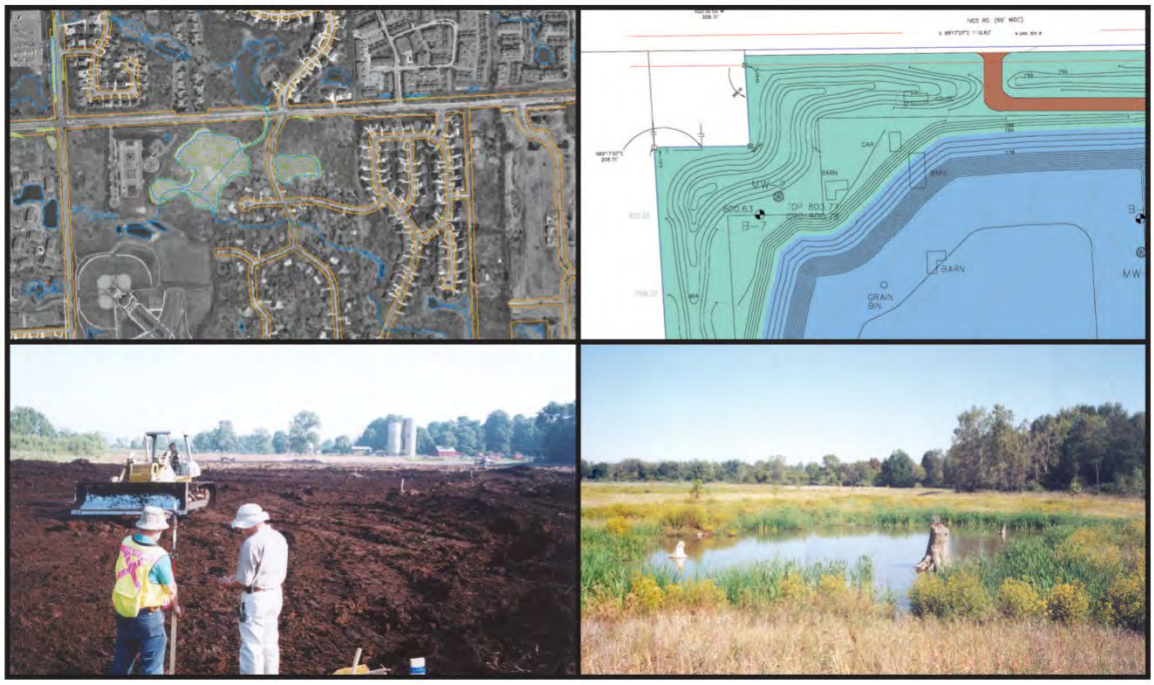
Waste Management Unit 30 Surface Soil Lead Investigation
Revision 1

18251 West Jefferson Avenue
Riverview, Michigan

Riverview-Trenton Railroad Company

March 29, 2021

ASTI ENVIRONMENTAL



ASTI ENVIRONMENTAL

Waste Management Unit 30 Surface Soil Lead Investigation
Revision 1

18251 West Jefferson Avenue
Riverview, Michigan

March 29, 2021

Prepared For:

Riverview-Trenton Railroad Company
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ASTI Project No. 10860

Report Prepared by:

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Director – Grand Rapids Office

Report Reviewed by:

Allison J. Rogowski, EP
Staff Scientist

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Attachments

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Waste Management Unit 30 Surface Soil Lead Investigation
Revision 1
Riverview-Trenton Railroad Company
Former McLouth Steel Site
18251 West Jefferson Avenue
Riverview, Michigan

1.0 Introduction

In accordance with the Corrective Action Consent Order ("CACO") dated November 1, 2018 between the Riverview-Trenton Rail Road Company ("RTRR") and the Michigan Department of Environment, Great Lakes, and Energy ("EGLE"), ASTI Environmental ("ASTI") is providing this lead investigation summary for a portion of the property located at 18251 West Jefferson Avenue in the City of Riverview, Wayne County, Michigan ("Subject Property"). The Subject Property lies east of West Jefferson Avenue, south of West Jefferson Avenue, and Monguagon Creek, west of the Trenton Channel of the Detroit River and, north of the former McLouth Steel Facility. The portion of the Subject Property which lies south of Sibley Road, is located in the City of Trenton. A Site Location Map is provided as Figure 1 included in Attachment A. ASTI completed this report in accordance with item number seven within the Statement of Work included as Attachment A of the CACO for the Subject Property and with the Work Plan – Waste Management Unit Investigations prepared by ASTI dated June 28, 2019 ("Work Plan").

This report summarizes investigations, completed by others for the former Electronic Arc Furnace ("EAF") Dust Pile, also known as Waste Management Unit 30 ("WMU-30"). Attachment A of this report includes Figure 1 – Site Location Map and Figure 2 – Site Features Map. ASTI reviewed investigations completed by others to determine the extent of lead impacts in surface soil at concentrations exceeding the current Generic Nonresidential Cleanup Criteria ("GNRCC") for Direct Contact ("DC") of 900 milligrams per kilogram ("mg/kg" or parts per million). ASTI did not collect additional data for the purpose of this investigation.

2.0 Subject Property Background

The McLouth Steel Company ("McLouth") acquired the Subject Property between 1956 and 1961, and used portions of it for storage of raw materials, waste, and product to support the integrated production of steel and iron in the production facility located to the south ("McLouth Facility"). A large slag processing operation, operated by E. C. Levy Company, was also located on the Subject Property. Historically, the Subject Property included the Monguagon Creek channel, which flowed from the north to south and bisected the Subject Property, an oil storage terminal, and a large building with docking facilities. By 1961, the large building and oil terminal had been demolished and the Monguagon Creek channel had been rerouted along River Road where it currently empties into the Trenton Channel northeast of the Subject Property (Figure 2). By 1967, the original channel and mouth area of Monguagon Creek had been filled completely and this area was used for storage of equipment and materials (ore, debris, and scrap)[1].

[1] North Area Characterization Plan, Revised, ESC, November 2, 2000.

After about 1975, steel production decreased until McLouth ceased operations in April of 1996 after filing for Chapter 11 bankruptcy protection on September 29, 1995. At that time, only one blast furnace was operational and most other production units were operating at significantly reduced capacities.

Hamlin Holdings, Inc. acquired the Subject Property in July of 1996, although it is unclear what was conducted on the Subject Property during that time. Detroit Steel Company ("DSC") obtained title for the Subject Property in August of 1996 and used it for storage and conducted removal activities. DSC resumed pickling of strip steel at the McLouth Facility in July 1998. In support of the pickling operations, DSC started the scrubber, Central Wastewater Treatment Plant, and the pH adjustment station at the McLouth Facility. Those operations closed in 2005. Crown Enterprises purchased the Subject Property on June 2, 2000 and conveyed the property to RTRR in November of 2000.

3.0 Waste Management Unit 30 Background

McLouth Steel used both basic oxygen furnaces ("BOF") and EAF for production. The waste emission control dust generated from the EAF air pollution control systems was designated as a listed hazardous waste (K061) under the Resource Conservation and Recovery Act ("RCRA"). Sludge was accumulated in a concrete sump and transferred to the interim status EAF Dust Pile storage area. McLouth filed a notification of waste activity and a RCRA Part A permit on November 17, 1980 for storage of EAF dust prior to treatment or disposal. The unit was classified as an Interim Status Hazardous Waste Storage Unit in McLouth's 1980 Part A permit application. WMU-30 was a roughly 25,000 square feet area with an earthen berm built on top of the fill that covers most of the Subject Property. Figure 3 - WMU-30 Soil Sample Location Map, depicts the WMU-30 area.

Part B of McLouth's RCRA storage permit application was called in by the United States Environmental Protection Agency ("USEPA") in 1984. McLouth made various submissions, resulting in a final RCRA/Act 64 permit application dated February 27, 1988. After rejection of that permit, McLouth decided to close the EAF Dust Pile and accumulate EAF dust for no longer than 90 days[2].

McLouth operated the waste management unit continuously until early 1989, when new concrete accumulation tanks (WMU-31) were constructed and placed into use. Final removal of waste took place in 1991. Approximately 980 tons of EAF dust were transported to Horsehead Resource Development Company in Palmerton, Pennsylvania.

4.0 WMU-30 Closure Activities

McLouth prepared the EAF Dust Pile Closure Plan ("Closure Plan") in August 1988 and revised the Closure Plan in response to comments by EGLE (then known as the Michigan Department of Natural Resources). The revised Closure Plan was approved on October 31, 1988 with a stipulation which required a hydrogeological investigation. The hydrogeological investigation plan was approved by EGLE (then known as the Michigan Department of Environmental Quality) on October 17, 1995.

[2] Final Closure Report and Certification – Interim Status Hazardous Waste Storage Unit, Techna Corporation, March 31, 1998.

In 1991, McLouth initiated closure activities in accordance with the revised Closure Plan through removal of residual waste material from the EAF Dust Storage pile area. McLouth did not complete any other closure activities prior to termination of operations in 1996. DSC resumed closure activities in the fall of 1996 and completed those activities in late 1997.

Closure activities were conducted in accordance with the revised Closure Plan and the Hydrogeological Investigation Plan. The closure activities consisted of the following:

- Final removal of waste,
- Soil assessment,
- Groundwater assessment, and
- Final Closure Report and Certification.

Final waste removal activities were completed by McLouth between September 23, 1991 and November 13, 1991. Clayton Environmental Consultants, Inc. ("Clayton") completed the initial soil sampling, supplemental soil sampling, and Soil Assessment Report and Certification between February 1997 and August 1997.

The hydrogeological investigation began on October 30, 1996 with the installation of five groundwater monitoring wells: three upgradient of WMU-30 and two downgradient of WMU-30. Four consecutive quarters of groundwater sampling and analysis began in November 1996 and were completed in August 1997. Groundwater analytical results from downgradient wells were compared to results from upgradient wells to determine if the EAF Dust Storage Pile impacted groundwater. Laboratory analytical results for the downgradient wells showed that the EAF Dust Storage Pile did not impact groundwater. The Final Closure Report provides details of the geology and hydrogeology of the WMU-30 area.

The Final Closure Report and Certification – Interim Status Hazardous Waste Storage Unit ("Final Closure Report") prepared by Techna Corporation ("Techna") in March 1998 provides detail about the assessment and closure activities. The Final Closure Report is included as Attachment B. The following sections provide a summary of the surface soil investigation activities and analytical results.

4.1 Surface Soil Lead Investigation

In November 1996, Clayton collected soil samples in accordance with the approved Closure Plan. The sample collection grid was developed in the 1988 closure plan based on a waste pile with dimensions differing from the bermed area depicted in Figure 3. The original grid and pile are shown in in the Closure Plan, which is included in Appendix B. The Final Closure Report and Certification developed by Techna provided an overlay of the original grid area on the bermed waste storage pile. The soil samples were analyzed for barium, cadmium, chromium, lead, and pH. Clayton collected soil samples within and adjacent to WMU-30 to assess soil and outside of the WMU-30 area to determine soil background concentrations.

In accordance with the CACO, this report describes the previous soil assessment activities to determine if surface soil lead impacts resulting from the WMU-30 storage pile have been delineated with respect to the current GNRCC for DC (900 mg/kg). Soil samples were collected from the 50-foot grid system presented in the Closure Plan. Details of the sample

collection process are included in the Final Closure Report and Certification included as Attachment B. Figure 3 – WMU-30 Soil Sample Location Map (Attachment A) depicts the locations of the samples collected in November 1996 and February 1997. Figure 3 shows the WMU-30 area including sample collection locations.

The impacted area was not fully delineated based on the November 1996 sampling event. Therefore, Clayton collected additional soil samples in February 1997 to define the extent of impacts. Details of the sampling process are included in the Final Closure Report (Attachment B) and the sample locations are included in Figure 3 (Attachment A).

4.2 Lead Analytical Results in Surface Soil

The laboratory analytical results from the November 1996 and February 1997 soil investigations conducted by Clayton are summarized in Table 1 and Table 2, respectively. Table 3 provides a summary the lead analytical results for the background soil samples collected during closure activities. Figure 3 depicts the locations of the soil samples and the locations with lead concentrations in exceedance of the current GNRCC for DC (900 mg/kg). As shown on Figure 3, surface soil from sample locations A2, B2, C2, D1, D2, D6, E1, and F4, collected in November 1996, contained lead concentrations exceeding the current GNRCC for DC. Based on the November 1996 surface soil results, lead was not delineated south of A2, east of D1 and E1, west of D6, or north of E1 and F4. Lead impacts were delineated to the west of A2, B2, C2, D2, and E1 based on samples collected from the west-neighboring grids during the same sampling event. Sample E2 provided delineation north of the impacts detected at D2.

The locations of the surface soil samples collected in February 1997 were chosen to delineate the area of impact as defined by the November 1996 sampling event. The surface soil sample designated as A2-South did not contain a lead concentration exceeding the current GNRCC for DC and therefore provided delineation of surface soil lead impacts at the southern extent of WMU-30. Surface soil samples D1-East and E1-East did not contain lead at concentrations exceeding the current GNRCC for DC and therefore provided delineation of surface soil lead impacts at the eastern extent of WMU-30. The surface soil sample collected within the F1 grid did not contain lead at a concentration exceeding the current GNRCC for DC and therefore provided delineation to the north of E1. The surface soil sample collected at the D7 location did not contain lead at a concentration exceeding the current GNRCC for DC and therefore provided the western delineation of surface soil lead impacts in the WMU-30 area. The concrete pad for WMU-31 provides a barrier to direct contact of surface soil north of D6 and west of F4.

Sample G2 (Figure 3) was collected during the February 1997 sampling event at the northern extent of the proposed grid area. Surface soil in the sample collected from the G2 location (G2 Surface) contained a lead concentration below the current GNRCC for DC. However, the duplicate sample from this location (G2 Surface Duplicate) contained a lead concentration of 990 mg/kg, which exceeds the current GNRCC for DC. Table 2 provides a summary of the lead analytical data for the February 1997 sampling event.

Techna collected additional background in July 1997. Sample TBG-A was collected approximately 50 feet north of G2 and contained a surface soil lead concentration of 41.3 mg/kg. Sample TBG-A provided delineation of the northern extent of the surface soil lead impact defined by the G2 location (Figure 3).

The purpose of this investigation is to evaluate lead concentrations in surface soil; however, the background sample collected from the location TBG-E in the interval between three feet to four feet below ground surface (bgs) contained a lead concentration of 1,100 mg/kg which exceeds the GNRCC for DC. The sample collected from the same location in the interval between one foot and two feet bgs contained a lead concentration of 612 mg/kg which is below the GNRCC for DC. Table 3 provides a summary of the lead analytical data for the background samples.

Based on surface soil samples collected in November 1996, February 1997, and July 1997, lead impacts in exceedance of the current GNRCC for DC were delineated for the WMW-30 waste storage area, as defined by the waste pile and bermed area. Three additional surface soil lead impacts were also discovered outside of the bermed waste area (D6, F4, and G2) and sampling conducted in February 1997, July 1997, and the background samples provided delineation of those areas.

5.0 Measures to Prevent Unacceptable Human Exposure to Lead

Historical soil investigations have delineated lead in surface soil at the former EAF Dust Storage Pile location. These samples also exceed the GNRCC for Drinking Water; however, groundwater at the Subject Property is not currently used for drinking water and will not be used in the future for consumption. Therefore, the Non-residential Drinking Water pathway is not complete. Each of the surface soil samples collected during the WMU-30 investigation contained lead concentrations below the GNRCC for Particulate Soil Inhalation of 44,000 mg/kg.

