected sample TP4-D2 at 4'.		
5		5'	E
	Dark brown, PEAT, fibrous.		
6	Collected sample TP4-D3 at 5'.	6'	E
	Bottom of excavation at 6'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	6
Vol (ft^3):	180

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: No non-native material observed below 3'

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-E
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Sample TP4-E1 collected at 6". Dry, brown, medium to coarse SAND and medium to coarse GRAVEL.		
2	Sample TP4-E2 collected at 2' at the base of the brown sand.	2'	E
3	Sample TP4-E3 collected at 2.5' at the top of the grey sand.		
4	Dry, grey - brown, fine SAND, some fine to medium gravel, litle silt.		
5			
6		6'	E
7	Dark brown, PEAT.		
8		8'	E
9	Bottom of excavation at 8'.		
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	10
Depth (ft):	8
Vol (ft^3):	240

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: Excavated adjacent to large scrap metal pile

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-F
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dark brown, fine to medium SAND with organics - Topsoil.		
1	Sample TP4-F1 collected at 6".		
	Similar shallow soil but with large pieces of what appeared to be local bedrock.		
2	Also noted angle iron and 6' cast iron pipe.		
	Moved excavation over ~5'.		
3	Noted rust colored horizon at 3'.	3'	D
4			
	Encountered 6" thick slabs of concrete and a little asphalt.		
5	Sample TP4-F2 collected at 5'.		M
6			
7			
8	Sample TP4-F3 collected at 8'.		
9		9'	M
	Bottom of excavation at 9'.		
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	6
Length (ft):	10
Depth (ft):	9
Vol (ft^3):	540

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	multiple
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-G
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Sample TP4-G1 collected at the surface by the tank outlet.		
1	Dry, brown, fine to medium SAND, little silt.		E
	Sample TP4-G1 collected at 1'. Asphalt noted at 1'.		
2	Sample TP4-G3 collected at 1.5 - 2'.		
3	Increasing asphalt content.		E
4			
5	Encountered refusal at 5'.	5'	D
	Bottom of Excavation at 5'.		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	10
Depth (ft):	5
Vol (ft^3):	150

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: Excavated at outlet of a coal filled brine filter (second from east).

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-H
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Sample TP4-H1 collected at the surface by the tank outlet. Dry, brown, fine to medium SAND, some fine to medium gravel, little silt. Sample TP4-H2 collected at 1'.	1.5'	E
2 3 4 5	Sample TP4-H3 collected at 2'. Dry, brown and grey, fine to medium SAND, some fine to medium gravel, little silt and asphalt up to 50%.	5'	M
6 7 8 9 10 11 12	Bottom of excavation at 5'.		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	5
Depth (ft):	5
Vol (ft^3):	75

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: Excavated at the outlet of a coal filled brine filter (third from the east)

Updated On: 01/23/2002

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50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-I
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1			
2	Rubble fill with asphalt up to 60%.		
	Sample TP4-I1 collected at 2'.		
3			
4	Sample TP4-I2 collected at 4'.	4'	E
	Bottom of excavation at 4'.		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	6
Depth (ft):	4
Vol (ft^3):	72

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Excavated between coal filled brine filters (3rd and 4th from the east).

Updated On: 01/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP4-J
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Collected samples TP4-J1, 3, 5 & 7 from 0-6".		
	Collected samples TP4-J2, 4, 6 & 8 from 12 - 18".	1.5'	E
2	Bottom of excavation at 1.5'.		
3	Samples 1 and 2 collected in front of easternmost tank.		
	Samples 3 and 4 collected in front of next easternmost tank.		
4	Samples 5 and 6 collected in front of second from westernmost tank.		
	Samples 7 and 8 collected in front of westernmost tank.		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	50
Depth (ft):	1.5
Vol (ft^3):	225

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Excavated long shallow trench in front of coal-filled brine filters, could not go deeper due to road and tanks.

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-A
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Sample TP11-A1 collected from 1-2" in area with no vegetation. Dry, brown, fine to medium SAND, little silt and fine to medium gravel.	1.5'	E
2 3	Dry, mottled brown to light brown, hard SILT and fine SAND (layered).	3'	E
4 5 6	Grey - brown, medium to coarse SAND, some debris fill. noted one plastic bag, one brick and some black stained soil with roots. Collected sample TP11-A2 at 4' from black stained soil.	6'	E
7 8	Brown, medium to coarse SAND (appears native).	8'	E
9 10 11 12	Bottom of excavation at 8'.		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	12
Depth (ft):	8
Vol (ft^3):	288

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: Excavated next to an area with no vegitation

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-B
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, fine to medium SAND, little gravel, little silt. (fill)		
2	One piece of plastic noted at 2'.	2'	E
3	Layered SILT and fine SAND (fill). Collect sample TP11-B1 at 3'.	3'	E
4	Dry, grey - brown, fine to medium SAND and SILT.		
5	Some black staining asociated with roots.		
6	No non-native material observed below 2'		
7			
8		8'	E
9	Bottom of excavation at 8'.		
10			
11			
12			

T.P. DIMENSIONS

Width (ft): 3
Length (ft): 10
Depth (ft): 8
Vol (ft^3): 240

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-C
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, coarse SAND and GRAVEL.		
	Collected sample TP11-C1 at 1'.		
2			
3			
4	Dry, mottled grey - brown, fine SAND and SILT.		
5	Collect sample TP11-C1 at 5'.		
6	Hit large rock of phyllite at 6'.		
7			
8			
9			
10		10'	E
11	Brown, fine to medium SAND, trace silt, no gravel (appears native).		
	Collect sample TP11-C3 at 11'.		
12	Bottom of excavation at 12'.	12'	E

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	12
Depth (ft):	12
Vol (ft^3):	432

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	1

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-D
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, SILT and fine SAND with some rounded gravel.	1.5'	E
2	Collect sample TP11-D1 at 1.5 - 2.0'.		M
3	Dry, dense, brown, fine SAND, some silt, some gravel. (appears to be native)		M
4	Excavator noted that this soil appeared to be native and was more difficult to excavate.		
5		5'	M
6	Bottom of excavation at 5'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	5
Vol (ft^3):	150

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Excavated adjacent to tree line

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-E
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1–4	Dry, mottled grey - brown, fine SAND and SILT, some gravel. Collected sample TP11-E1 at 2'.	4'	E
5–6	Dry, brown, fine to medium SAND, some fine to coarse rounded gravel, no silt. (appeared native) Collect sample TP11-E2 at 5'.	6'	E
7–12	Bottom of excavation at 6'.		

T.P. DIMENSIONS	TEST PIT PLAN	BOULDER COUNT
Width (ft):	N ⇧	6 in-12 in:
Length (ft):		12 in-18 in:
Depth (ft):		18 in-24 in:
Vol (ft^3): 0		24 in-30 in:

DESCRIPTION	EXCAVATION EFFORT
and : 35 to 50 %	E : Easy
some : 20 to 35 %	M : Moderate
little : 10 to 20 %	D : Difficult
trace : 1 to 10 %	

Remarks:

Updated On: 01/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-F
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Topsoil and fine to medium SAND, collected sample TP11-F1 at 6".	0.5'	E
1			
2	Dry, mottled brown, fine SAND, some silt. (fill)		
	Sample TP11-F2 collected at 2'.		
3	No non-native material observed.		
4		4'	E
	Sample TP11-F3 collected at 4'.		
5	Dry, brown, coarse SAND, some fine to medium gravel.		
	(appeared native)		
6		6'	E
	Bottom of excavation at 6'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	12
Depth (ft):	6
Vol (ft^3):	216

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP11-G
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown to dark brown, fine to medium SAND, some gravel.		
	Collected sample TP11-G1 at 1'.		
2		2'	E
3			
	Collected sample TP11-G2 at 3'.		
4			
	Dry, brown, fine to medium SAND, some gravel and occasional inclusions		
5	of blue - grey silt. (fill)		
6		6'	E
	Collected sample TP11-G3 at 6'.		
7	Brown, fine SAND, little gravel. (appears native)		
8		8'	E
	Bottom of excavation at 8'.		
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	12
Depth (ft):	8
Vol (ft^3):	288

TEST PIT PLAN

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP12-A
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, fine to medium SAND.	1'	E
2	Dry, light brown, hard (dense) fine SAND, some gravel, little silt.		
3	Sample TP12-A1 collected at 2'.		
4			
5		5'	E
6	Bottom of excavation at 5'.		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	5
Vol (ft^3):	150

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP12-B
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dry, brown, fine to medium SAND, some gravel, little silt. Sample TP12-B1collected at 6".		
1	Sample TP12-B2 collected at 1'.		
2	Hard, dense, fine SAND and SILT, little gravel.		
3	(appears native)		
4	Bottom of excavation at 3'.		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	3
Vol (ft^3):	90

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP12-C
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dry, brown, fine to medium SAND, little gravel and organics. Sample TP12-C1 at 6".	0.5'	E
1	Light brown, fine to coarse SAND, some gravel.	1.5'	E
2	Bedded fine to medium SAND.		
	Collected sample TP12-C2 at 2'.		
3			
4		4'	E
	Interbedded SAND and SILT.		
5		5'	E
	Bottom of excavation at 5'.		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	5
Vol (ft^3):	150