The lead concentrations in surface soil in the WMU-30 area present an unacceptable risk to human health via direct contact with surface soils. Options to prevent unacceptable human exposure to lead in surface soils include placement of a low-permeability soil cap or paving over the impacted area depicted in Figure 3. A soil cap would consist of clay soil, graded to induce surface runoff and prevent surface water leaching into the subsurface. Paving would include covering the impacted surface soil with concrete or asphalt to restrict direct contact with the soil and prevent surface water from infiltrating through the impacted surface soil. Routine inspections would be required for a soil or pavement cap to ensure that the cap is functioning properly. The cap would be inspected for cracking, vegetation growth (soil cap), and/or other signs that the cap is not functioning as intended. Reports detailing the results of each inspection would also be required.

Aa restrictive covenant would be required after placement of a cap (soil or pavement) to maintain and prevent removal of the cap. The covenant would also restrict installation of wells for consumptive use of groundwater.

6.0 Summary

WMU-30 was formerly used for storage of EAF Dust created from the steel-making process at the former McLouth Steel Facility located in Trenton, Michigan. EAF dust was stored in the WMU-30 area between 1980 until final removal of waste in 1991. Approximately 980 tons of EAF dust waste (K061) was transported offsite for proper disposal.

In accordance with the CACO dated November 1, 2018, ASTI reviewed data collected during previous investigations conducted by others. ASTI did not collect additional data for the purpose of delineating lead in surface soil in the WMU-30 area. Clayton investigated surface soil in November 1996 and delineation soil sampling in February 1997. The samples collected in February 1997 provided delineation of lead in surface soil in the WMW-30 area with one exception (G2). Additional background samples were collected in July 1997 and provided delineation of the GNRCC DC exceedance in G2. Exceedances of the GNRCC for DC are depicted in the shaded area of Figure 3.

Due to the presence of lead in surface soil in exceedance of the GNRCC for DC, measures are required to restrict direct contact to surface soil with lead concentrations exceeding 900 mg/kg. Likely measures include placement of a low-permeability cap (soil or pavement).

7.0 RCRA Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Greg S. Oslosky, P.G.
Director – Grand Rapids

Tables

Waste Management Unit 30 Surface Soil Investigation

Table 1
Summary of Soil Laboratory Analytical Results - Lead
Clayton, November 6 and 7, 1996
WMU-30, RTRR - Riverview
18251 West Jefferson Ave., Riverview, MI
ASTI Project Number: 10860

Sample Identification and Depth	Units	Lead
A1 (Surface)	mg/kg[(1)]	884
A1 (2')	mg/kg	739
A2 (Surface)	mg/kg	**7,400**
A2 (2')	mg/kg	<20
A3 (Surface)	mg/kg	<50
A3 (1')	mg/kg	<50
A4 (Surface)	mg/kg	620
A4(2')	mg/kg	110
Bl (Surface)	mg/kg	860
B1 (2')	mg/kg	<50
B1 (2') Duplicate	mg/kg	<50
B2 (Surface)	mg/kg	**7,200**
B2 (2')	mg/kg	**7,200**
B3 (Surface)	mg/kg	330
B3 (2')	mg/kg	<50
B4 (Surface)	mg/kg	880
B4 (2')	mg/kg	150
B5 (Surface)	mg/kg	<50
B5 (2')	mg/kg	<50
Cl (Surface)	mg/kg	120
C1 (Surface) Duplicate	mg/kg	180
C1 (2')	mg/kg	110
C2 (Surface)	mg/kg	**1,300**
C2 (2')	mg/kg	130
C3 (Surface)	mg/kg	220
C3 (2')	mg/kg	<20
C4 (Surface)	mg/kg	320
C4 (2')	mg/kg	<50
C5 (Surface)	mg/kg	430
C5 (2')	mg/kg	<20
D1 (Surface)	mg/kg	**1,100**
D1 (2')	mg/kg	<50
D1 (2') Duplicate	mg/kg	<50
D2 (Surface)	mg/kg	**1,400**
D2 (1')	mg/kg	230
D3 (Surface)	mg/kg	510
D3 (2')	mg/kg	<50
D4 (Surface)	mg/kg	560
D4 (2')	mg/kg	<50
D5 (Surface)	mg/kg	620
D5 (2')	mg/kg	<50
D6 (Surface)	mg/kg	**1,700**
D6 (Surface) Duplicate	mg/kg	**1,800**
D6 (2')	mg/kg	<50

Table 1
Summary of Soil Laboratory Analytical Results - Lead
Clayton, November 6 and 7, 1996
WMU-30, RTRR - Riverview
18251 West Jefferson Ave., Riverview, MI
ASTI Project Number: 10860

E1 (Surface)	mg/kg	**2,900**
E1 (2')	mg/kg	<20
E2 (Surface)	mg/kg	440
E2 (2')	mg/kg	95
E3 (Surface)	mg/kg	630
E3 (2')	mg/kg	94
E4 (Surface)	mg/kg	690
E4(2')	mg/kg	<20
F2 (Surface)	mg/kg	780
F2 (2')	mg/kg	210
F2 (2') Duplicate	mg/kg	430
F3 (Surface)	mg/kg	380
F3 (2')	mg/kg	<20
F4 (Surface)	mg/kg	**1,100**
F4 (2')	mg/kg	<50
GNRCC - Direct Contact[3]	mg/kg	900
GNRCC - Particulate Soil Inhalation[3]	mg/kg	44,000

Notes:
1 - mg/kg = milligrams per kilogram or parts per million (ppm)
2 - "<" indicates concentration below laboratory reporting limit
3 - Per R299.46, June 25, 2018
BOLD and shading indicates a concentration above criteria
Soil samples were collected by Clayton and originaly reported in the Final Closure Report and Certification, Interim Status Hazardous Waste Storage Unit, Techna, March 31, 1998

Table 2
Summary of Soil Laboratory Analytical Results - Lead
Clayton, February 5 and 6, 1997
WMU-30, RTRR - Riverview
18251 West Jefferson Ave., Riverview, MI
ASTI Project Number: 10860

Sample Identification and Depth	Units	Lead
A1 South Surface	mg/kg[1]	740
A1 South (2')	mg/kg	270
A1 East Surface	mg/kg	190
A1 East (2')	mg/kg	99
A2 South Surface	mg/kg	19
A2 South Surface Dup.	mg/kg	270
A2 South (2')	mg/kg	NA[2]
A4 South Surface	mg/kg	270
A4 South (2')	mg/kg	NA
A5 Surface	mg/kg	220
A5 (2')	mg/kg	NA
B1 East Surface	mg/kg	550
B2 (4')	mg/kg	5
B5 (4')	mg/kg	NA
B6 (2')	mg/kg	NA
C5 (4')	mg/kg	NA
C6 Surface	mg/kg	NA
C6 (2')	mg/kg	NA
D1 East Surface	mg/kg	520
D2 (4')	mg/kg	15
D7 Surface	mg/kg	460
E1 East Surface	mg/kg	90
E2 (4')	mg/kg	NA
F1 Surface	mg/kg	440
F1 (2')	mg/kg	160
G2 Surface	mg/kg	640
G2 Surface Duplicate	mg/kg	**990**
G2 (2')	mg/kg	270
G4 (Surface)	mg/kg	490
GNRCC - Direct Contact[3]	mg/kg	900
GNRCC - Particulate Soil Inhalation[3]	mg/kg	44,000

Notes:
1 - mg/kg = milligrams per kilogram or parts per million (ppm)
2 - "NA" not analyzed
3 - Per R299.46, June 25, 2018
BOLD and shading indicates a concentration above criteria
Soil samples were collected by Clayton and originaly reported in the Final Closure Report and Certification, Interim Status Hazardous Waste Storage Unit, Techna, March 31, 1998

Table 3
Summary of Soil Laboratory Analytical Results - Lead
Background Soil Samples
WMU-30, RTRR - Riverview
18251 West Jefferson Ave., Riverview, MI
ASTI Project Number: 10860

Sample Identification	Depth (ft. bgs)[1]	Units	Lead
BGDA	0-1	mg/kg[2]	450
BGDA	2-3	mg/kg	<20
BGDB	0-1	mg/kg	130
BGDB (Duplicate)	0-1	mg/kg	170
BGDB	2-3	mg/kg	55
BGDC	0-1	mg/kg	260
BGDC	2-3	mg/kg	110
BGDD	0-1	mg/kg	240
BGDD	2-3	mg/kg	<20
BGD1	0-1	mg/kg	120
BGD1	2-3	mg/kg	13
BGD2	0-1	mg/kg	270
BGD2	2-3	mg/kg	43
TBG-A	0-1	mg/kg	41.3
TBG-B	0-1	mg/kg	191
TBG-B	2-3	mg/kg	96.6
TBG-C	0-1	mg/kg	406
TBG-D	1-2	mg/kg	273
TBG-D	3-4	mg/kg	73
TBG-E	1-2	mg/kg	612
TBG-E	3-4	mg/kg	**1,110**
TBG-F	0-1	mg/kg	399
TBG-G	0-1	mg/kg	185
GNRCC - Direct Contact[3]		mg/kg	900
GNRCC - Particulate Soil Inhalation[3]		mg/kg	44,000

Notes:

1 - Feet below ground surface

2 - mg/kg = milligrams per kilogram or parts per million (ppm)

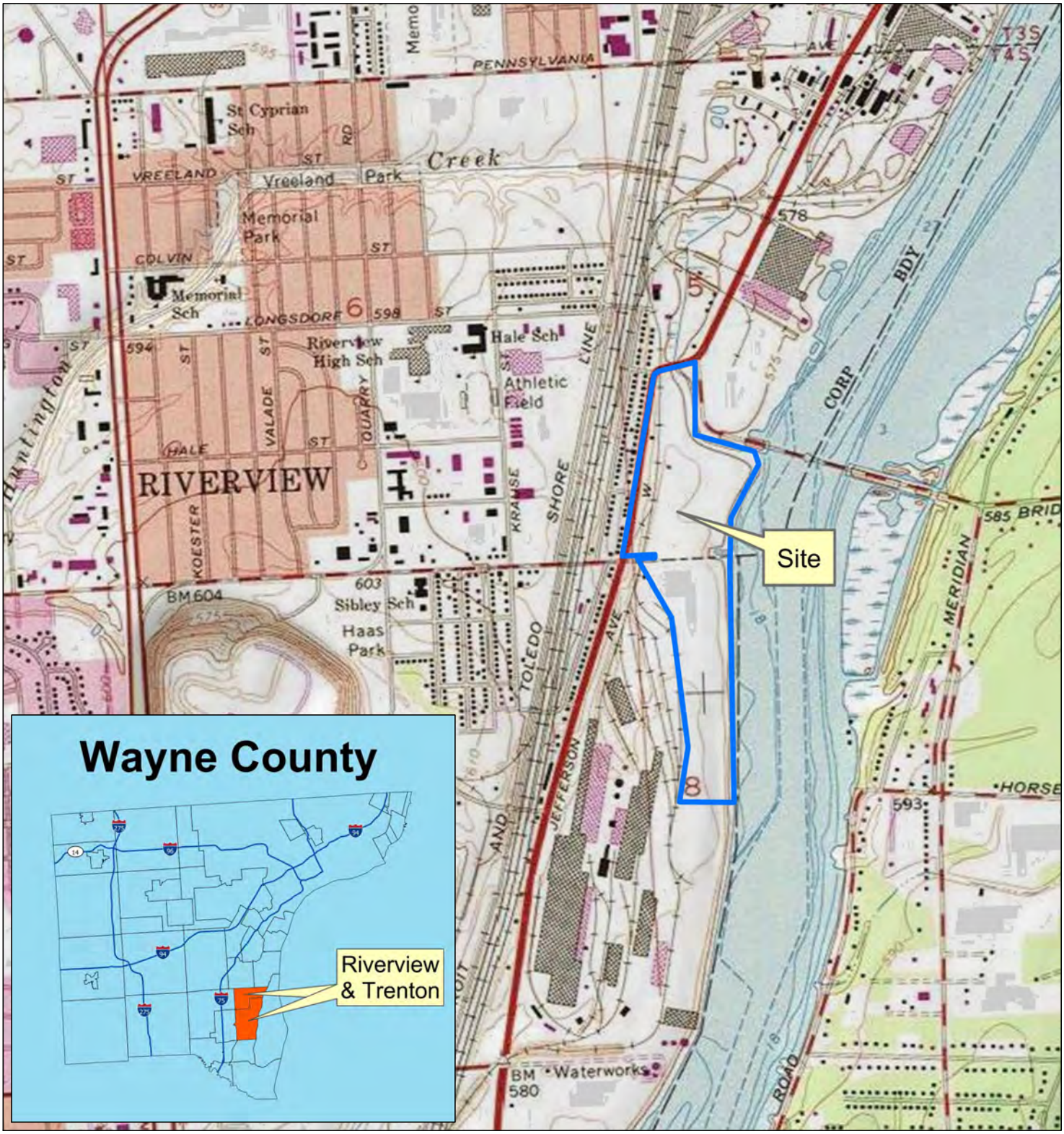
3 - Per R299.46, June 25, 2018

BOLD and shading indicates a concentration above criteria

Soil samples were collected by Techna and originaly reported in the Final Closure Report and Certification, Interim Status Hazardous Waste Storage Unit, Techna, March 31, 1998

Attachment A
Figures

Waste Management Unit 30 Surface Soil Investigation



RTRR - WMU-30 Investigation

Created for: Riverview-Trenton Railroad Company

ASTI Project 10860, JRN, March 3, 2020

18251 West Jefferson
Riverview, MI

Figure 1 - Site Location Map

ASTI Environmental

LEGEND

Subject Property

WMU Area

0 400 800 1200

Approximate Scale in Feet

RTRR - WMU-30 Investigation

18251 West Jefferson Avenue, Riverview, MI

Environmental

N

Created for: Riverview-Trenton Railroad Company

Figure 2 - Site Features Map

ASTI Project 10860, JRN/JMD, July 16, 2020

Y:\Project Files\Current and Closed\10000-10999\10800-10899\10860 McLouth RTRR Property\CAD\10860 RTRR.dwg 3/14/2021 9:36 PM;

GRAPHIC SCALE

0 40 80 160

1 inch = 80 ft.
Paper Size = (8.5x11)

LEGEND

- Soil Sample Location
- Area of Lead Concentrations exceeding GNRCC for Direct Contact
- Sampling Grid system developed by Clayton Environmental Consultants

N

ASTI Environmental

RTRR Property

18251 West Jefferson, Riverview, MI

Created for: Riverview-Trenton Railroad Company

Figure 3 - WMU-30 Sample Location Map

ASTI Project 10860, JRN, March 14, 2021

Attachment B
Techna Final Closure Report and Certification

Waste Management Unit 30 Surface Soil Investigation

TECHNA CORPORATION

Knowledge, and the Creativity to Use It

44808 Helm St. Plymouth, MI 48170 (313) 454-1100 Fax. 454-1233

FINAL CLOSURE REPORT AND CERTIFICATION

INTERIM STATUS HAZARDOUS WASTE STORAGE UNIT

DSC Ltd. TRENTON PLANT

MID 017 422 304

Prepared by:

Techna Corporation
44808 Helm Street
Plymouth, Michigan 48170

TPN: 00738-12A-001

March 31, 1998

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INTERIM STATUS HAZARDOUS WASTE STORAGE UNIT
DSC Ltd.
TRENTON PLANT
MID 017 422 304

1.0 HAZARDOUS WASTE STORAGE AREA CLOSURE CERTIFICATIONS

This closure report is composed of three separate reports (final closure report and reports attached in Appendix B and Appendix C), each containing an engineer's certification of the respective report and work described therein. The following certification by DSC Ltd. references the entire closure project, encompassing all the activities and reports to date.

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

DSC Ltd.

Signature: Matthew G. Wilkinson

Name: Matthew G. Wilkinson

Title: Vice President

Date: April 1, 1998

The following engineer's certification references the final closure report and all closure data collection and evaluation activities described therein performed by Techna Corporation.

I certify under penalty of law that this document and all Techna Corporation attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

TECHNA CORPORATION

Signature: 

Name: John F. McInnis, P.E.

Date: April 1, 1998

Professional Engineer Registration No.: 37207

2.0 INTRODUCTION

This Closure Report and Certification for the DSC Ltd. (DSC) Interim Status EAF Pollution Control Dust Storage Pile (EAF Dust Pile) was prepared in accordance with the requirements of 40 CFR 265.115 and the approved ***Closure Plan for Emission Control Dust Storage Area***, as amended and with stipulations (Appendix A), prepared by McLouth Steel Products Corporation (McLouth). The closure assessment activities were conducted in the following five phases: 1) removal of final wastes, 2) initial closure and background assessment, 3) hydrogeological assessment, 4) supplemental background assessment, and 5) data evaluations and closure reporting.

The EAF Dust Pile closure plan was prepared by McLouth between 1988 and 1995. The Michigan Department of Environmental Quality (MDEQ; fka Michigan Department of Natural Resources) approved the initial closure plan in October 1988 with stipulations. A modified hydrogeological assessment plan was approved by MDEQ as part of the closure plan in 1995. McLouth stopped using the storage pile for EAF dust in 1990± and began accumulating (<90 days) the dust in specially designed concrete tanks. The approved plans had been only partially implemented (removal of EAF wastes in 1991) by the time McLouth terminated operations and entered bankruptcy in 1996. After DSC acquired the assets of McLouth in August 1996, they began activities to complete implementation of the closure plan.

Closure assessment activities were conducted by contractors for DSC between November 1996 and August 1997. Data review, evaluation and reporting activities have been conducted since September 1997. The closure activities and assessment findings are documented in three reports. This final closure report and certification includes discussions of site description and history (Section 3), overall technical approaches to closure (Section 4), technical approaches for collection of supplemental background data (Section 4), and summaries of assessment findings, statistical data evaluations, and conclusion (Section 5). Detailed descriptions and findings of the closure assessment soil sampling and analysis program is presented in a separate report and certification (Appendix B) prepared by Clayton Environmental Consultants, Inc. (Clayton).

Detailed descriptions and findings of the hydrogeological assessment conducted by Clayton also are presented in a separate report and certification attached in Appendix C.

3.0 SITE DESCRIPTION AND HISTORY

3.1 Location

The DSC Trenton Plant is located at 1491 West Jefferson Avenue, Trenton, Wayne County, Michigan. The EAF dust storage pile was located on the north portion of the property, northeast of the intersection of West Jefferson Avenue and Sibley Road (Figures 1 and 2).

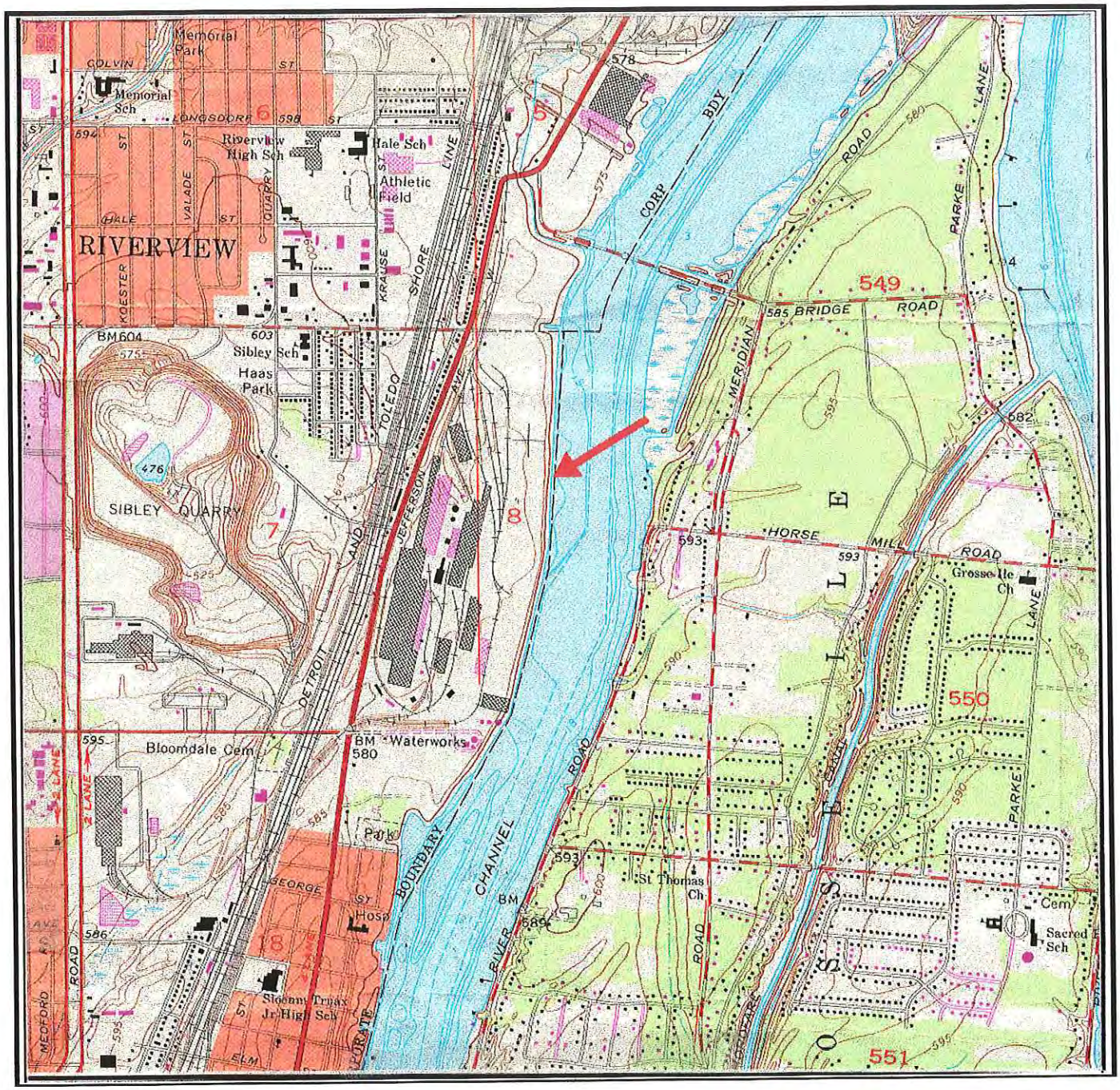
The interim status storage area was constructed on bare soil/fill (see also Section 3.3) in the vicinity of other piles of iron and steel making debris. The storage pile area was identified by McLouth prior to DSC's acquisition of the property, and the area was delineated by an earthen berm for closure activities (Figure 2).

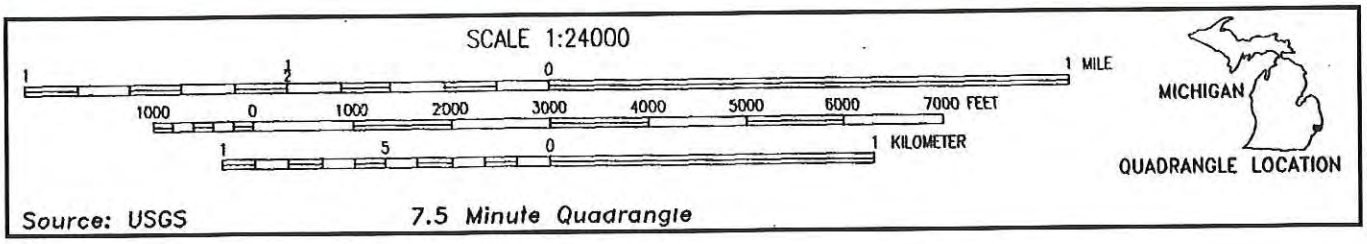
The storage pile area was irregularly shaped and occupied approximately 25,000 square feet of ground surface. It was constructed in an area that is composed of fill to a depth of 15'-20'. This fill consists of iron and steel making wastes (e.g. scales, slag, air pollution control dusts, coke and graphite fines, refractory, and dried process and wastewater treatment sludges) and plant debris (e.g. brick, refractory, and scrap metal). The portion of the site containing the EAF debris pile was acquired between 1956 and 1961 by McLouth based on reviews of aerial photographs. Significant fill was deposited in the area to raise the ground elevation between 1961 and 1967. By 1967 the general area of the EAF pile was in use for storage of raw materials and/or process waste and plant debris in piles. Between 1967 and 1997 the area was in continuous use for storage of these materials, as well as scrap, surplus equipment, and construction materials.

3.2 History and Operation of Waste Management Unit

The McLouth Steel Products Corporation was an integrated iron and steel producing facility that used both basic oxygen furnaces (BOF) and electric arc furnaces (EAF) to produce steel. The waste emission control dust generated from EAF air pollution control systems was designated as a listed hazardous waste (K061) by USEPA rules promulgated in 1980 pursuant to the Resource

Site Diagram





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1491 West Jefferson Avenue
Trenton, Wayne County, Michigan

April 3, 1998

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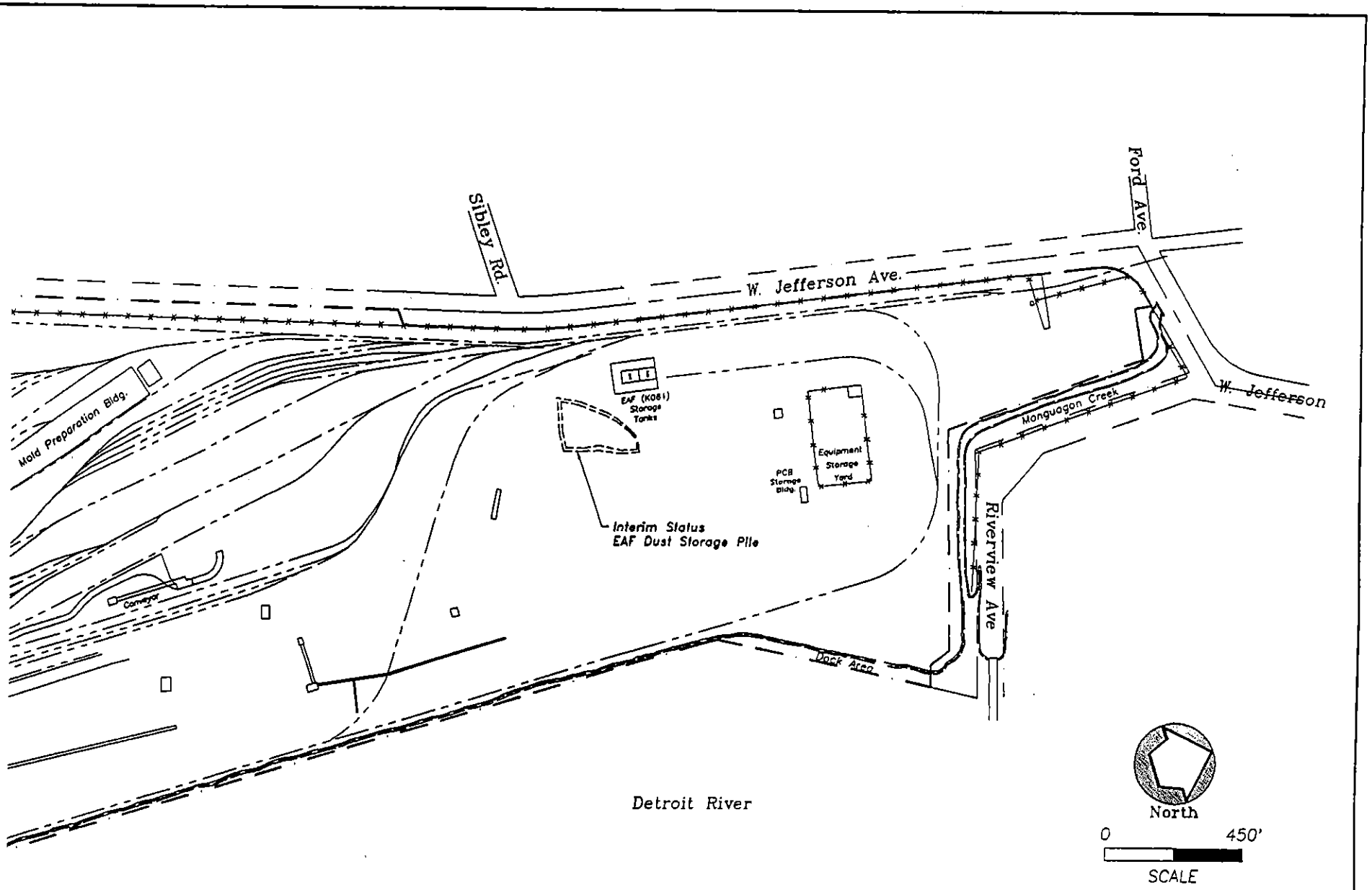

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Date: 3-18-98
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File: 7380T39A.DWG

Figure 2

EAF Dust Pile Location

DSC Ltd.
Trenton, MI

Conservation and Recovery Act (RCRA). McLouth filed a notification of waste activity and a RCRA Part A permit on November 17, 1980 for storage of EAF dust prior to treatment or disposal.

The EAF Dust Pile was established on the north portion of the McLouth property as described in Section 3.1 and operated continuously until final removal of waste in 1991. The final waste removal occurred during the period September - November 1991. Approximately 980 tons of EAF dust wastes were transported to Horsehead Resource Development Co. in Palmerton, Pennsylvania.

EAF dust was generated at a rate of approximately 1,500 tons per year from the EAF wet collector air pollution control system located outside the northeast part of the Melt Shop building. Sludge was accumulated in a concrete sump and transferred by truck, wholly within the site boundaries, to the interim status EAF Dust Pile storage area. Stored waste was then periodically transported for off-site disposal or resource recovery.

Part B of McLouth's RCRA storage permit application was called in by the USEPA in 1984. McLouth made various submissions in response to the call in, culminating in a final RCRA/Act 64 Permit Application dated February 27, 1988. After that application was rejected by the Michigan Department of Natural Resources (MDNR), McLouth decided to close the EAF Dust Pile and accumulate EAF dust for no longer than 90 days.

A closure plan was submitted to the MDNR in August 1988 and was subsequently revised in response to MDNR comments. The revised closure plan was approved with stipulations on October 31, 1988. A groundwater monitoring plan, required by the October 1988 stipulations, was approved by the MDEQ on October 17, 1995. Copies of the approved closure plan and groundwater monitoring plan are attached in Appendix A.