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP14-A
Project Name:	HoltraChem Manufacturing Site	Equipment:	Leibherr R914 rubber tire excavator	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Topsoil, dark brown, fine SAND, some silt, organics	0.5	E
2	Dry, dense, brown fine SAND and SILT, little to some clay, little gravel, large boulders (till)		D
3			
4	Bottom of Excavation 4'. Excavator encountered refusal on rock		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	8
Depth (ft):	4
Vol (ft^3):	96

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	0
12 in-18 in:	5+
18 in-24 in:	0
24 in-30 in:	1+

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **No groundwater encountered.**

Updated On: 1/23/2002

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP14-B
Project Name:	HoltraChem Manufacturing Site	Equipment:	Leibherr R914 rubber tire excavator	Logged By:	Ernest Ashley
Project Location:	Orrington, Maine	Depth to Water:	N/A	Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
0	Topsoil, dark brown, fine SAND, some silt, organics	0.5	E
1	Dry, dense, brown fine SAND and SILT, little to some clay, little gravel, large boulders (till)		
2			D
3			
4	Dry, dense, grey fine SAND and SILT, little to some clay, little gravel, large boulders.		
5			D
6			
7	Bottom of excavation 7', No groundwater encountered		
8			
9			
10			
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	8
Depth (ft):	7
Vol (ft^3):	168

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	0
12 in-18 in:	5+
18 in-24 in:	0
24 in-30 in:	1+

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **No groundwater encountered.**

Updated On: 1/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP15-A
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Loose, coarse SAND and GRAVEL.	0.75'	E
1	Fine SAND and SILT.		
		1.5'	E
2			
	Hard, blue - grey, SILT and CLAY.		
3			D
		4'	D
5			
6	Hard, blue - grey, SILT and CLAY.		M
7	Bulk sample collected for geotechnical testing.		
8			
9			
10		10'	M
	Bottom of excavation at 10'.		
11			
12			

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	15
Depth (ft):	10
Vol (ft^3):	450

TEST PIT PLAN

N ⇧

BOULDER COUNT	
6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP15-B
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dry, dark brown loam with gravel.	0.5'	E
1	Dry, brown - grey, fine to medum SAND, little silt, little gravel.		
2			E
	Dry, brown to dark brown, coarse to medium SAND with roots.	2.5'	E
3			
4			
5	Dry, hard, mottled grey and brown, SILT and CLAY.		M
6			
7			
8			
9			
	Increasing moisture content.		
10		10'	M
	Bottom of excavation at 10'.		
11			
12			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	10
Vol (ft^3):	450

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02139
(617) 452-6000

Test Pit Log

Client:	Mallinckrodt	Contractor:	H.E. Sargent	Test Pit No.	TP15-C
Project Name:	Holtrachem Manufacturing Site	Equipment:		Logged By:	Rick Jones
Project Location:	Orrington, Maine	Depth to Water:		Date:	11/13/2001
Project Number:	0654-10508-RT.TASK22	Ground Surface EL:	N/A	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
	Dark brown, LOAM.	0,5'	E
1			
2	Dry, brown, fine to medium SAND.		
3			
4	Encountered crushed stone drainage layer and water.	4'	E
5	Blue - grey, fine SAND and SILT.		
6		6'	E
7	Bottom of excavation at 6'.		
8			
9			
10			
11			
12			

T.P. DIMENSIONS

Width (ft): 3
Length (ft): 8
Depth (ft): 6
Vol (ft^3): 144

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION

and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 01/23/2002

Appendix D
Geotechnical Testing

CDM Jessberger
A Division of Camp Dresser & McKee Inc.

Memorandum

To: *Ernest Ashley*

From: *Kurt Sjoblom, Ph.D.*

Date: *December 27, 2001*

Subject: *Geotechnical Laboratory Test Results*
MALLINCKRODT Group
Holtrachem Manufacturing Site
Orrington, ME
Project No: 0654-10508 RT.TASK23

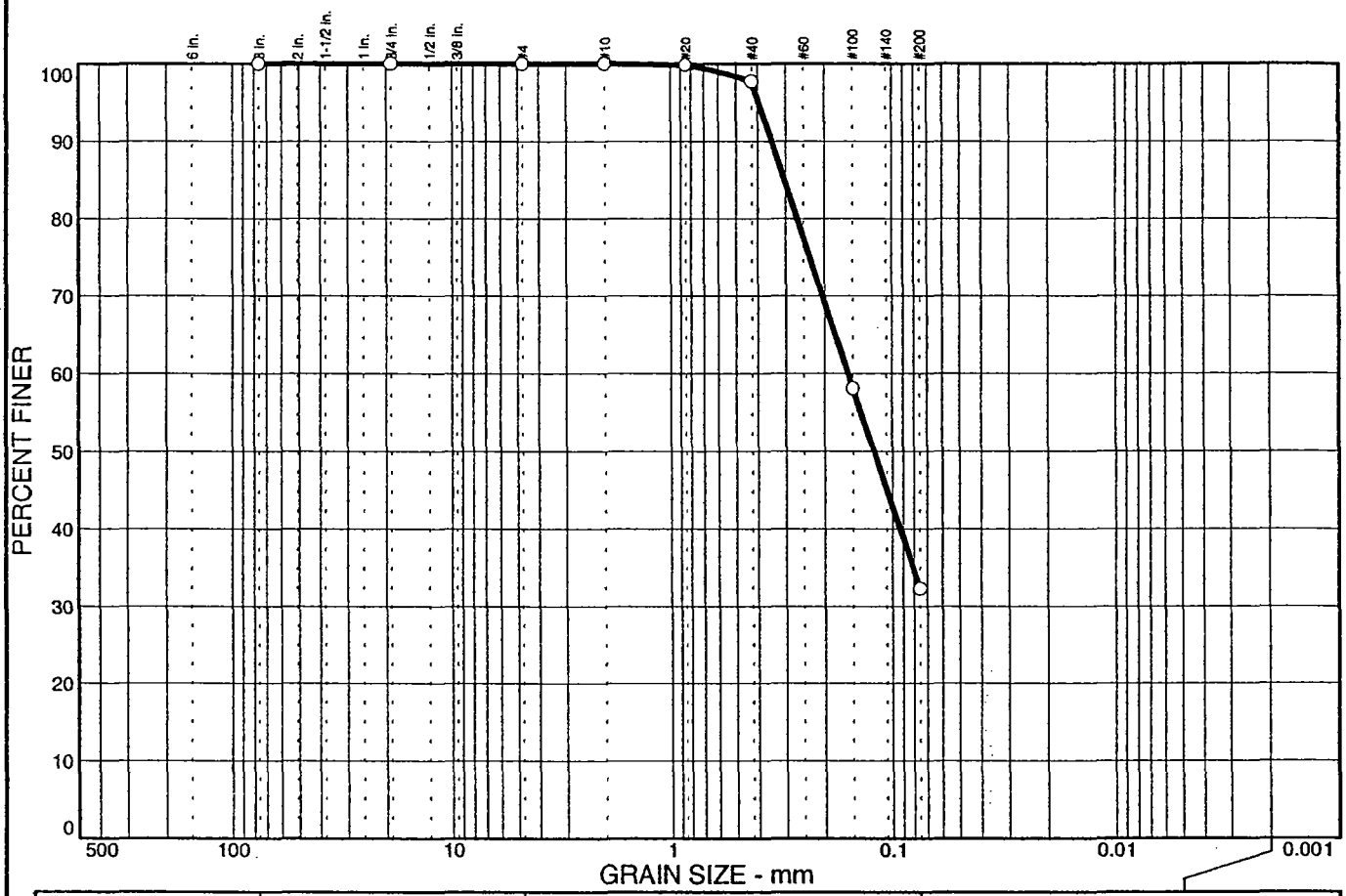
Enclosed are the results of the geotechnical laboratory tests performed on the soil samples from the Holtrachem Manufacturing Site project in Orrington, ME. The tests were performed in accordance with the following standards:

- Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter (ASTM D5084) and;
- Standard Test Method for Particle-Size Analysis of Soils (ASTM D422).

Please contact me if you have any questions regarding the test results.

Thank you.

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	2.3	65.4	32.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	100.0		
#20	99.8		
#40	97.7		
#100	58.1		
#200	32.3		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 0.303 D_{60}= 0.158 D_{50}= 0.121
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= ---

Remarks

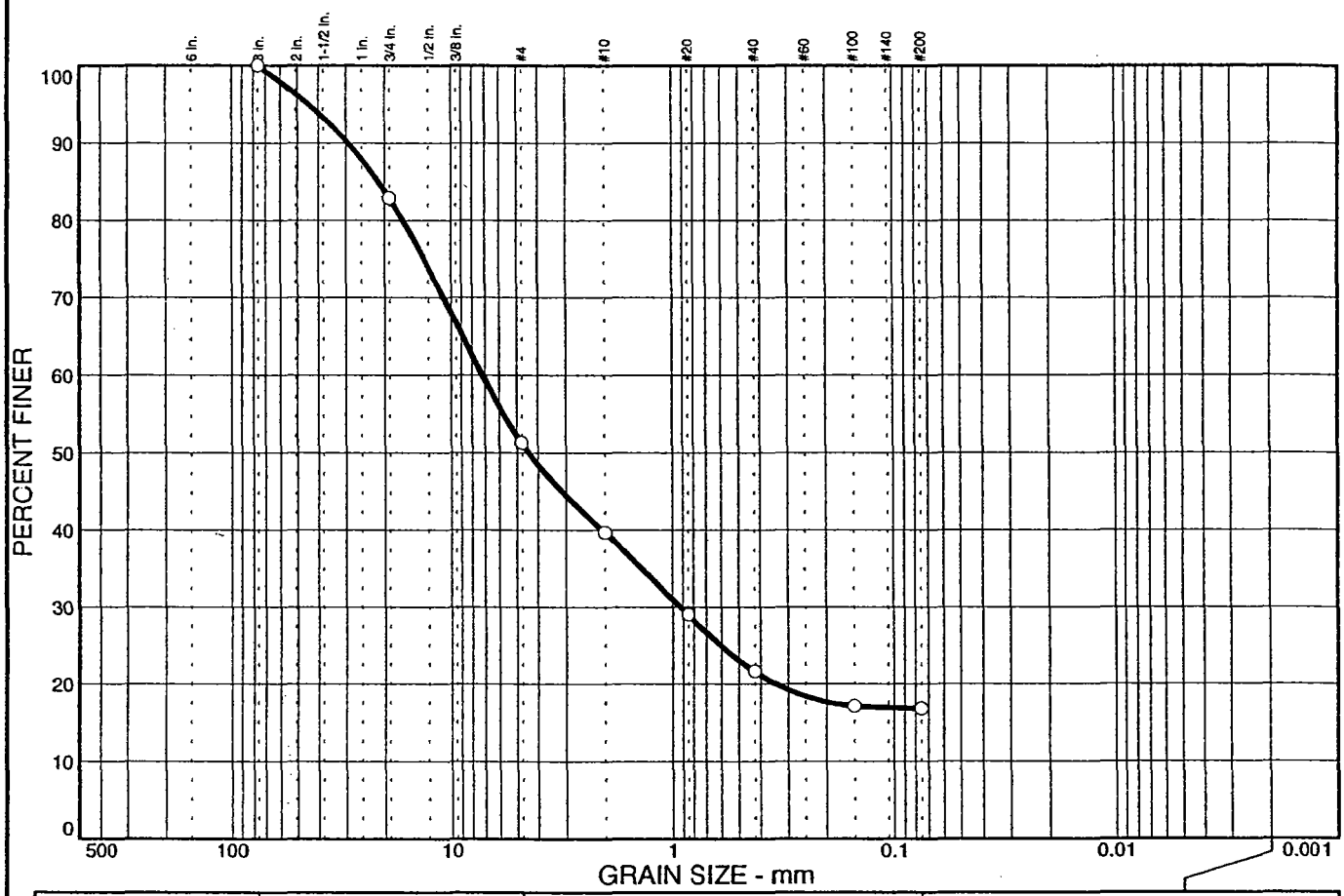
As received moisture content = 9.2%
Soil classification and description based on Visual-Manual Procedure (ASTM D2488)

Sample No.: SB13-01-15-17 **Source of Sample:** ---- **Date:** 11/13/01
Location: --- **Elev./Depth:** 15.0'-17.0'

CDM Jessberger Geotechnical Engineering Laboratory	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

CDM0012961

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	17.1	31.6	11.6	18.1	4.8	16.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	82.9		
#4	51.3		
#10	39.7		
#20	29.0		
#40	21.6		
#100	17.1		
#200	16.8		

* (no specification provided)

Soil Description

Silty gravel with sand

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 21.3 D_{60}= 7.17 D_{50}= 4.41
D_{30}= 0.921 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO= ---

Remarks

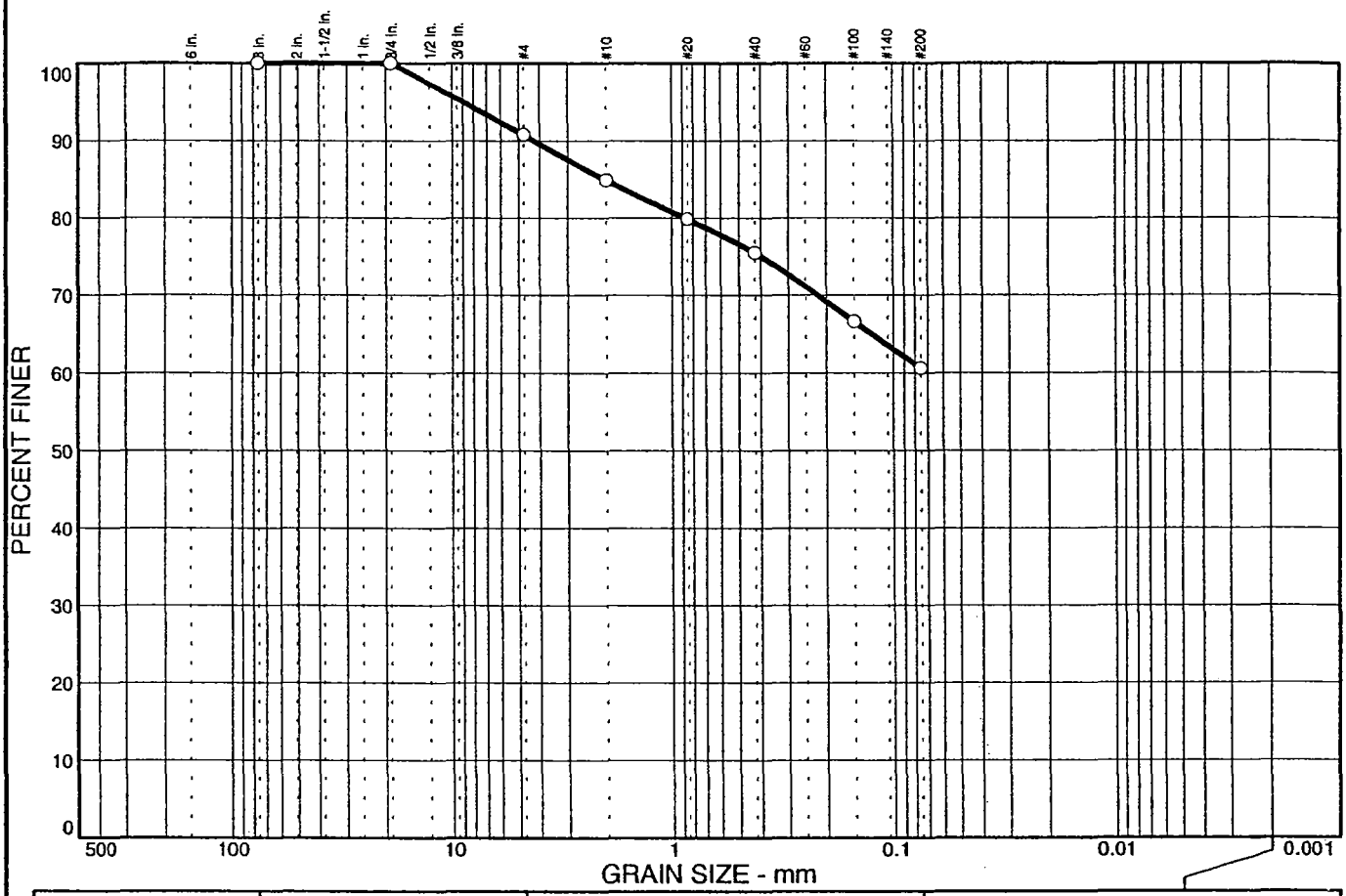
As received moisture content = 8.7%
Soil classification and description based on Visual-Manual Procedure (ASTM D2488)

Sample No.: SB13-01-35-37 **Source of Sample:** ---- **Date:** 11/13/01

Location: --- **Elev./Depth:** 35.0'-37.0'

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	9.2	5.9	9.4	14.9	60.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	90.8		
#10	84.9		
#20	79.9		
#40	75.5		
#100	66.6		
#200	60.6		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 2.03 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= ---