Closure activities were initiated by McLouth in 1991 with the removal of residual waste materials from the EAF Dust Pile storage area. No further closure actions were taken by McLouth prior to termination of operations in the spring of 1996. Closure activities were restarted by DSC after acquisition of the property. Closure assessment tasks began in the fall of 1996 and were completed in late 1997. Data evaluation and reporting tasks were completed with the submission of this report.

3.3 Site Setting and Geology

The former EAF Dust Pile storage area was located on an upland portion of the northern part of an approximately 260-acre property (Figure 1) now owned and managed by DSC. The property is bounded on the west by West Jefferson Avenue; on the south by industrial property, then park land and residences; on the east by the Detroit River, and on the north by Monguagon Creek, then other industrial properties. The site is generally flat, with a gradual slope toward the Detroit River, that is more pronounced on the southern portion of the property.

The general site stratigraphy consists of fill overlying a lacustrine clay stratum, which in turn overlies limestone bedrock (Figure 3; from ***Summary of Initial Assessment Results, DSC Ltd. - Trenton Plant,*** October 20, 1997, previously submitted to the MDEQ). The underlying native clay layer typically varies in thickness from 10' to 20', except along the Detroit River in the central portion of the site. Only fill is observed over the bedrock in this area, probably representing historical reclamation of low lying river edges. Fill on the remainder of the site varies in thickness from 4' to 25', generally increasing in thickness from west to east, toward the river. The uppermost zone of saturation was perched in the base of the upper fill stratum, generally bounded by the underlying confining clay unit.

The stratigraphy in the area of the former EAF Dust Pile is consistent with the general site geology. Boring logs from the hydrogeological assessment for closure (Appendix C) indicate that the uppermost stratum typically is composed of approximately ten feet to 15 feet of industrial fill. The fill layer is underlain by the clay stratum observed on the remainder of the

upland portions of the property. Fill was observed to an atypical depth of at least 30 feet in MW-4, southeast of the EAF pile. It was reported by Clayton that this boring was advanced through an area of mounded fill above grade.

The groundwater table in the vicinity of the former EAF dust pile was observed at a depth of approximately eight to 16 feet below typical grade. Groundwater flow direction in the area generally was to the south-southeast. The flow direction appeared to trend in a more southerly direction, with a shallower gradient, east of the former storage pile.

4.0 CLOSURE ACTIVITIES

Closure activities were performed as described in the approved closure plan and hydrogeological investigation plan. Final waste removal was accomplished in 1991. Initial site assessment activities included collection of background samples and assessment (foreground) samples from 0' to 2' BGL (below ground level) at 27 locations. After review of analysis results from those samples, additional samples from stepout locations and greater depths at original locations were collected and analyzed to complete delineation of the suspected potential impact from waste management activities. Background samples from seven additional locations nearer the EAF storage pile were subsequently collected to improve the representativeness of data collected to characterize the chemistry of fill not impacted by waste management activities.

The hydrogeological investigation was conducted using five groundwater observation wells located upgradient and downgradient of the former storage pile. Four quarterly sampling episodes were employed to collect sufficient data for a groundwater impact evaluation.

4.1 Closure Schedule

Closure activities pursuant to the approved plans were performed according to the following schedule:

Final Removal of Waste.....9/23/91 - 11/13/91

Closure Assessment (Soil)

Clayton Initial Sampling and Analysis.....11/6/96 - 11/7/96

Clayton Supplemental Sampling and Analysis.....2/5/97 - 2/6/97

Clayton Initial Soil Assessment Report and Certification 8/19/97

Techna Supplemental Background Sampling and Analysis 7/28/97

Closure Assessment (Groundwater)

Observation Well Installation .....10/30/96 - 11/20/96

Initial Sampling and Analysis .....11/8/96 - 11/20/96

Second Quarterly Sampling and Analysis 2/5/97

Third Quarterly Sampling and Analysis 5/23/97

Fourth Quarterly Sampling and Analysis 8/27/97

Hydrogeological Investigation Report and Certification 12/9/97

Final Closure Report and Certification 4/3/98

4.2 Final Waste Removal

Removal and disposal of the last wastes stored in the EAF dust pile commenced on September 23, 1991 and continued until November 13, 1991. Wastes were transported by Autumn Industries, Inc. to Horsehead Resource Development Co. in Palmerton, Pennsylvania. Approximately 980 tons of EAF dust were removed from the storage pile. Copies of transportation manifests for the shipments of waste material are attached in Appendix D.

4.3 Closure Assessment - Soil

Soil samples were collected in November 1996 from background and assessment sampling points selected as described in the approved closure plan (Figure 4, Figure 5 and Appendix B). The initial samples were analyzed for the following species (totals basis): barium, cadmium, chromium, lead and pH. Approximately 20% of the initial samples, and all background samples, also were analyzed for hexavalent chromium. Comparison of initial assessment sample results to calculations of background values for target analytes (mean + 3σ as in the approved work plan) indicated limited areas of impact from barium (Ba), cadmium (Cd), chromium (Cr) and lead (Pb). Hexavalent chromium (Cr VI) was not detected in any sample.

Additional assessment samples were collected in February 1997 to further define the extent of suspected impact. Individual samples were analyzed for only the metals specie(s) measured at levels above background in proximate sample(s) in the previous assessment episode. Method reporting/detection limits for the target analytes are summarized below:

Barium	1.0-10 mg/kg (higher limits due to high analyte concentrations)
Cadmium	0.05-10 mg/kg (higher limits due to high analyte concentrations)
Chromium	2.5-130 mg/kg (higher limits due to high analyte concentrations)
Chromium VI	0.1 mg/kg
Lead	1-50 mg/kg (higher limits due to high analyte concentrations)

Complete descriptions of soil assessment activities, procedures and findings are presented in the Clayton closure assessment report and certification attached in Appendix B.

4.4 Supplemental Background Assessment - Soil

Evaluations of the results presented in the Clayton soil assessment report (Appendix B) indicated that a clean closure determination based on the background sampling locations and statistical approach in the approved closure plan would not be appropriate for site conditions for the following reasons:

- the EAF pile was constructed on top of fill with chemical characteristics very similar to the EAF dust;
- the initial background samples were in a fill area and did not represent native soil;
- the target metals concentrations in assessment and background samples exhibited a high degree of variability; and
- the initial background sample locations were too far removed from the EAF pile area to confidently assume that they were representative of the fill upon which the pile was built.

Results of these evaluations further indicated that a clean closure determination would have to be based on a "contribution" standard, particularly for species (cadmium, chromium and lead) with more variable concentrations. To that end, Techna collected additional representative samples of the fill which underlies the area of the EAF pile. The analysis results from assessment samples were then compared to the background data set to determine if waste management activities contributed to the levels of metals in the underlying fill or if those levels were typical of the fill, unimpacted by waste management activities, in the area.

Techna collected ten additional soil samples from seven background locations within approximately 100 feet of the former EAF dust storage pile (Figures 4 and 5) on July 28, 1997. Sample locations were selected at random, but roadways and debris piles were avoided. Samples were collected randomly from depths of 0'-1' BGL, 1'-2' BGL, 2'-3' BGL and 3'-4' BGL. A summary of sampling locations and depths is presented in Table 1 (Section 5). An eleventh sample (TBG-H) was collected from a location approximately 250'-300' south of the EAF pile. This sample was rejected from subsequent background evaluations because of its distance from the EAF pile.

Soil samples were collected with a split barrel sampler. Samples were collected from the soil column at the specified sampling depths. Sampling equipment was decontaminated prior to the collection of each discrete sample using a 1) phosphate free surfactant wash, 2) deionized water rinse, 3) isopropyl alcohol rinse, and 4) final deionized water rinse. Samples were placed directly into 120-ml, pre-cleaned, glass sample jars fitted with Teflon lined covers and stored at approximately 4° C until analyzed.

Samples were managed and transferred to the analysis laboratory, Fire and Environmental Consulting Laboratories, Inc., under strict chain-of-custody protocols. The samples were chemically analyzed for Cd, Cr, and Pb using USEPA Method 6020 (SW-846). Method reporting/detection limits for the target analytes are summarized below:

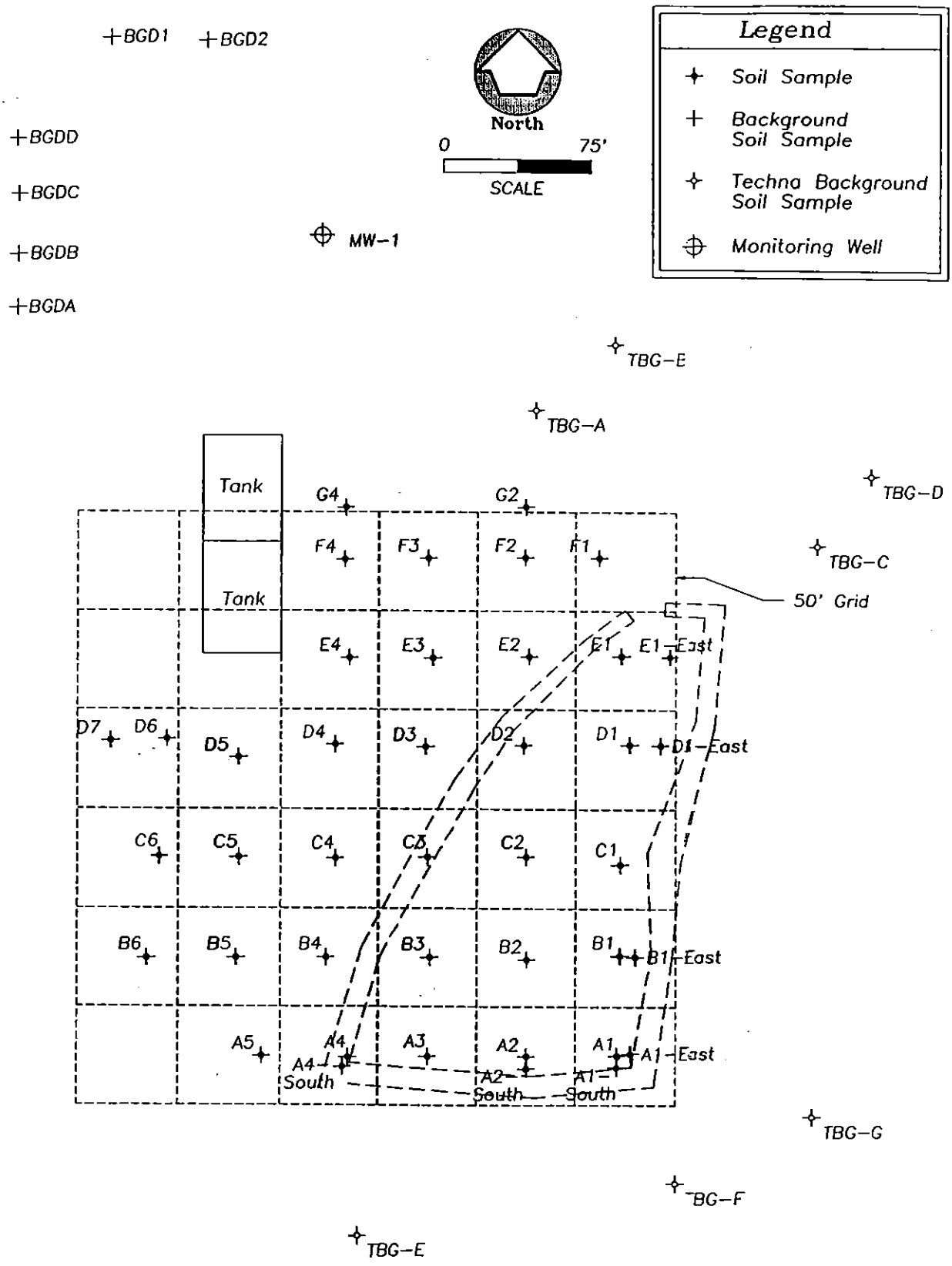

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Figure 4

Sampling Locations

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TPN: 00738-12A
Date: 3-18-98
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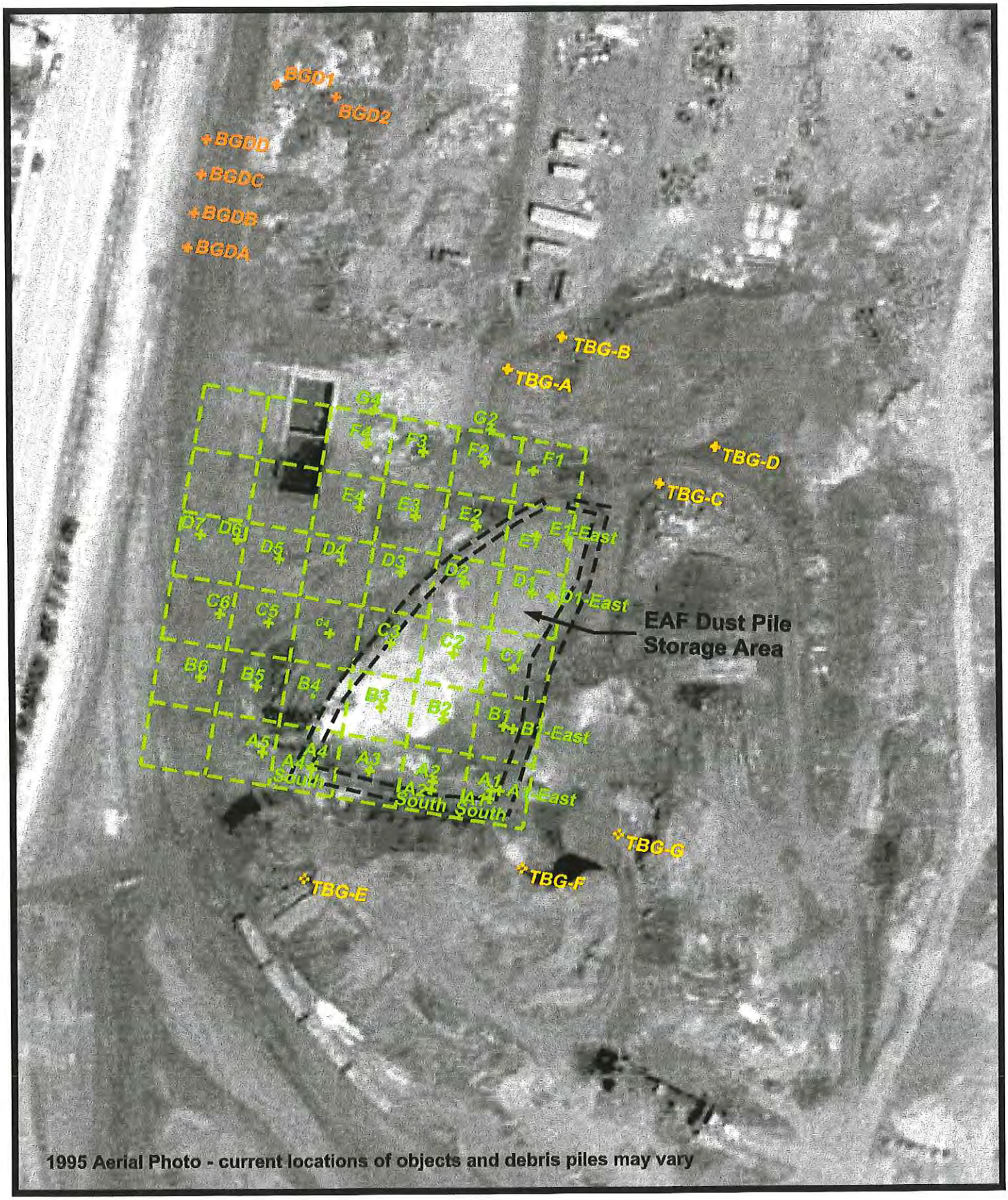
Drn: 060
Ref:
File: 7380TR38.DWG

FIGURE 5

Closure Sampling Overlay



Cadmium	0.05 mg/kg
Chromium	1.0 mg/kg
Lead	1.0 mg/kg

4.5 Closure Assessment - Groundwater

Groundwater samples were collected from five observation wells installed in October and November 1996 as specified in the approved closure plan. Samples were collected during four quarterly sampling events and analyzed for the following species: barium, cadmium, chromium, hexavalent chromium, lead and pH. Method reporting/detection limits for the target analytes are summarized below:

Barium	0.2 mg/L
Cadmium	0.0005 mg/L
Chromium	0.05 mg/L
Chromium VI	0.005-0.05 mg/L (higher limits due to matrix interferences)
Lead	0.003 mg/L

Complete descriptions of observation well installation activities, groundwater sampling and analysis procedures, and findings are presented in the Clayton closure assessment report and certification attached in Appendix C.

5.0 CLOSURE ASSESSMENT RESULTS AND CONCLUSIONS

Data collection activities during the closure assessment included 1) background and foreground soil sampling for chemical analyses and visual characterization, 2) groundwater measurements for hydrogeological characterizations, and 3) upgradient and downgradient groundwater sampling for chemical analyses. Results of these activities are presented and discussed in the following subsections.

5.1 Soil Stratigraphy and Hydrogeology

Evaluations of boring logs and groundwater elevation measurements from the hydrogeological investigation (Appendix C), results of previous subsurface investigations (Figure 3), and visual observations during soil sampling were compiled to characterize the subsurface stratigraphy and hydrogeology in the area of the former EAF Dust Pile. The uppermost stratum is composed of approximately 15 feet to 18 feet of industrial fill. The fill layer is composed of brown to black sand and clayey sand containing pebbles, brick, slag, rock and metal debris. Based on historical data for the site, this fill is generally composed of iron and steel making wastes such as slag, scale, air pollution control dusts, wastewater treatment sludges and filter cake, coke fines, refractory, and other debris generated at the site. Fill was observed to an atypical depth of at least 30 feet in MW-4, southeast of the EAF pile. This resulted from the placement of MW-4 on a mounded area of debris (Appendix C).

The fill was underlain by a stratum of native clay. The thickness of this clay was not measured in the area of the EAF dust pile, but was found to be 10 feet to 20 feet thick over most of the property (see below). Groundwater was observed in a perched saturated zone in the fill immediately above the underlying native clay layer. The groundwater table typically was measured at approximately 8 feet to 15 feet below ground level, at elevations between 580 feet and 575 feet NVGD. The elevation of the Detroit River was approximately 573 feet NGVD during the assessment period (***Summary of Initial Assessment Results, DSC Ltd. - Trenton Plant,*** October 20, 1997, previously submitted to the MDEQ). Groundwater flow direction in the

area of the former EAF Dust Pile generally is to the south-southeast. The flow direction appears to trend in a more southerly direction, with a shallower gradient, east of the former storage pile. These results were consistent for the four quarterly monitoring periods. Additional groundwater monitoring results are presented in Section 5.3.1 and Appendix C.

5.2 Soil Assessment

5.2.1 Background Soil Samples

Background samples were collected during two sampling episodes. The combined analysis results for detected species in all representative samples are presented in Table 1. Hexavalent chromium was not detected in any background sample. Laboratory analysis reports for these samples are attached in Appendix B and Appendix E.

The upper limit of the mean background concentrations (mean + 3σ; hereafter, background mean) of the target metals also are presented in Table 1. Upper limits were calculated for both the complete data set and for the Techna samples (TBG) only. The Techna data set was evaluated separately because it is composed of representative samples collected from fill in the immediate vicinity of the former EAF Dust Pile, but in areas not impacted by the waste management activities. The Clayton background samples (Appendix B) were collected in a limited area northwest of the storage area. This sampling area was along a railroad spur near West Jefferson Avenue. The characteristics of this area are different from the storage area, and the fill may not be representative of the material on which the former EAF Dust Pile was operated.

The data sets for all four target metals showed a high degree of variability. This was consistent with the types of industrial fill known to compose the subsurface soil stratum in this area. The fills are comprised of scales, slags, air pollution control dusts and other metals-containing materials generated at high temperature. These materials typically contain microscopic to

TABLE 1

Summary of Target Background Metals Coucentrations and Upper Limit Values

Sample Location	Depth (Ft. BGL)	Barium	Cadmium	Chromium	Lead
BGDA	0-1	270	3.60	480	450
BGDA	2-3	110	0.33	690	<20
BGDB	0-1	82	1.30	650	130
BGDB (Dup.)	0-1	92	1.70	420	170
BGDB	2-3	36	0.77	430	55
BGDC	0-1	50	0.78	330	260
BGDC	2-3	110	0.40	690	110
BGDD	0-1	68	1.00	360	240
BGDD	2-3	61	0.38	930	<20
BGD1	0-1	100	<0.05	250	120
BGD1	2-3	17	<0.05	530	13
BGD2	0-1	140	<0.05	290	270
BGD2	2-3	34	<0.05	540	43
TBG-A	0-1	NA	0.82	561	41.3
TBG-B	0-1	NA	1.83	200	191
TBG-B	2-3	NA	1.38	197	96.6
TBG-C	0-1	NA	5.00	429	406
TBG-D	1-2	NA	1.42	488	273
TBG-D	3-4	NA	1.58	39	73.1
TBG-E	1-2	NA	7.19	3,770	612
TBG-E	3-4	NA	9.18	208	1,110
TBG-F	0-1	NA	2.05	302	399
TBG-G	0-1	NA	2.38	145	185
BACKGROUND UPPER LIMIT - ALL DATA					
Mean		90	1.9	560	229
Std. Dev. (S)		65	2.3	730	249
Mean+3S		**280**	**8.9**	**2,800**	**976**
		285	88	2950	995
BACKGROUND UPPER LIMIT - PROXIMATE (TECHNA "TBG-") DATA					
Mean		NA	3.3	634	339
Std. Dev. (S)		NA	2.9	1,114	324
Mean+3S		NA	**12**	**3,980**	**1,310**
			12	3996	1311

NOTEs: Measurements <MDL were replaced with 0.5 x MDL for statistical calculations;

granular sized inclusions of condensed metallic components. This often causes highly variable distributions of metals species in both collected samples and the aliquots removed from those samples for analyses. Background data sets of ≥10 samples were used to help compensate for this inherent variability.

The upper limit of background concentrations for the Techna data set were similar to, but somewhat higher than, those for the full data set. This is probably indicative of differences in fill between the more atypical sampling locations specified in the approved closure plan (Clayton data) and the sampling locations more directly associated with the material under the former EAF dust pile (Techna data).

5.2.2 Assessment (Foreground) Soil Samples

The results of chemical analyses performed on foreground samples collected in November 1996 and February 1997 are presented in Tables 1 and 2 in Appendix B. The results for Cd, Cr, and Pb were highly variable, as observed in the background samples. Results for Ba also were quite variable, but generally not as much as the other three analytes. Hexavalent chromium was not detected in any assessment sample.

Soil pH values typically were measured in one of two general ranges: 8.5 - 9.5 S.U. and 11.5 - 12.5 S.U. Samples in the lower range generally were collected from near surface (0'-1') soil, and samples in the higher range generally were collected from the subsurface (≥1' - 2').

5.2.3 Comparison of Foreground and Background Data

Since the former EAF Dust Pile was managed on top of fill containing elevated levels of the same target metal contaminants as in the EAF dust, a clean closure demonstration would rely on verification that waste management activities did not result in an increase in (contribution to) the inherent levels of metals in the fill. After reviewing the high variability of the assessment results, it was determined that the appropriate demonstration would be a comparison of 1) the background mean (mean + 3σ) of the concentrations of each metal in the local site background fill with 2) the true average concentration of each metal in the assessed (foreground) fill,

represented by the 95% upper confidence limit (UCL) of the mean of the measured concentrations.

The foreground data set for each metal was comprised of the analysis results presented in Tables 1 and 2 of Appendix B. The number of data points for the four target metals ranged from 62 to 79. The data set for each metal was divided into ranges of values, and the number of results in each range was plotted to determine if the data distributions were normal or lognormal. These plots are presented in Figure 6.

None of the four data sets demonstrated a normal distribution and were subsequently treated as lognormally distributed. The 95% UCL for the arithmetic mean of the lognormally distributed data was calculated as described in ***Supplemental Guidance to RAGS: Calculating the Concentration Term,*** USEPA Publication 9285.7-081, May 1992 (Appendix F). The data was first transformed using the natural logarithm function, and the arithmetic mean and standard deviation of the transformed data was determined. The 95% UCL was then calculated using the H-statistic as described in the USEPA reference document. A summary of the results of the 95% UCL calculations is presented in Table 2.

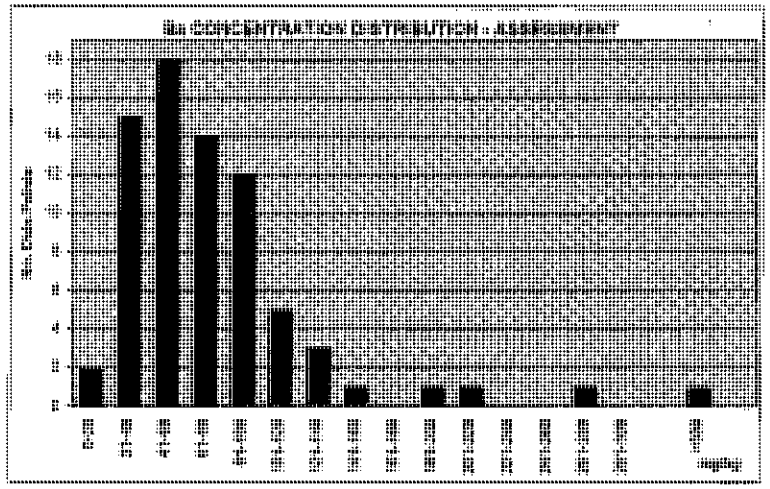
The 95% UCL for the foreground mean concentration of each detected target metal was compared to the background mean for that metal. Comparisons were made to the background mean for all data and for the more proximate Techna data set (see Section 5.2.1). A summary of the comparison data is presented in Table 2.

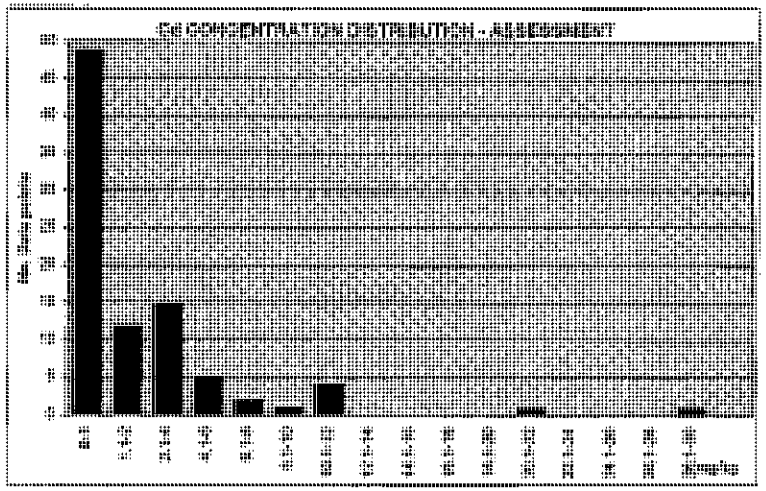
The foreground 95% UCL for Ba and Cr were well below the respective background reference values. This demonstrates that waste EAF dust management activities did not contribute to the levels of these metals present in the soil under or near the former EAF dust storage pile.

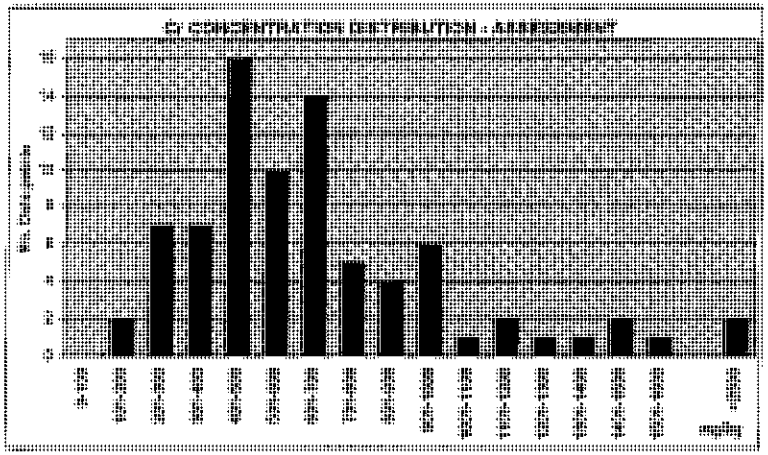
The average foreground concentrations of Cd and Pb were below the respective background reference values calculated from results of analyses of the proximate (Techna) data. However, they were slightly above the reference values calculated from the complete data set. Based on the

FIGURE 6

Concentration Distribution Plots
EAF Dust Pile Assessment Results







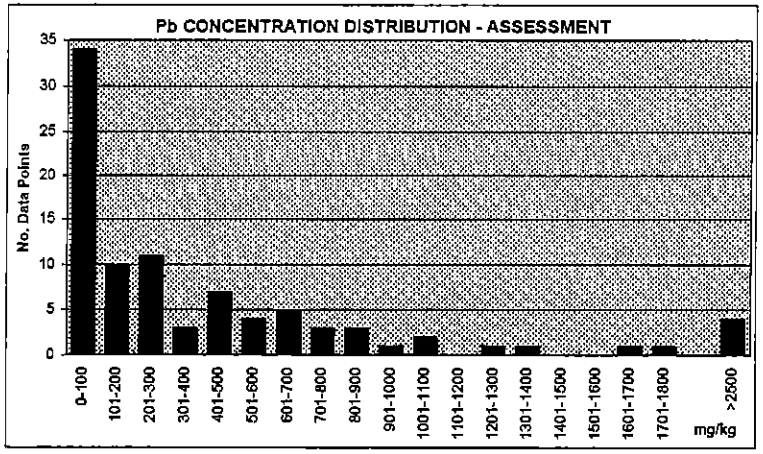


TABLE 2

Summary of Lognormal Statistical Determination of 95% UCL for EAF Dust Pile Assessment Results

Analyte	N	$Mean_{lnX}$	S_{lnx}	$H_{0.95}$	95% UCL (mg/kg)	Background Upper Limit Proximate Data (mg/kg)*	Background Upper Limit All Data (mg/kg)*
Ba	62	4.11	0.61	1.941	86	NA	290 280 232
Cd	77	-0.29	1.92	3.308	9.7	12	25.3 8.9 8.8
Cr	68	6.43	0.62	1.942	870	3,980	2058 2,800 2924
Pb	79	5.35	1.55	2.847	1,200	1,310	2021 976 963

* Data from Table 1

following evaluations of the assessment data comparisons, the foreground-background comparisons do not indicate that waste management activities contributed to the levels of Cd and Pb measured in the assessment samples:

- the biased (non-representative) nature of the original (Clayton) data set indicates that comparison to the Techna background data set is more reliable than comparison to the complete data set;
- the high variability of the data support a general conclusion that all of calculated background and foreground values for each metal are comparable.