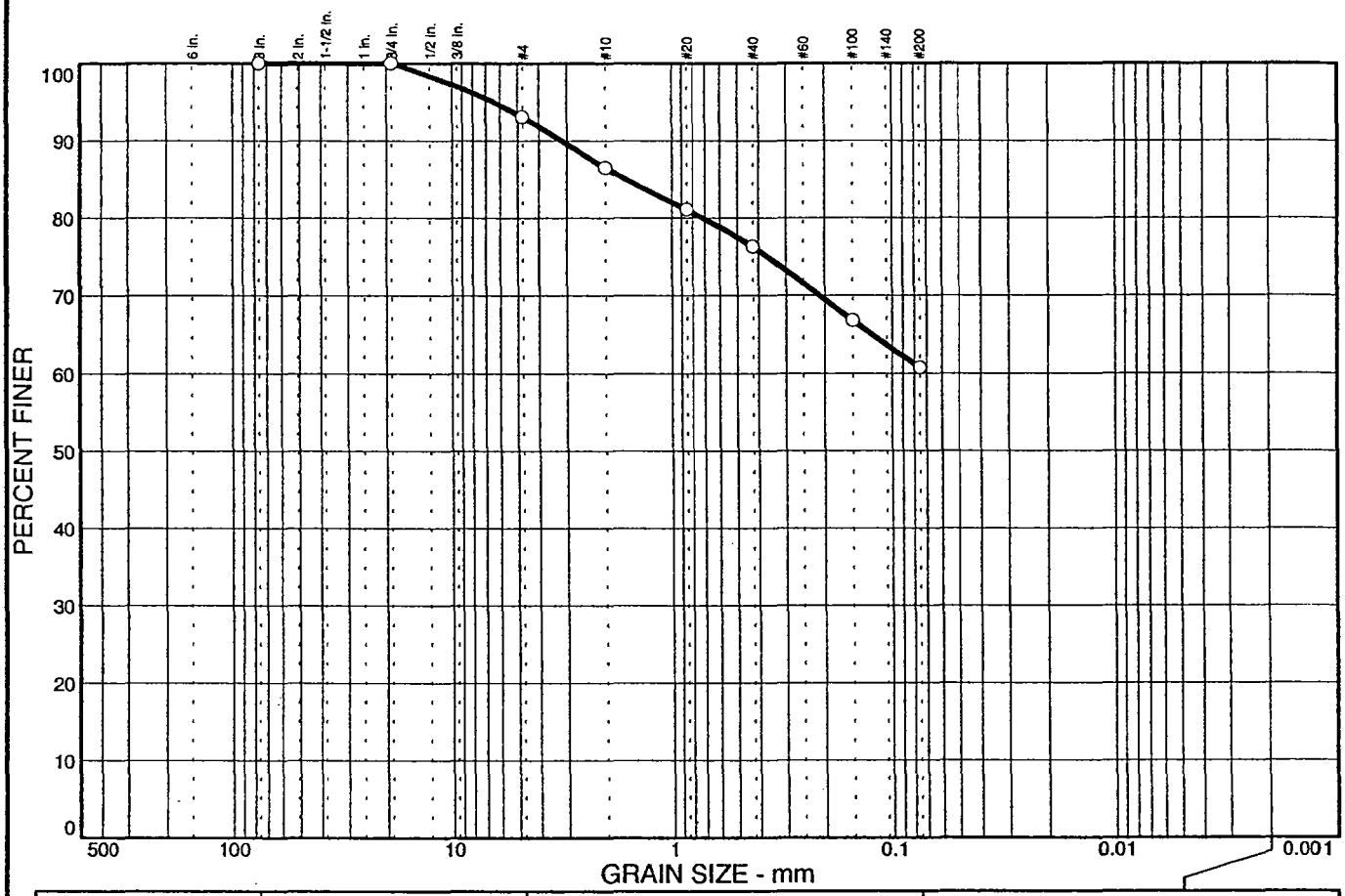
Remarks

As received moisture content= 10.2%
Soil description and classification based on Visual-Manual Procedure (ASTM D2488).

Sample No.: SB13-01-51-53 **Source of Sample:** ---- **Date:** 11-14-01
Location: --- **Elev./Depth:** 51.0'-53.0'

CDM Jessberger Geotechnical Engineering Laboratory	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	6.9	6.6	10.2	15.6	60.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	93.1		
#10	86.5		
#20	81.1		
#40	76.3		
#100	66.8		
#200	60.7		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 1.61 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= ---

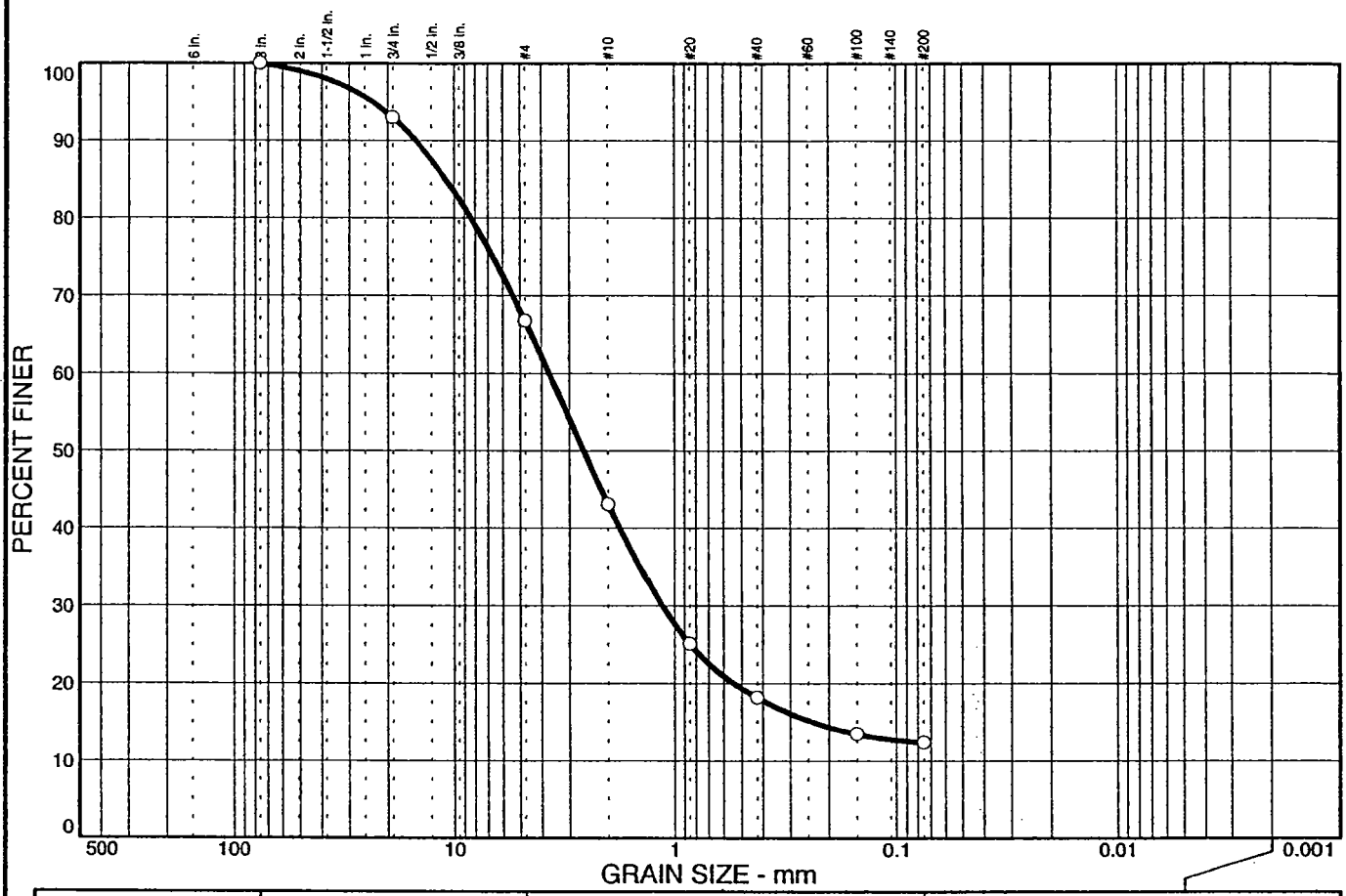
Remarks

As received moisture content= 8.1%
Soil description and classification based on Visual-Manual Procedure (ASTM D2488).

Sample No.: SB13-01-57-59 **Source of Sample:** ---- **Date:** 11-14-01
Location: --- **Elev./Depth:** 57.0'-59.0'

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	7.0	26.2	23.7	24.9	5.8	12.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	93.0		
#4	66.8		
#10	43.1		
#20	25.1		
#40	18.2		
#100	13.5		
#200	12.4		

(no specification provided)

Soil Description

Silty sand with gravel

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 10.9 D_{60}= 3.69 D_{50}= 2.58
D_{30}= 1.13 D_{15}= 0.237 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= ---