Therefore, statistical evaluations of the soil assessment results demonstrate that waste EAF dust management and storage activities did not result in a contribution of contamination in the interim status unit or surrounding soil. The data indicate that the final waste removal activities were sufficient to remediate the unit.

5.3 Groundwater Assessment

5.3.1 Results of Quarterly Monitoring

Samples were collected quarterly from upgradient and downgradient groundwater monitoring wells installed around the former EAF Dust Pile during the period November 1996 through August 1997. Samples were analyzed for the assessment target metals (Ba, Cd, Cr, Cr VI, and Pb) and pH. Groundwater elevations were measured five times during this period. Results of these analyses and measurements are presented in Table 1 through Table 5 in Appendix C.

The groundwater flow direction was determined to be consistent throughout the assessment period. It generally flows south-southeast in the vicinity of the former EAF pile, then trends to a more southerly flow direction east of the storage area. A representative groundwater flow diagram is shown in Figure 2 of Appendix C.

These results reveal that observation wells MW-1 and MW-2 are in monitoring locations that would not be impacted by EAF dust storage activities, and MW-3, MW-4 and MW-5 represent downgradient monitoring locations.

5.3.2 Comparison of Downgradient and Upgradient Monitoring Results

Evaluation of groundwater flow direction and observation well placement indicated that wells MW-1 and MW-2 were located in areas that would be unimpacted by EAF dust management activities. Samples from these wells were designated as "background" for purposes of evaluating the potential impact of the EAF pile activities. Observation wells MW-3, MW-4 and MW-5 were designated as downgradient monitoring points. A summary of the chemical analysis results for the hydrogeological assessment is presented in Table 3. The mean and variance for each analyte/well data set (derived from Table 2 through Table 5 in Appendix C) and the t-statistics for the Cochran's t-test are also presented in Table 3.

The groundwater monitoring results were first compared to the health based drinking water criteria applicable to closures under Part 111 of the Michigan Natural Resources and Environmental Protection Act (NREPA). These criteria were referenced in ***MERA Operational Memorandum #8, Revision 3 – Type B Criteria,*** February 4, 1994. The concentrations of Ba and Cr were below their respective drinking water criteria in ALL samples from ALL wells. Concentrations of Cd and Pb were greater than their respective health based criteria in at least one sample from each well. The mean concentrations of Cd in all wells, except upgradient well MW-2, exceeded the criterion. The mean concentrations of Pb were greater than its health based criterion in all wells.

Based on requirements of the approved closure plan, the groundwater monitoring data for Cd and Pb were statistically evaluated using Cochran's approximation of the Student's t-test. The combined data from MW-1 and MW-2 were used as the upgradient ("background") data set for each metal. A value of one-half MDL was substituted for analysis results reported as "not detected" or less than MDL/MRL.

TABLE 3

Summary and Evaluations of Groundwater Assessment Results

	Ba (mg/L)[2]	Cd (mg/L)[1]	Cr (mg/L)[2]	Pb (mg/L)[1]
Upgradient Wells				
MW-1	0.1	0.015	0.1	0.013
	0.1	0.00025	0.025	0.0015
	0.1	0.0078	0.025	0.004
	0.1	0.00025	0.025	0.0015
Mean	<0.1	0.00583	0.04375	0.00500
S^2	NA	0.00005	NA	2.98E-05
MW-2	0.1	0.00025	0.08	0.0015
	0.2	0.00025	0.025	0.0015
	0.1	0.011	0.025	0.021
	0.2	0.00025	0.025	0.023
Mean	0.12500	0.00294	0.03875	0.01175
S^2	NA	0.00003	NA	0.00014
MW-1+MW-2				
Mean	NA	0.00438125	NA	0.00838
S^2	NA	0.00004	NA	0.00009
Downgradient Wells				
MW-3	0.5	0.013	0.12	0.012
	0.6	0.00025	0.025	0.0015
	0.5	0.0083	0.025	0.079
	0.5	0.00025	0.025	0.007
Mean	0.52500	0.00545	0.04875	0.02488
S^2	NA	0.00004	NA	0.00132
t^*	NA	0.28103	NA	0.89370
t_c	NA	2.20959	NA	2.33853
MW-4	0.4	0.017	0.025	0.026
	0.46	0.016	0.025	0.022
	0.4	0.00025	0.025	0.0015
	0.4	0.0068	0.025	0.073
	0.4	0.00025	0.025	0.004
Mean	0.41200	0.00806	<0.025	0.02530
S^2	NA	0.00007	NA	0.00083
t^*	NA	0.87059	NA	1.27539
t_c	NA	1.98457	NA	2.00766
MW-5	0.1	0.017	0.11	0.011
	0.2	0.00025	0.025	0.0015
	0.1	0.0074	0.025	0.085
	0.5	0.00025	0.15	0.19
Mean	0.22500	0.00623	0.07750	0.07188
S^2	NA	0.00006	NA	0.00759
t^*	NA	0.40953	NA	1.45318
t_c	NA	2.25067	NA	2.35042
MDEQ Default Type B Drinking Water Criteria[3]	2.4	0.0035	Cr^{+3} 37	0.004

[1] Evaluated using Cochran's Approximation to the Student's t-Test, 40 CFR 264, Appendix IV (0.5 MDL substituted for ND entries)

[2] Evalauted against default Type B criterion

[3] ***MERA Operational Memorandum #8, Revision 3 -- Type B Criteria***, February 4, 1994

Reported results < MDL

Results of the t-tests for the two metals, Cd and Pb, detected in both upgradient and downgradient wells at levels above health based criteria were examined. The t-test results ($t^* < t_c$) demonstrate that there is not a significant difference between the upgradient and downgradient mean concentrations of either Cd or Pb in groundwater samples collected and analyzed.

The above results from evaluations of the concentrations of target metals in the upgradient and downgradient wells confirm that EAF dust waste management activities did not impact site groundwater and no groundwater response activities are required for closure of the EAF dust storage pile.

5.4 Summary and Conclusions

Results of comparisons of soil closure assessment results to typical fill chemistries demonstrated that management of EAF dust wastes (K061) at the interim status storage pile did not contribute to the levels of target metals measured in area fill during the closure assessment. This demonstrates that the final waste removal activities successfully remediated the former dust pile sufficient to achieve closure to site specific background.

Results of comparisons of downgradient groundwater assessment results with upgradient groundwater results demonstrated that contaminants from the EAF dust storage pile were not released to groundwater.

The combined closure assessment results established that no residual soil contamination resulted from the former waste management activities at the EAF Dust Pile and that no contaminants were released to the local environment at levels above health based criteria and/or site specific background levels during operation of the pile. Therefore, the EAF Dust Pile has been successfully closed, requiring no further closure response activities.

APPENDIX A

APPROVED CLOSURE PLAN

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

RUSSELL J. HARDING, Director

October 17, 1995

Mr. Donald S. Windeler
McLouth Steel Corporation
1650 W. Jefferson Avenue
Trenton, Michigan 48183

Dear Mr. Windeler:

SUBJECT: Groundwater Monitoring Plan approval
McLouth Steel Trenton Plant (McLouth)
MID 017 423 304

Waste Management Division (WMD) staff have reviewed Section 2.2 "Task 2-Groundwater Monitoring Program," and the material related to groundwater testing in Sections 2.3 "Task 3-Chemical Testing," and 2.3.1 "Quality Assurance/Quality Control" submitted to the WMD on September 12, 1995. This information was submitted on behalf of McLouth Steel Corporation by Walter W. Tomyn. Stipulation 2.B of the WMD stipulations for approval attached to the October 31, 1988 closure plan approval letter required McLouth to submit a groundwater monitoring plan to the WMD. The sections mentioned above were reviewed in accordance with Stipulation 2.B.

The WMD approves the material WMD staff reviewed in the attachment to the September 12, 1995 with a modification. The attached "Modification for Groundwater Monitoring Plan Approval" describes the modification. The modified groundwater monitoring plan is the approved groundwater monitoring plan, and an enforceable part of the approved closure plan.

This approval does not constitute an approval of any part of the September 5, 1995 attachment to the September 12, 1995 letter related to soil sampling or any section not specifically listed as reviewed by WMD staff. For soil sampling McLouth must follow the approved closure plan. Once sampling and analysis have been completed, McLouth may determine that a closure plan amendment is necessary based upon the sampling results. That will be the first legitimate time McLouth can amend the approved closure plan.

If you have any questions, please call Ms. Angela Hahn of the WMD at 517-373-7738.

Sincerely,

Kenneth Burda, Chief
Hazardous Waste Program Section
Waste Management Division
517-373-0530

cc: Mr. Ben Okwumabua/Mr. Tim Sonnenberg, DEQ-Livonia
Ms. JoAnn Merrick/Mr. Rick Rusz, DEQ
Mr. Steve Buda, DEQ
Ms. Angela Hahn, DEQ

October 17, 1995

McLouth Steel Corporation
MID 017 423 304

Modification for Groundwater Monitoring Plan Approval

1. The appropriate number of background and foreground samples must be taken to properly apply the statistical method proposed in the McLouth submittal dated 12/20/89 (Cochran's t-test). If the t-test is not going to be applied, the appropriate number of samples must be taken for the statistical method used.

   This modification is necessary to assure proper statistical procedures are used.

NTH Consultants, Ltd.
Professional Engineering and
Environmental Services

38955 Hills Tech Drive
P.O. Box 9173
Farmington Hills, MI 48333-9173
(810) 553-6300
(810) 489-0727 Fax

McLouth Steel Corporation
c/o Walter W. Tomyn, P.E.
3742 Elder Road South
West Bloomfield, Michigan 48324

September 5, 1995
Project No. 13-4562-01

RE: Modified Work Plan for Remedial Investigation
Former Furnace Dust Stockpile
McLouth Steel
1650 West Jefferson
Trenton, Michigan

Dear Mr. Tomyn:

In response to discussions with representatives of the MDNR on August 24, 1995, and as agreed by all parties present, we are pleased to submit a modified work plan for conducting a remedial investigation at the former furnace dust stockpile formerly located at the McLouth Steel facility in Trenton, Michigan. The modified workplan incorporates the basic sampling plan as proposed in the 1988 work plan prepared by others and previously approved by the MDNR. However, the modified work plan retains our previous monitoring well scheme as presented in our August 1, 1994 work plan, but introduces a monitoring program pursuant to MDNR requests. Furthermore, the modified work plan limits the total number of soil samples required for chemical analysis to near surface samples for the initial analysis. Lastly, 6 borings are added to provide background information. The modified work plan and associated cost estimates are presented below.

(Partial pages 1, 3, 4, 5 only)

2.2 TASK 2 - GROUNDWATER MONITORING PROGRAM

- Groundwater monitoring wells will be installed in at least four of the test borings as follows: one interior boring, one upgradient background boring, and the two downgradient exterior borings. However, the downgradient wells will be placed no more than 50 feet from the perimeter of the former stockpile. The wells will be used to determine both groundwater quality and local groundwater flow direction. Final well locations and depths will be made based on groundwater conditions encountered during on-site drilling activities. Due to the close proximity of the Detroit River, river staging data will be requested from the U.S. Army Corp of Engineers concurrently with groundwater elevation measurements in the wells.

- In general, the well screens will be set at a depth intended to straddle the uppermost groundwater surface. The wells will be constructed using 2" outside diameter PVC screens and riser pipe. The well screens will be 5 feet long. Unless otherwise directed, the riser pipe will be left above grade and protective, above-ground locking covers will be installed over them and cemented in place. After installation, the wells will be developed and sampled either with disposal polyethylene bailers or a peristaltic pump. Prior to placement in sample jars, the groundwater samples will be filtered using 0.45 micron disposable filters. Development water will be containerized on site until disposal requirements are determined. In addition, where accessible, existing on-site wells that are in service will be sampled in a similar manner.

- The ground surface elevation at each boring location and the top of casing elevation at each monitoring well will be surveyed by a licensed subcontracted surveyor. Top of casing elevations will be surveyed to the nearest 0.01 feet. Ground surface elevations will be surveyed to the nearest 0.1 feet. Elevations will be referenced to a USGS datum or equivalent.

- Qualified NTH personnel will monitor and record the drilling, sampling, and well installation operations, develop and collect groundwater samples from the monitoring wells, and obtain static water level measurements. Soil conditions encountered will be recorded on individual test boring logs.

- Samples of groundwater and static water level measurements will be obtained on an approximate quarterly basis for a period of one year for a total of four (4) rounds of sample analysis. Water samples will be field filtered and analyzed for dissolved concentrations of cadmium, total chromium, and lead. Following analysis of the year's data the groundwater monitoring program will be evaluated to determine additional needs, if any.

- Upon receipt of analytical results for each sampling period, an interim report summarizing current groundwater conditions will be prepared. Results of the groundwater monitoring program will be summarized in a final report distinct from the final report on the soil conditions encountered during field investigation. summarizing current groundwater conditions.

2.3 TASK 3 - CHEMICAL TESTING

The soil and groundwater samples will be delivered to Eagle Laboratories Inc. of Wixom, Michigan within 24 hours of collection for chemical analysis. Sample analyses will be performed in accordance with MDNR recommended analytical methods and target method detection limits pursuant to MERA Operational Memorandum #6, Revision #3 (MDNR, February 4, 1994). Results of soil sample analyses will be reported on a dry-weight basis.

Based on review of available information, and specifically the constituents of potential concern as identified for K061 waste, selected soil and groundwater samples will be analyzed for the following parameters:

	Method	
Parameter	Soil	Water
Cadmium (Cd)	7131	213.2
Chromium *	7195	218.6
Lead (Pb)	7420	239.2
Barium **	7081	208.2

* Approximately 25% of soil samples selected for analysis will be tested for the presence of Cr(VI).

** The basis for including barium in the original plan is not clear, as barium is not an indicator for the McLouth Electric Furnace Dust.

The groundwater analyses will be conducted on field-filtered samples to determine the dissolved concentrations of the parameters of interest.

2.3.1 Quality Assurance/Quality Control

To provide a measure of quality assurance/quality control (QA/QC) for sampling activities, duplicate soil samples (1 sample for each set of 10 soil samples) and daily equipment blanks (one per day) will be submitted to the analytical laboratory for testing. In addition, a duplicate water sample will be submitted for analysis along with each set of water samples.

As an additional quality control procedure, the analytical laboratory will provide QA/QC data with the chemical testing reports. The data supplied by the laboratory will include information on laboratory blanks, laboratory duplicates, spike recoveries, and parameter control limits.

MCLOUTH STEEL PRODUCTS CORPORATION

1491 West Jefferson * Trenton, Michigan 48183
Telephone (313) 285-1200

September 16, 1988

Mr. Steven Sliver
Waste Management Division
Michigan Department of Natural Resources
Stevens T. Mason Building
Box 30028
Lansing, Michigan 48909

Subject: Emission Control Dust Storage Area Closure Plan

Reference: McLouth Steel Products Corporation
Trenton, Michigan Plant
EPA ID No. MID 017 422 304

Dear Mr. Sliver:

Enclosed please find our revised closure plan, which has been modified in response to your letter dated August 23, 1988 and our subsequent discussions.

Please contact the undersigned at 285-1200, if there are questions or comments on this information.

Very truly yours,
MCLOUTH STEEL PRODUCTS CORPORATION

D. S. Windeler
Manager of Environmental Affairs

cc: J. R. Turek
P. F. Coles - SEG
S-862

CLOSURE PLAN FOR

EMISSION CONTROL DUST STORAGE AREA

PREPARED FOR:

McLOUTH STEEL PRODUCTS CORPORATION
TRENTON, MICHIGAN

PREPARED BY:

SEG ENGINEERS & CONSULTANTS, INC.
1120 MAY STREET
LANSING, MICHIGAN 48906

SEPTEMBER 16, 1988

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CLOSURE PLAN FOR EMISSION CONTROL DUST (ECD) STORAGE AREA

This closure plan has been prepared in accordance with 40 CFR 265 Subpart G. This plan identifies all steps that will be necessary to close the ECD storage facility at the McLouth Corporation's Trenton, Michigan plant (MID 017423304).

The ECD storage area is located on the northern portion of the Trenton property as shown in Figure 1. The ECD is contained in this area by berms of on-site fill material approximately ten (10) feet high. An approach ramp has been constructed to allow the transport vehicles to end dump over the top of the berms into the storage area.

McLouth will maintain an on-site copy of the approved closure plan and all revisions to the plan until the certification of closure completeness has been submitted and accepted by MDNR Waste Management Division.

Additionally, SEG will prepare a site safety plan to cover the conduct of all persons associated with the sampling and subsequent closure activities.

McLouth will implement this plan immediately following approval of this plan by MDNR.

Upon completion of closure, McLouth will submit a certification that the facility has been closed in accordance with the specifications in the approved closure plan. This certification will be submitted to the MDNR and completed by a registered professional engineer and by McLouth.

I-1a Closure Performance Standard (40 CFR Section 265.111)

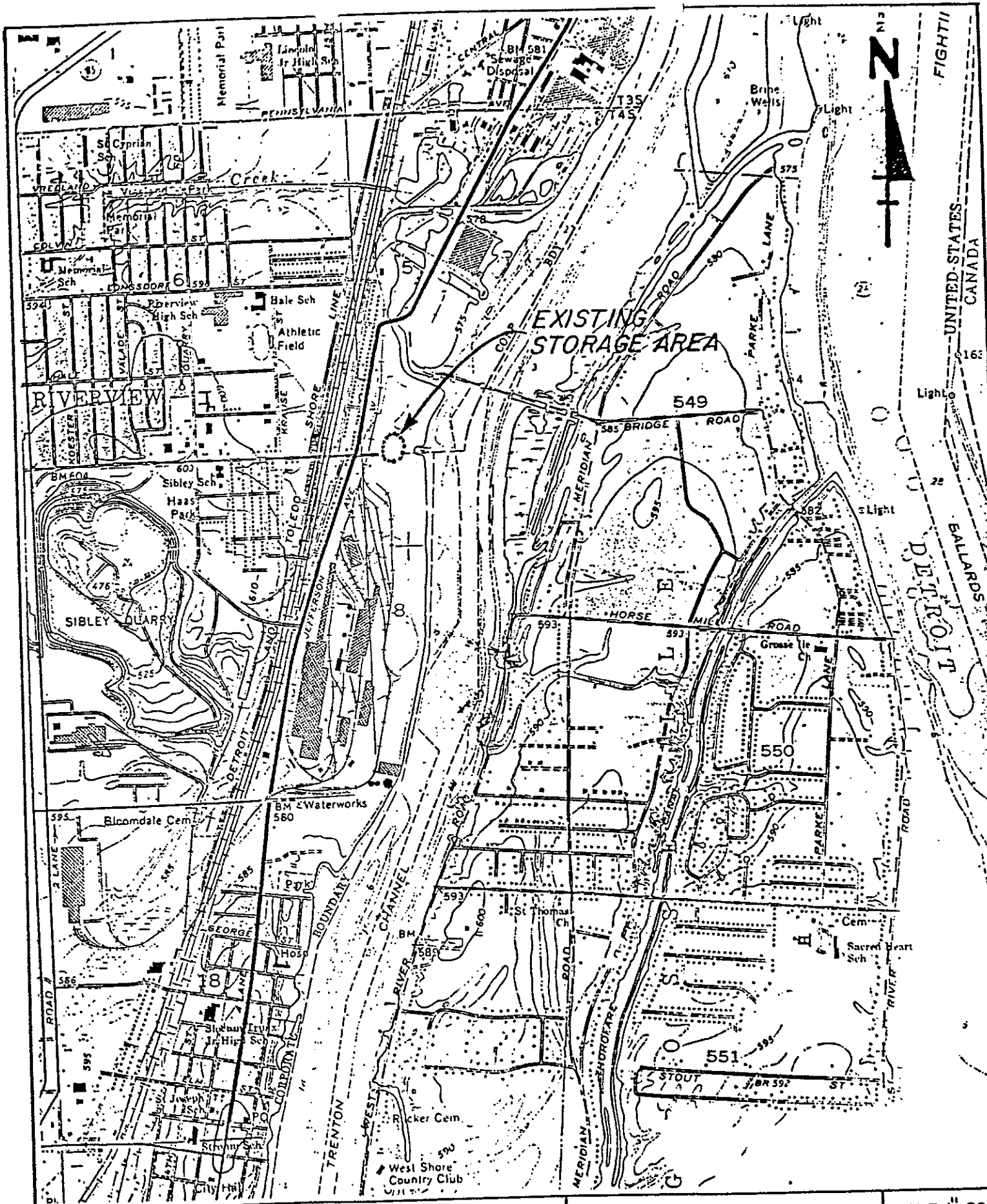
This facility will be closed in a manner that will minimize the need for further maintenance and controls; will minimize or eliminate threats to human health and the environment; and will avoid post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere. All contaminated materials will be removed to a licensed hazardous waste management facility. This plan will describe how this will be accomplished.

I-1b Final Closure of Facility

McLouth Steel plans to close the storage area at its Trenton, Michigan facility as soon as regulatory approval has been received.

I-1c Maximum Waste Inventory

The maximum inventory of wastes in storage at any time based on



OSC Engineers & Consultants, Inc. 1120 May St., Lansing, Michigan 48906 (517) 371-8500	McLOUTH STEEL PRODUCTS CORPORATION TRENTON PLANT	EMISSION CONTROL DUST STORAGE AREA	SCALE: 1"=200'
			FIG. NO. 1

TEXT OF FIRST PARAGRAPH ON PAGE 3 OF APPROVED CLOSURE PLAN

The complete inventory of material will be removed starting thirty days after regulatory approval of both the closure plan and disposal arrangements. It is currently estimated that complete removal and disposal at an approved hazardous waste management facility will take about one month. Removal of this material will be in compliance with the procedures in I-1d(4).

inventory records and inspection reports is estimated to be 6,000 cubic yards of dust.

I-1d(1) Inventory Removal (Revised 9/28/89)

Pilot testing to meet stabilization requirements will begin within thirty days of receipt of MDNR approval of both the closure plan and disposal arrangements. It is currently estimated that the period required for testing, disposal site acceptance, stabilization, and complete removal will take about three months. Pilot testing and stabilization will follow the procedure outlined in APPENDIX E. Handling and removal will follow the procedures in I-1d(4).

I-1d(2) Closure of Storage Area

Following removal of the ECD, a soil sampling program will be initiated to determine if a clean closure has been attained. As shown on Figure 2, a surveyed grid will be superimposed over the storage area. The grid spacing, 50 feet, was suggested by the Michigan Department of Natural Resources. Soil samples will be acquired at selected grid points as shown on Figure 2 at the surface and at a depth of two (2) feet. Background soil samples will be taken as shown on Figure 2 and will be of the same horizons as the remaining samples.

All soil samples will be collected using stainless steel spoons which have been rinsed and cleaned with deionized water prior to use and wrapped to reduce the possibility of contamination. A separate clean spoon will be used for each sample. Samples will be collected in 850 ml glass jars with tops having a teflon liner.

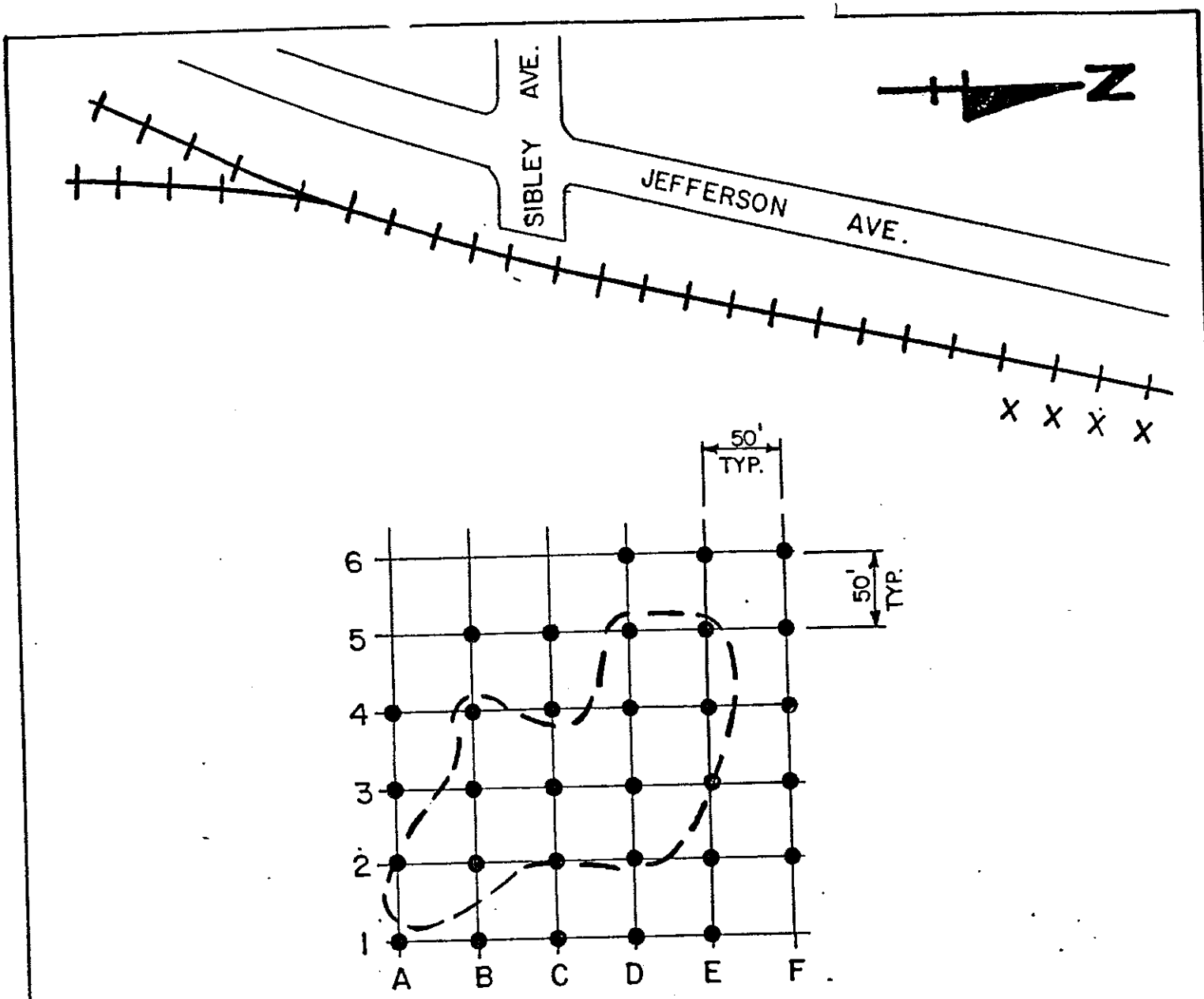
Soil samples will be subjected to analytical testing for those parameters in Table 1. Table 1 also indicates the appropriate protocols and detection limits.

TABLE 1 - TEST METHODS

Parameter	Test Method	Reference	Anticipated Detection Limit	
			Soil (mg/kg)	Liquid (mg/L)
pH	Electrometric-meter	SW846 Section 9040	.01 std. units	.01 std. units
Barium	Atomic absorption	7080	1.0	.025
Cadmium	Atomic absorption	7130	0.2	.005
Lead	Atomic absorption	7420	0.4	.010
Chromium (Hexavalent)	Atomic absorption	7197 solid, 7196 liquid	.05	.005

SM - Standard Methods for the Examination of Water & Wastewater, 16th ed.

SW846-EPA - Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, 3rd. ed.



LEGEND

X BACKGROUND SOIL SAMPLE SITES

● SOIL SAMPLE SITE

SEG Engineers & Consultants, Inc. 120 May St., Lansing, Michigan 48906 (517) 374-6000	McLOUTH STEEL PRODUCTS CORPORATION TRENTON PLANT	EMISSION CONTROL DUST STORAGE AREA SAMPLING GRID	SCALE: 1" = 100'
			FIGURE 2

Utilizing the statistical procedures outlined in Attachment 1, the analytical results from the storage area samples will be compared to background levels. If the study area results are within the range of plus or minus three (3) standard deviations, it will be concluded that no significant impact has occurred as a result of the storage operation. If the results are outside this range, contamination will be assumed. If the evaluation shows that contamination is present, a contingency plan will be implemented to carry out additional investigation. This contingency plan is described later in this closure plan.

I-1d(3) Contingency Plan for Additional Soil Sampling

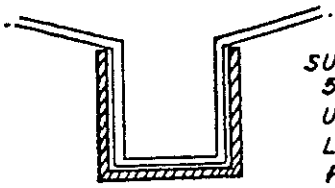
If the results of the initial testing show that contamination is present, additional soil testing will be required. If contamination is present at the two (2) foot depth, at a particular sample site, samples will then be acquired at the four, eight and ten foot depths. If contamination is present at the site perimeter, samples will be taken from one additional grid point. The depths at which samples will be acquired will depend upon the results of the preliminary testing. If preliminary test results show contamination at the surface only, then the new sample site will be sampled at the surface only. If contamination is at the two (2) foot depth, then the samples will be acquired at the surface, two, four, eight and ten foot depths.

All sampling and analytical protocols will be as previously described.