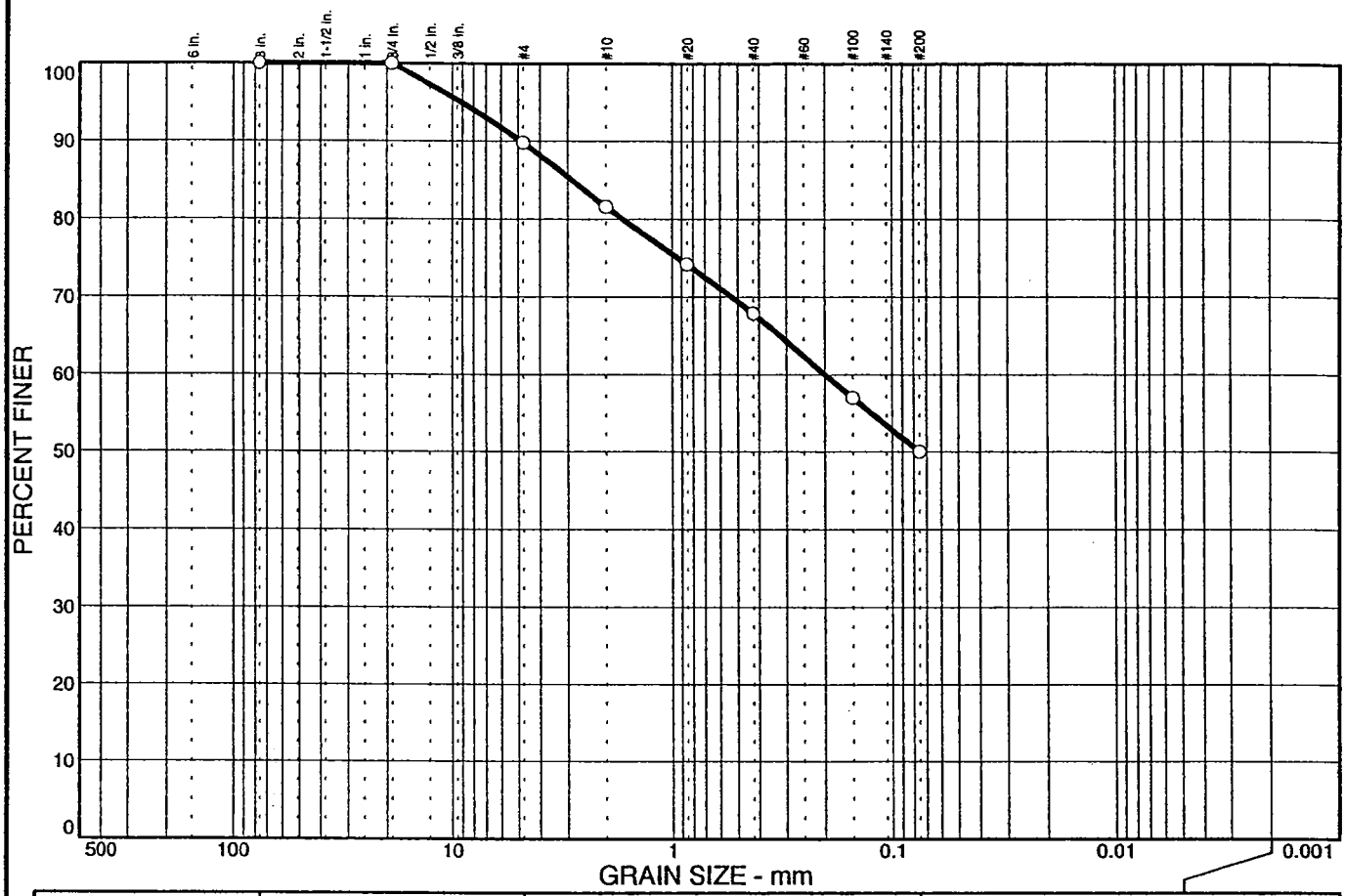
Remarks

As received moisture content = 8.0%
Soil classification and description based on Viusal-Manual Procedure (ASTM D2488)

Sample No.: SB13-02-40-42 **Source of Sample:** ---- **Date:** 11/14/01
Location: --- **Elev./Depth:** 40.0'-42.0'

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	10.2	8.2	13.7	17.9	50.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	89.8		
#10	81.6		
#20	74.2		
#40	67.9		
#100	57.0		
#200	50.0		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 2.86 D_{60}= 0.199 D_{50}= 0.0750
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= ---

Remarks

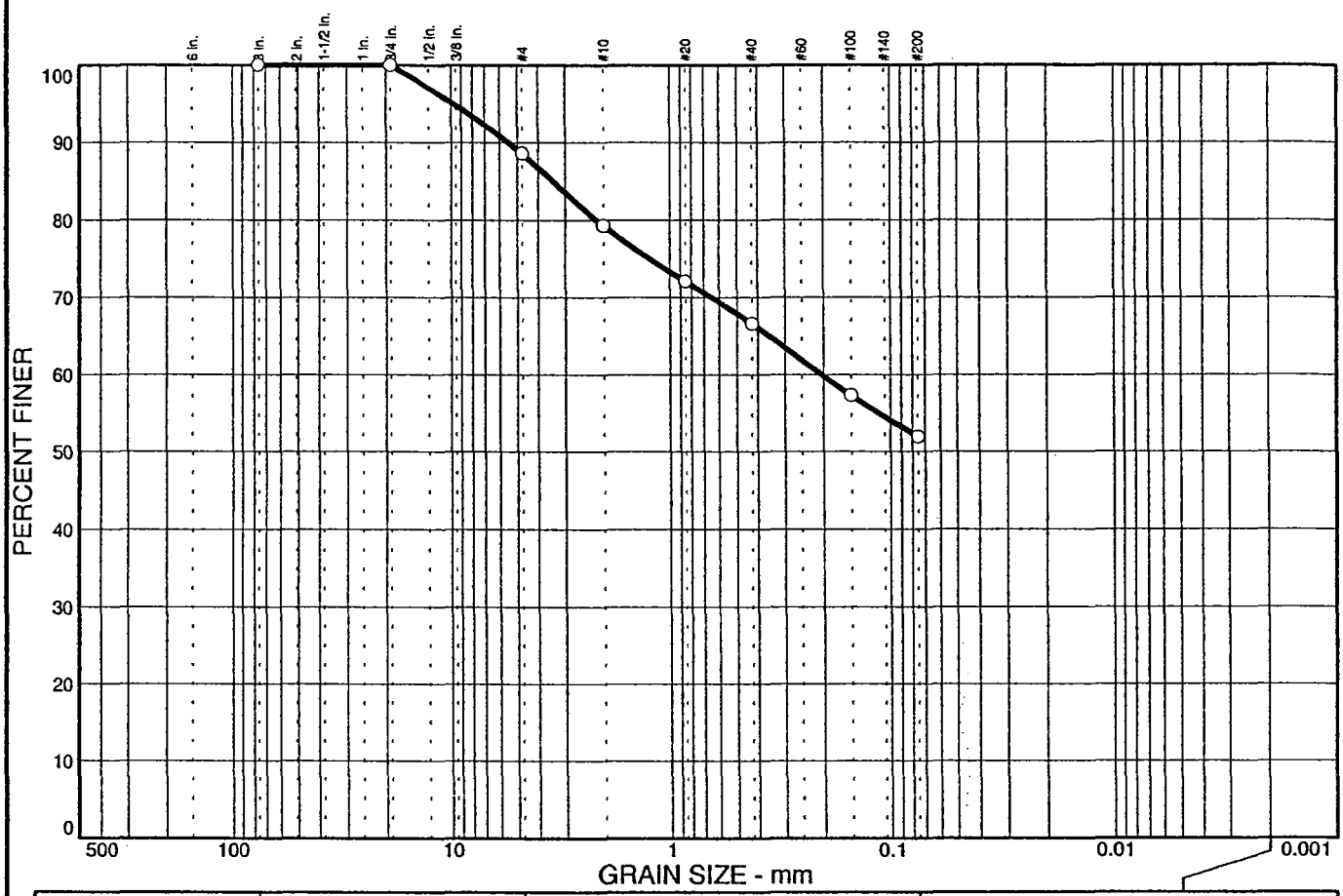
As received moisture content= 8.2%
Soil description and classification based on Visual-Manual Procedure (ASTM D2488).

Sample No.: SB13-02-59-61 **Source of Sample:** ---- **Date:** 11-14-01

Location: --- **Elev./Depth:** 59.0'-61.0'

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	11.4	9.3	12.7	14.7	51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	88.6		
#10	79.3		
#20	72.1		
#40	66.6		
#100	57.3		
#200	51.9		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 3.40 D_{60}= 0.204 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= ---

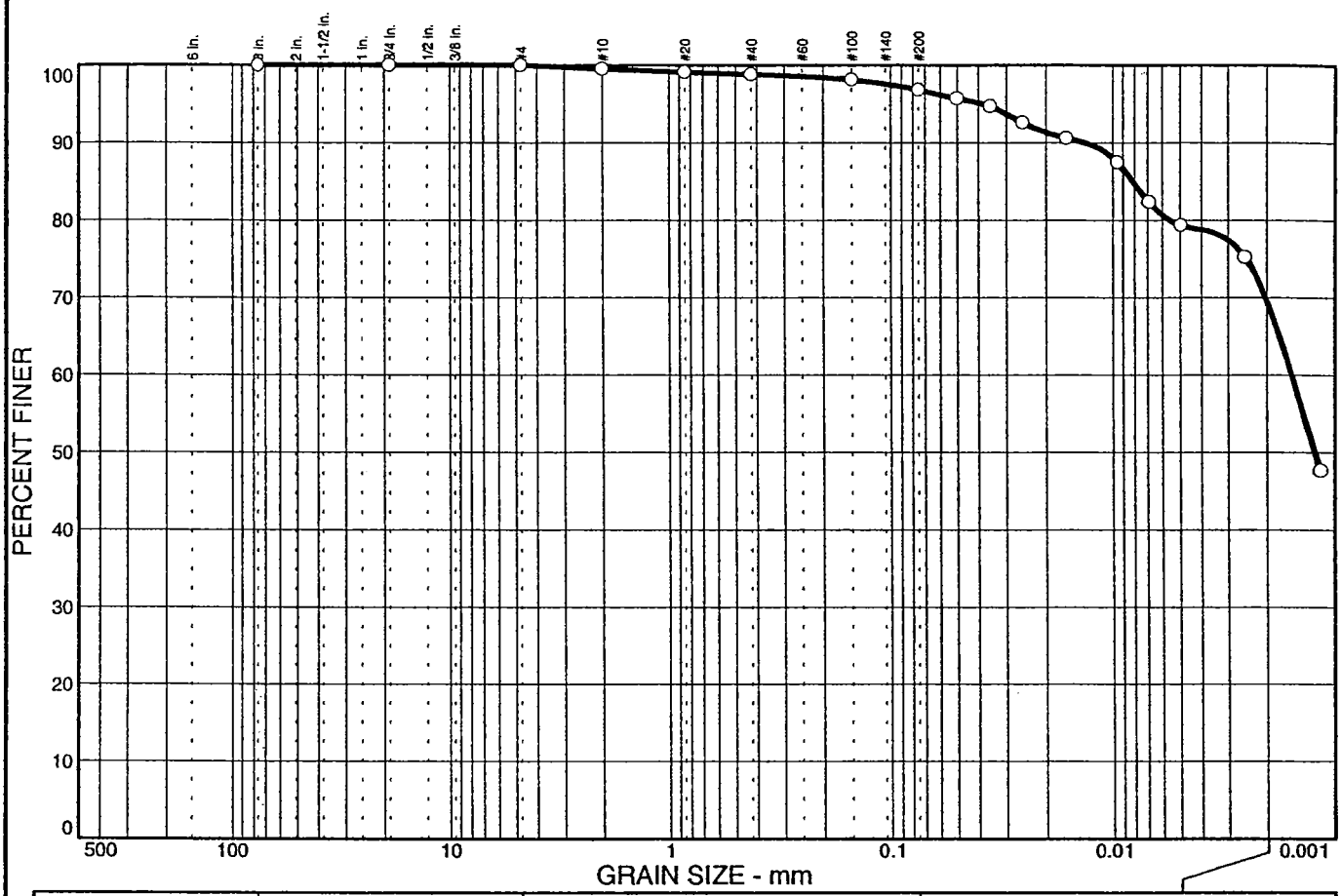
Remarks

As received moisture content= 8.2%
Soil description and classification based on Visual-Manual Procedure (ASTM D2488).

Sample No.: SB13-03-37-39 **Source of Sample:** ---- **Date:** 11-14-01
Location: --- **Elev./Depth:** 37.0'-39.0'

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.5	0.7	2.0	27.3	69.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
3/4	100.0		
#4	100.0		
#10	99.5		
#20	99.1		
#40	98.8		
#100	98.1		
#200	96.8		

* (no specification provided)

Soil Description

Silt

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 0.0081 D_{60}= 0.0015 D_{50}= 0.0012
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= ---

Remarks

As received moisture content = 25.6%
Soil classification and description based on Visual-Manual Procedure (ASTM D2488)

Sample No.: CLAY1 **Source of Sample:** ---- **Date:** 11/14/01
Location: --- **Elev./Depth:** ---

CDM Jessberger **Geotechnical Engineering Laboratory**	**Client:** MALLINCKRODT **Project:** HOLTRACHEM SITE **Project No:** 0654-10508-RT.TASK22 **Plate**

CDM Jessberger
Geotechnical Engineering Laboratory

Hydraulic Conductivity Using Flexible Wall Permeameter (ASTM D 5084)

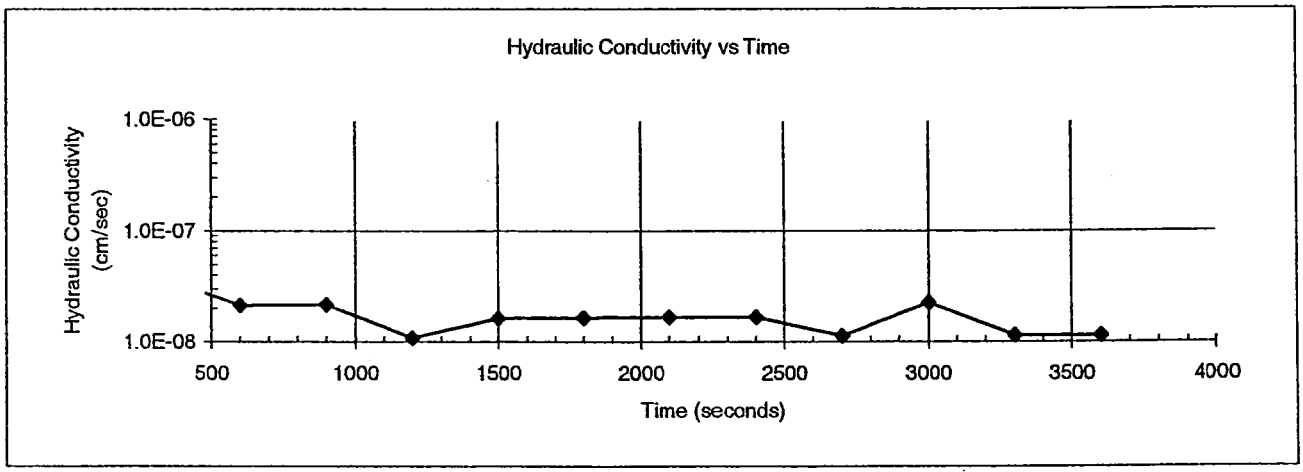
Client:	Mallinckrodt Inc.	Tested by:	MY
Project Name:	Holtrachem Manufacturing Site	Checked by:	KS
Project Location:	Orrington, ME	Start Test Date:	12/5/01
Project Number:	0654-10508-RT.TASK22	Permeant Fluid:	De-aired water
Sample Number:	SB13-03-37-39		
Sample Location:	-	Sample Preparation Procedures:	Sample extruded from tube.
Depth (ft):	37-39		
Lab I.D. Number:	314C		
Sample Description:	Blue/Grey Clay		
Test Type:	Falling head (Method C)		

Sample Characteristics	Initial	Final
Avg. length of specimen (in):	3.14	3.14
Avg. dia. of specimen (in):	2.42	2.42
Area (sq in):	4.61	4.61
Volume (cubic in):	14.46	14.46
Moist mass (g):	538.0	535.9
Moist unit weight (pcf):	141.8	141.2
Moisture content (%):	8.2	9.8
Dry unit weight (pcf):	131.0	128.6
Specific gravity (assumed)	2.65	2.65
Void Ratio	0.26	0.29

Test Specifications	
B-Value (%):	97.0
Consolidation stress (psi):	10.0
Maximum gradient (in/in):	33.1
Minimum gradient (in/in):	30.5
Cell pressure (psi):	40.0
Back pressure (psi):	38.0

Comments: No observed anomalies (ie. rocks, voids, etc.).

Hydraulic Conductivity at 20 °C = **1.4E-08** cm/sec



CDM Jessberger
Geotechnical Engineering Laboratory

Hydraulic Conductivity Using Flexible Wall Permeameter (ASTM D 5084)

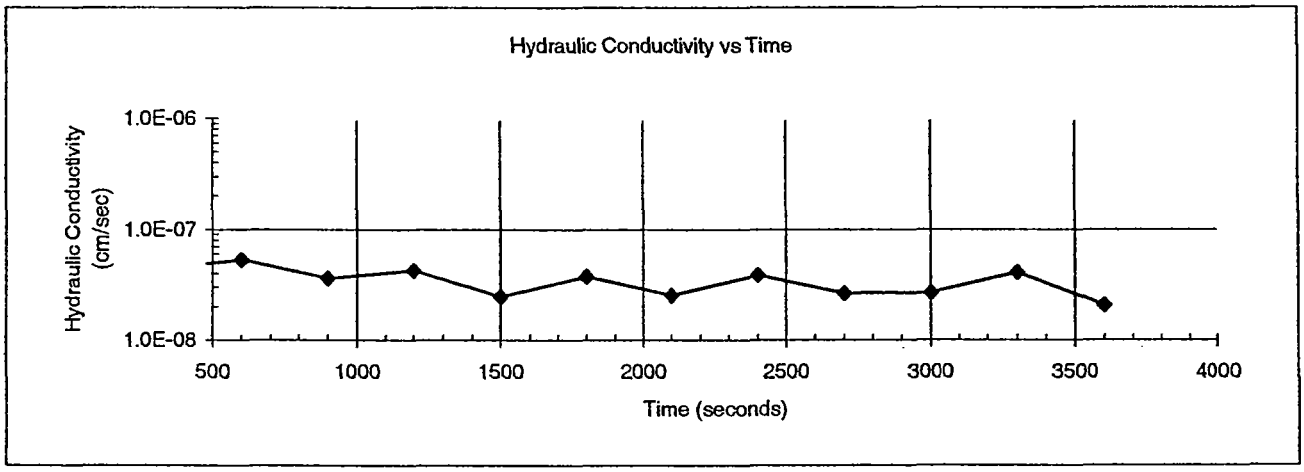
Client:	Mallinckrodt Inc.	Tested by:	MY
Project Name:	Holtrachem Manufacturing Site	Checked by:	KS
Project Location:	Orrington, ME	Start Test Date:	12/5/01
Project Number:	0654-10508-RT.TASK22	Permeant Fluid:	De-aired water
Sample Number:	SB13-02-57-61		
Sample Location:	-	Sample Preparation Procedures:	Sample extruded from tube.
Depth (ft):	59-61		
Lab I.D. Number:	313C		
Sample Description:	Blue/Grey Clay		
Test Type:	Falling head (Method C)		

Sample Characteristics	Initial	Final
Avg. length of specimen (in):	3.17	3.17
Avg. dia. of specimen (in):	2.41	2.41
Area (sq in):	4.55	4.56
Volume (cubic in):	14.41	14.44
Moist mass (g):	562.9	561.8
Moist unit weight (pcf):	148.8	148.2
Moisture content (%):	8.2	9.0
Dry unit weight (pcf):	137.5	136.0
Specific gravity (assumed)	2.65	2.65
Void Ratio	0.20	0.22

Test Specifications	
B-Value (%):	99.0
Consolidation stress (psi):	10.0
Maximum gradient (in/in):	30.5
Minimum gradient (in/in):	25.7
Cell pressure (psi):	40.0
Back pressure (psi):	38.0

Comments: No observed anomalies (ie. rocks, voids, etc.).

Hydraulic Conductivity at 20 °C = **2.8E-08** cm/sec



CDM Jessberger
Geotechnical Engineering Laboratory

Hydraulic Conductivity Using Flexible Wall Permeameter (ASTM D 5084)

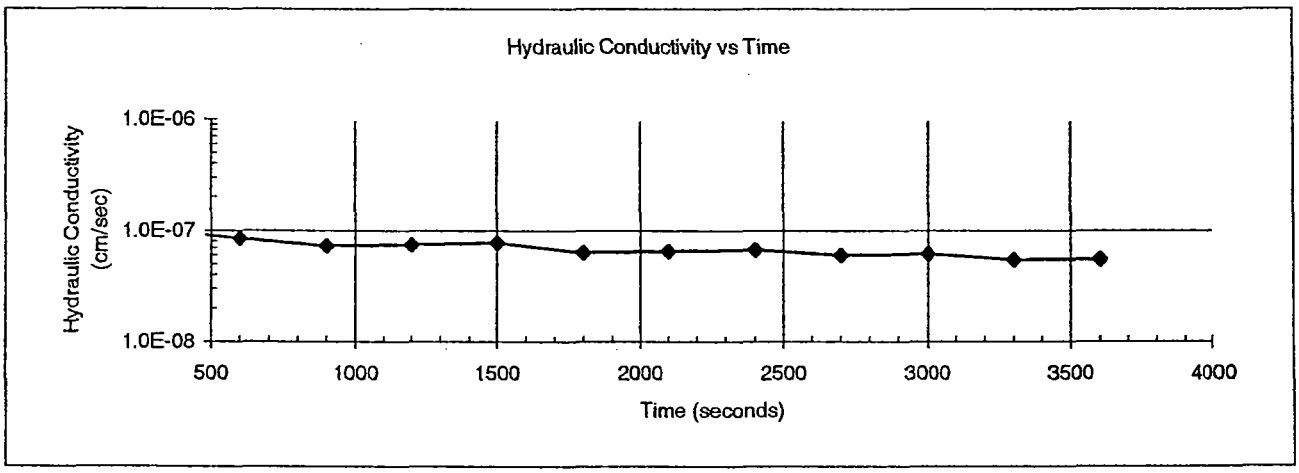
Client:	Mallinckrodt Inc.	Tested by:	MY
Project Name:	Holtrachem Manufacturing Site	Checked by:	KS
Project Location:	Orrington, ME	Start Test Date:	12/5/01
Project Number:	0654-10508-RT.TASK22	Permeant Fluid:	De-aired water
Sample Number:	SB13-01-57-59		
Sample Location:	-	Sample Preparation Procedures:	Sample extruded from tube.
Depth (ft):	57-59		
Lab I.D. Number:	312C		
Sample Description:	Blue/Grey Clay		
Test Type:	Falling head (Method C)		

Sample Characteristics	Initial	Final
Avg. length of specimen (in):	3.52	3.52
Avg. dia. of specimen (in):	2.42	2.42
Area (sq in):	4.61	4.61
Volume (cubic in):	16.25	16.24
Moist mass (g):	620.6	624.3
Moist unit weight (pcf):	145.5	146.5
Moisture content (%):	8.1	10.1
Dry unit weight (pcf):	134.6	133.1
Specific gravity (assumed)	2.65	2.65
Void Ratio	0.23	0.24

Test Specifications	
B-Value (%):	98.0
Consolidation stress (psi):	10.0
Maximum gradient (in/in):	25.5
Minimum gradient (in/in):	18.7
Cell pressure (psi):	40.0
Back pressure (psi):	38.0

Comments: No observed anomalies (ie. rocks, voids, etc.).

Hydraulic Conductivity at 20 °C = **5.7E-08** cm/sec



CDM Jessberger
Geotechnical Engineering Laboratory

Hydraulic Conductivity Using Flexible Wall Permeameter (ASTM D 5084)

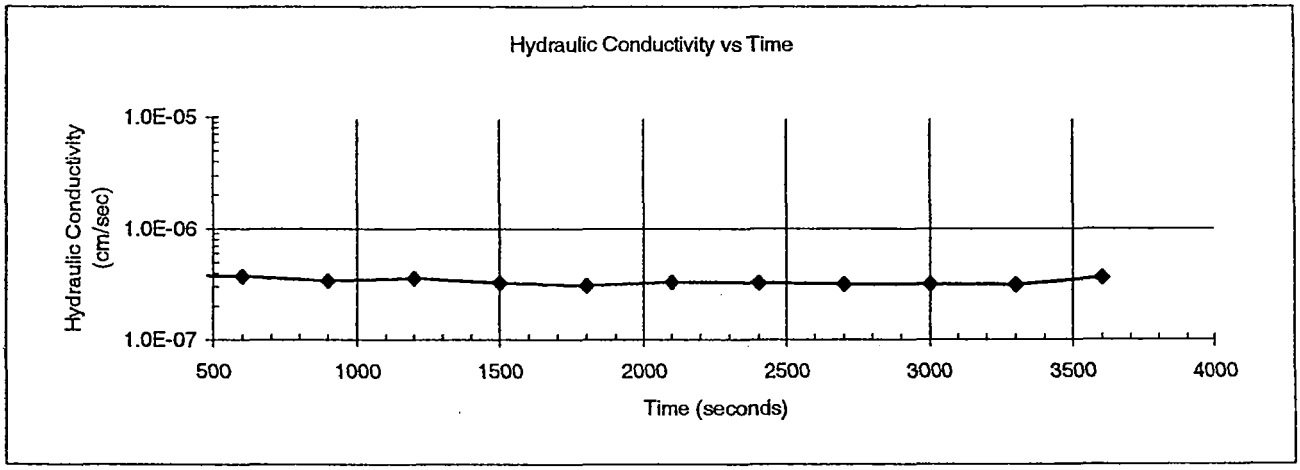
Client:	Mallinckrodt Inc.	Tested by:	MY
Project Name:	Holtrachem Manufacturing Site	Checked by:	KS
Project Location:	Orrington, ME	Start Test Date:	12/5/01
Project Number:	0654-10508-RT.TASK22	Permeant Fluid:	De-aired water
Sample Number:	SB13-01-51-53		
Sample Location:	-	Sample Preparation Procedures:	Sample extruded from tube.
Depth (ft):	51-53		
Lab I.D. Number:	311C		
Sample Description:	Blue/Grey Clay		
Test Type:	Falling head (Method C)		

Sample Characteristics	Initial	Final
Avg. length of specimen (in):	3.16	3.14
Avg. dia. of specimen (in):	2.42	2.42
Area (sq in):	4.61	4.60
Volume (cubic in):	14.57	14.45
Moist mass (g):	521.3	519.4
Moist unit weight (pcf):	136.3	137.0
Moisture content (%):	10.2	11.0
Dry unit weight (pcf):	123.7	123.4
Specific gravity (assumed)	2.65	2.65
Void Ratio	0.34	0.34

Test Specifications	
B-Value (%):	98.0
Consolidation stress (psi):	10.0
Maximum gradient (in/in):	26.8
Minimum gradient (in/in):	4.9
Cell pressure (psi):	40.0
Back pressure (psi):	38.0

Comments: No observed anomalies (ie. rocks, voids, etc.).

Hydraulic Conductivity at 20 °C = **3.2E-07** cm/sec



Appendix E

Data Quality Assessment

Appendix E
Data Quality Assessment

E.1 Soil Samples

Laboratory quality control data associated with samples submitted from the HoltraChem site in Orrington, Maine for the sampling conducted during the CMS Field Investigation (CMS FI) were reviewed and are summarized below. The samples were analyzed by Alpha Analytical Laboratories, of Westborough, Massachusetts. The samples were analyzed according to the analytical methods described in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846 Update III, 1997. This data quality assessment is based on the review of the following quality control information:

- Laboratory Method Blanks
- Matrix Spike/Matrix Spike Duplicates
- Laboratory Quality Control Samples
- Laboratory Duplicates
- Sample Holding Time Data

Project-generated quality control data were also reviewed. Twenty-two (22) field blank samples were included in the sample delivery groups (SDGs). In addition, twenty-two field duplicates were also included in these SDGs.

Applicable quality control data were evaluated on a per analysis basis and are summarized below by analytical parameter. Hold time and field blank data are summarized with the laboratory analytical results.

E.1.1 Mercury Analyses

Laboratory and Field Blanks

Mercury was not detected in any laboratory method or calibration blanks. No contamination was noted in any of the field blanks.

Matrix Spike/Matrix Spike Duplicate Recoveries

There were fifty total metals spike analyses for mercury in the SDGs reviewed. Twenty-three of the fifty did not meet the 60-140% recovery criteria. Typically the percent recoveries exceeded the 140% recovery criteria and the explanation provided by the laboratory was that this was due to high mercury concentrations existing in the samples.

Laboratory Control Sample Recoveries

Fifty laboratory control samples were analyzed for mercury. All had reported recoveries that were within recommended criteria.

Laboratory Duplicate Precision

There were fifty-one soil laboratory duplicate analyses associated with the samples from the CMS FI. All duplicate analyses fell within the 45% duplicate relative percent difference (RPD) criteria.

Field Duplicate Precision

There were twenty-two field duplicate samples associated with the samples. All duplicate analyses met the 45% RPD criteria for soils.

Holding Times

Mercury analyses associated with all SDGs were conducted within the specified holding time.

Overall Assessment

The overall precision and accuracy, as determined by QC checks including laboratory duplicates, laboratory control samples, and matrix spike samples, were acceptable for these data. The matrix spike analyses that did not fit the criteria are assumed to be outside of range and variable due to an elevated sample mercury concentration relative to the spike level used by the laboratory. The laboratory control samples indicated that recoveries were acceptable for the analyses. In conclusion, the soil data are acceptable for use in characterizing the concentrations and extent of mercury at the HoltraChem site.

Comparison of HoltraChem and Alpha Analytical Data

During the test pit investigation of the industrial sewer, 27 soil samples were analyzed for total mercury by the onsite HoltraChem. Three duplicates were run at the HoltraChem lab. The RPD of these samples ranged from 0 to 1.6%. Four split samples were forwarded to Alpha Analytical Laboratories. The relative percent difference for these split samples ranged from 9.8 to 68.5% and averaged 38.4%. One of the split sample pairs had greater than the 45% RPD criteria for soil samples.

The mercury values of the four samples analyzed by Alpha Analytical Laboratories were slightly higher that the corresponding results from the HoltraChem Laboratory. These data are not sufficient to indicate the presence or absence of a bias. Subsequent audit of the HoltraChem laboratory recommended additional calibration points to address this potential. Considering that the use of the HoltraChem laboratory for the industrial sewer characterization was to identify free elemental mercury and/or gross contamination, the difference in HoltraChem and Alpha analytical results does not affect the usefulness of the HoltraChem data.

E.1.2 PCB Analyses

Laboratory Method Blanks

No PCBs were detected in the laboratory blank for the CMS FI samples

Laboratory Duplicate Precision

The laboratory duplicate for the CMS FI samples was within acceptable criteria.

Laboratory Control Sample Recoveries

One laboratory control sample was analyzed for PCBs. The Aroclor and surrogate recoveries were within acceptance criteria.

Sample Surrogate Recoveries

The surrogate percent recovery for one of the two surrogates for sample SS7-05-01 was outside the laboratory acceptance criteria for the method. The sample was re-extracted and the analysis of the re-extraction confirmed the reported results with the acceptable surrogate recoveries.

Holding Times

Samples were extracted and analyzed within holding times specified for the method.

Overall Assessment

The PCB data collected for the CMS FI are acceptable for characterizing the concentrations and extent of PCBs at the HoltraChem site.

E.2 Groundwater Samples

Laboratory quality control data associated with samples submitted from the HoltraChem site in Orrington, Maine for the sampling conducted during the CMS FI were reviewed. The samples were all analyzed by Alpha Analytical Laboratories, of Westborough, Massachusetts. The samples were analyzed according to the analytical methods described in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846 Update III, 1997. This data usability assessment is based on the review of the following quality control information:

- Laboratory Method Blanks
- Matrix Spike/Matrix Spike Duplicates
- Laboratory Duplicates
- Laboratory Quality Control Samples
- Sample Holding Time Data

Project-generated quality control data was also reviewed. Four trip blanks and four field duplicates were included the CMS FI samples.

Applicable quality control data were evaluated on a per analysis basis and are summarized below by analytical parameter. Hold time and field blank data are summarized with the laboratory analytical results.

E.2.1 Mercury Analyses

Laboratory Blanks

Mercury was not detected in any of the laboratory method or calibration blanks.

Matrix Spike/Matrix Spike Duplicate Recoveries

There were six total metals spike analysis for mercury for the CMS FI samples. Two of the six analyses did not meet the 70-130% recovery criteria. Typically the percent recoveries exceeded the 140% recovery criteria and the explanation provided by the laboratory was that this was due to high mercury concentrations existing in the samples.

Laboratory Control Sample Recoveries

The laboratory control samples analyzed for mercury reported recoveries that were within recommended criteria. All samples were analyzed within the method specified criteria.

Laboratory Duplicate Precision

There were six aqueous laboratory duplicate analyses associated with the samples from the CMS FI. The duplicate analyses all fell within the 35% duplicate relative percent difference (RPD) criteria.

Field Duplicate Precision

There were four field duplicate samples associated with the samples from the CMS FI. The duplicate analyses met the 35% RPD criteria for aqueous samples.

Holding Times

All analyses for mercury were conducted within the allowed holding time (28 days). Two SDGs including samples from B-327 (November 2001) and the well points around Landfill 2 (WP-1 through WP-18, November 2002) were received at the laboratory and filtered for dissolved mercury two days after collection. It is recommended that samples to be analyzed for dissolved metals (except mercury and hexavalent chromium) be filtered and preserved in the field. EPA guidance for holding times does not explicitly state a time requirement for dissolved mercury. (EPA SW-846 Chapter 3 Table 3-1). The data are usable as reported.

Overall Assessment

The overall precision and accuracy, as determined by QC checks including laboratory duplicates, laboratory control samples, and matrix spike samples, were acceptable for the groundwater samples collected during the CMS FI. As noted above, detected dissolved metals concentrations in samples from B-321 (November, 2001) and Landfill 2 well points (November 2002) should be considered estimates.

E.2.2 Metals Analysis: Iron, Manganese, Calcium, Magnesium, Potassium and Sodium

Laboratory Blanks

No contamination was noted in any of the laboratory blanks for these SDGs.

Matrix Spike/Matrix Spike Duplicate Recoveries

There were five aqueous matrix spike analyses associated with the CMS FI samples. Matrix spike recoveries were within the recommended criteria (75-125%) with two exceptions where the sodium concentrations in the sample were greater than four times the spike amount added.

Laboratory Control Sample Recoveries

Laboratory control samples were analyzed for iron, manganese, calcium, magnesium, sodium and potassium. All recoveries were within the recommended criteria.

Laboratory Duplicate Precision

There were five aqueous laboratory duplicate analyses associate with the samples in these SDGs. All duplicate results were within the recommended criteria.

Field Duplicate Precision

There were three field duplicate samples associated with the CMS FI samples. The duplicate analysis met the 35% RPD criteria for aqueous samples.

Holding Times

All analyses were conducted within the recommended maximum holding times. Samples from B-327 (November 2001) were received at the laboratory and filtered for dissolved metals two days after collection. It is recommended that samples to be tested for dissolved metals (except hexavalent chromium and mercury) should be filtered and preserved in the field or by the laboratory within 24 hours of sample collection. Dissolved metals concentrations in this sample should be considered estimated.

Overall Assessment

The overall precision and accuracy, as determined by QC checks including laboratory duplicates, laboratory control samples, and matrix spike samples, were acceptable for the groundwater samples collected during the CMS FI.

E.2.3 Volatile Organic Analyses

Associated volatile organic quality control data was reviewed.

Laboratory and Trip Blanks

No target compounds were detected in any of the laboratory method blanks or trip blanks.

Matrix Spike/Matrix Spike Duplicate Recoveries

MS/MSD recoveries were within the acceptable percent recovery with the following exceptions: for MW-401-O1, the duplicate of B-326-02, MW-509-B1, MW-503-O1, B-327-O1, and one trip blank. TCE values were outside the acceptable percent recovery range. The other spiked compound recoveries were within acceptable ranges.

Laboratory Control Sample Recoveries

All VOC surrogate spike percent recoveries were acceptable.

Holding Times

The method specifies a holding time of fourteen days beyond the collection time for sample analysis. All samples were analyzed within the specified hold time.

Overall Assessment

The overall precision and accuracy, as determined by QC checks including laboratory duplicates, laboratory control samples, and matrix spike samples, were acceptable for the groundwater samples collected during the CMS FI.

E.2.4 Total Organic Carbon Analysis

Laboratory Blanks

TOC concentrations were not detected in the laboratory method blanks.

Laboratory Control Sample Recoveries

The reported laboratory control samples percent recovery were within the recommended criteria with the exception of sample from MW-510-O1 which was not analyzed due to high levels of chlorine present in the sample. The laboratory noted that full sample quality control was not able to be performed on the samples of two SDGs due to limited sample volumes.

Holding Times

All total organic carbon analyses were conducted within the holding times specified in the method.

Overall Assessment

The TOC analyses are acceptable for characterization of site groundwater.

E.2.4 Conventional Wet Chemistry Analysis

Laboratory and Trip Blanks

Associated quality control data was reviewed for hardness, alkalinity, chloride and sulfate analyses. No concentrations of these parameters were detected in any of the blanks associated with the project SDGs.

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike recovery data was reviewed for hardness, alkalinity, chloride and sulfate. Matrix spike recoveries were within the recommended criteria.

Laboratory Duplicate Precision

Laboratory duplicate data was reviewed for hardness, alkalinity, chloride and sulfate. All duplicate results were within the recommended criteria.

Field Duplicate Precision

There were three field duplicate samples associated with the CMS FI samples. The field duplicate results are all within the recommended criteria.

Laboratory Control Sample Recoveries

The laboratory control samples analyzed reported recoveries that were within the recommended criteria. All samples were analyzed within the method specified criteria.

Holding Times

All samples were analyzed within the specified hold times.

Overall Assessment

The wet chemistry analyses are acceptable for characterization of site groundwater.