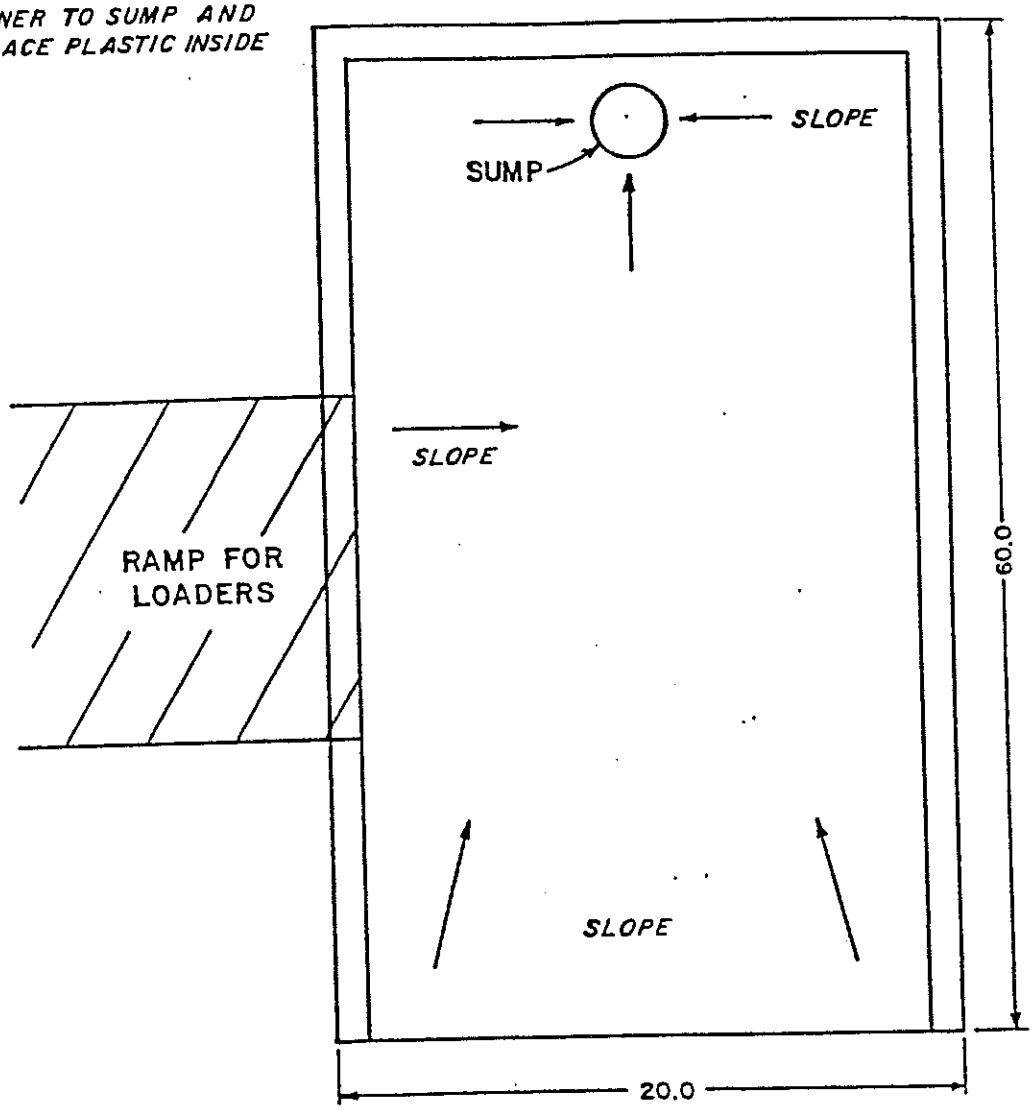
I-1d(4) Soil Removal

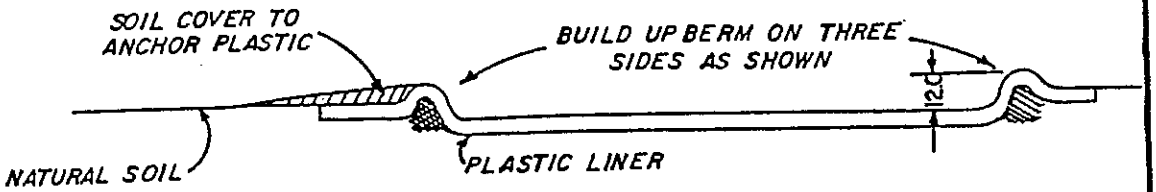
Once the horizontal and vertical extent of soil contamination has been determined, an excavation program will be initiated to remove the contamination. Excavation will be accomplished using a backhoe or other type of excavating equipment. A decontamination and loading pad (as shown in Figure 3) will be constructed immediately adjacent to the storage area. All loading will take place within this area. If the hazardous waste management facility does not offer truck decontamination facilities, the interior of the transporting trucks will be lined with plastic and the plastic will be draped over the side of the truck to prevent spills from contacting the truck tires. When the truck is loaded the plastic will be folded over the top of the load and the truck will be tarped in a conventional manner. Any spills on the plastic containment will be cleaned prior to moving the truck. If the proposed short term storage tank is complete at the time of soil removal, the concrete pad associated with the tank will be used in lieu of the plastic covered loading pad previously discussed.

Following removal of the contaminated soil, soil samples, over



SUMP -
55 GALLON DRUM TO BE USED AS SUMP - SLOPE LINER TO SUMP AND PLACE PLASTIC INSIDE





SEC Engineers & Consultants, Inc. 1120 May St., Lansing, Michigan 48906 (517) 374-6800	McLOUTH STEEL PRODUCTS CORPORATION TRENTON PLANT	DECONTAMINATION AND LOADING PAD	NO SCALE FIGURE 3

the grid used previously, will be acquired to demonstrate a clean closure. Samples will be acquired and tested using the protocols as previously discussed. Samples will be tested for the same parameters as during the investigation.

Once the excavation is complete and all transporting trucks have left the site, the excavating equipment will be decontaminated on the decon pad. Four samples of raw water will be taken prior to the cleaning. Following the cleaning, three rinse water samples will be taken from the sump to demonstrate that the decon procedures were effective. Both raw water and rinse water samples will be acquired in 60 ml glass jars with teflon lid liners. Samples from the sump will be taken when the rinse waters appear clean of turbidity and the sump has been rinsed three times. To demonstrate that the rinse waters are clean, the three rinse sample results must be equal to or less than the raw water results. However, all rinse waters will be used as make-up water in the electric arc furnace emission control system. This rinsate would help control the dissolved solids in the scrubber recycle water. The treatment of the scrubber blowdown is managed under NPDES Permit Number MI0002399.

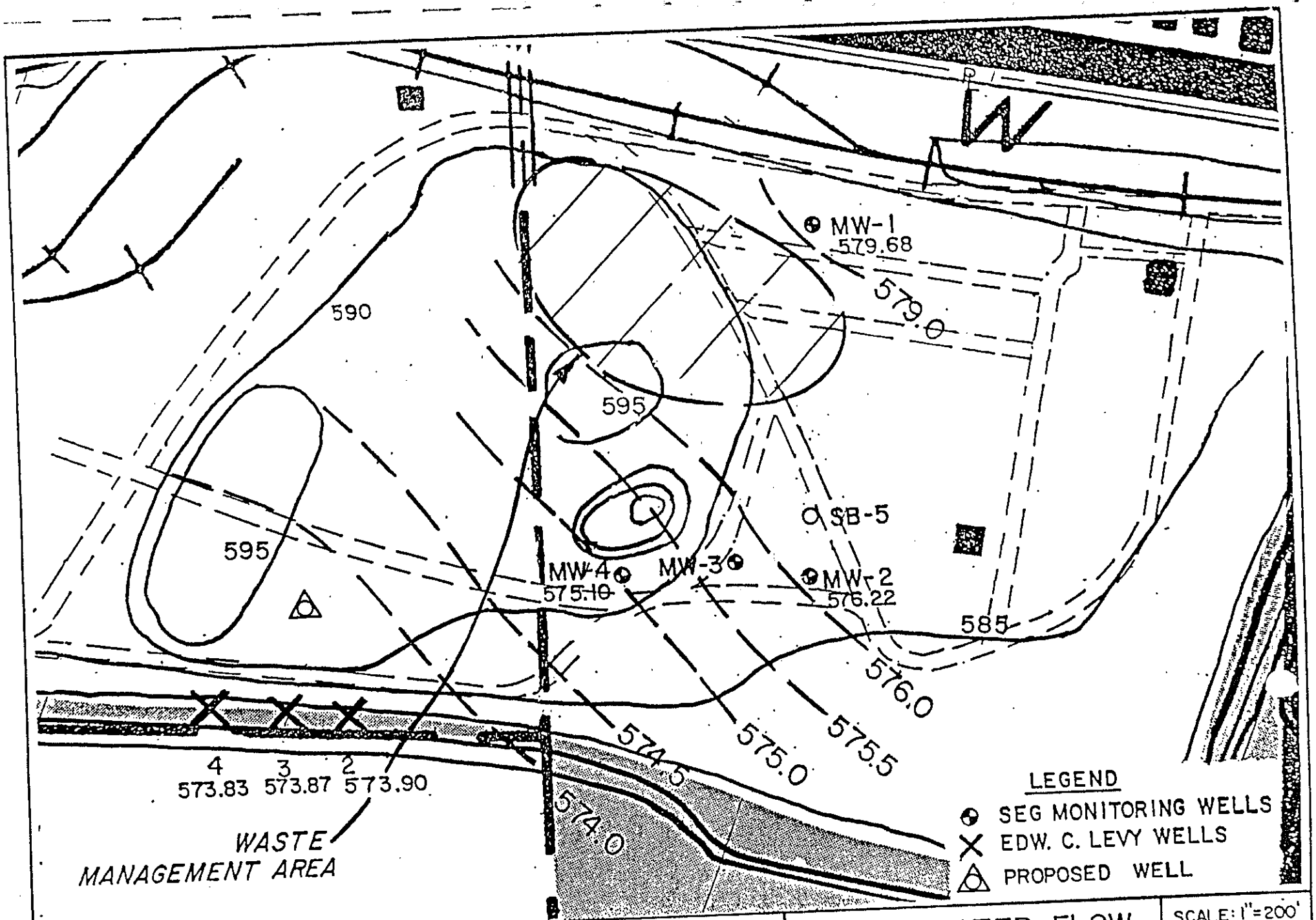
All plastic containment materials will be folded into the sump drum for disposal at a licensed hazardous waste management facility.

I-1e Ground Water Investigation

Four monitoring wells presently exist on the site. These were installed as part of a ground water study to define the hydrogeologic environment in connection with the proposed construction of a new emission control dust storage area. MW 1 is located such that it could be utilized as an upgradient well for the existing storage area. Of the three remaining wells, MW 3 and MW 4 could be utilized as downgradient monitoring locations for the existing storage area.

Based upon the preliminary evaluation of ground water characteristics, an additional downgradient monitoring well will be located approximately 500 feet due south of MW 4 as shown on Figure 4. The well will be constructed of two (2) inch I.D. flush joint Schedule 40 PVC with a five (5) foot PVC well screen. The screen will be sand packed to one foot above the top of the screen and the remaining annular space sealed with bentonite. A protective locking casing cemented into the ground will be provided.

Following installation of the well, all wells (#1, 3, 4 and 5 (new)) will be sampled and tested for dissolved barium, cadmium, lead, hexavalent chromium. All sampling techniques shall be in conformance with USEPA SW 846. Analyses shall be in conformance with Table 1. The analytical data will then be used in better



SEG Engineers & Consultants, Inc.
1120 May St., Lansing, Michigan 48906 (517) 374-6300

McLOUTH STEEL PRODUCTS CORP.
TRENTON PLANT

GROUND WATER FLOW
& PROPOSED WELL

SCALE: 1"=200'

FIGURE 4

defining the need for additional studies.

I-1f Certification of Closure

Following the completion of the closure steps outlined previously, McLouth will provide a certification that the storage area has been closed in accordance with the approved closure plan. This certification will include the following items:

- certification statement by the owner/operator
- certification statement by an independent registered engineer
- site safety plan
- manifests (or manifest summary) for the shipment of all wastes generated by closure activities
- summary of decontamination procedures and wastewater disposal
- summary analysis of closure activities including time table, weather conditions, runoff controls, equipment decontamination, soil and ground water results, etc.
- results of all tests used to determine clean closure
- statistical comparison of soil samples and background results
- sampling and analysis procedures
- final depths and elevations of waste and soil excavations
- properly labeled and easily identified sampling station map including background sampling stations
- summary of final restoration of excavated areas including type of fill material used and future land use outline, post-closure program and corrective action, if applicable
- a copy of the approved closure plan and letter of closure approval

I-1f Closure Cost Estimate

A closure cost estimate is included in Table 2.

I-1g Closure Schedule

A schedule for the activities associated with the closure of the storage area is attached as Figure 5.

SEG COST ESTIMATES

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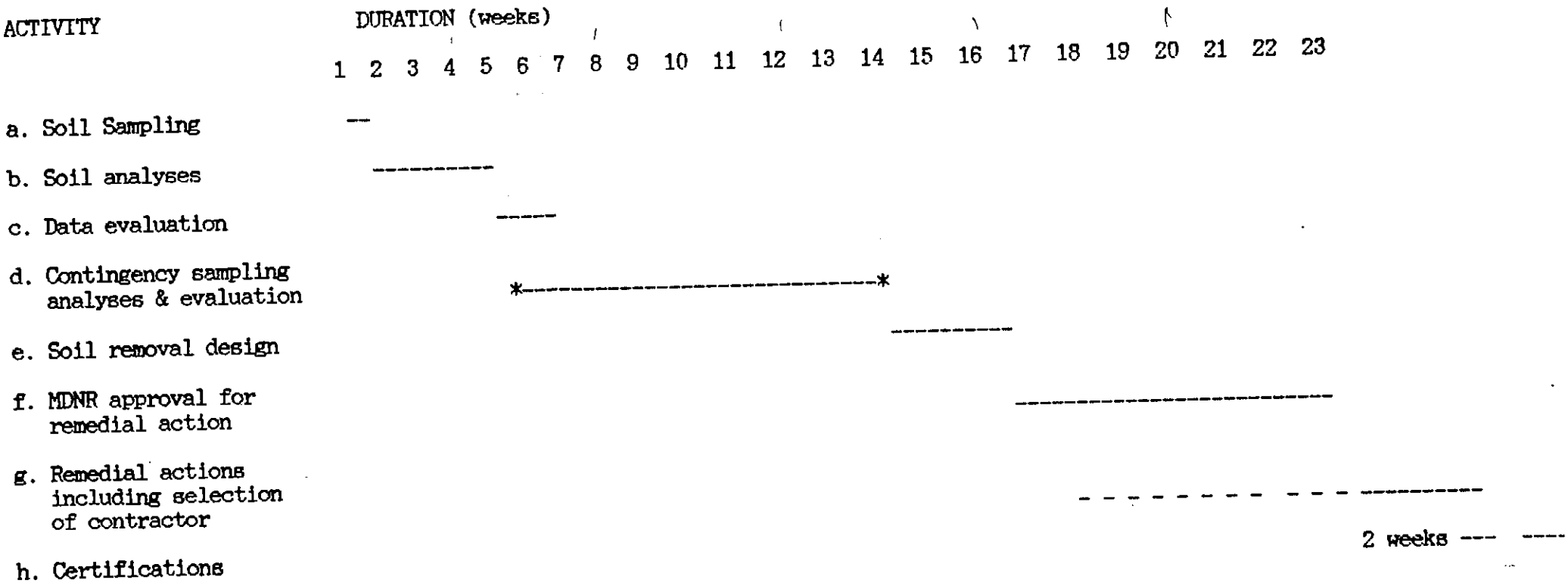
FIGURE 5 - CLOSURE SCHEDULE



---------- = If this task is not required, move up remaining tasks

- - - - - - - = Indicates activities on-going prior to DNR approval, such as preparation of bidding documents, disposal approvals, etc.

Note: Closure schedule is contingent upon availability of licensed disposal sites.

ATTACHMENT 1

STATISTICAL PROCEDURES

- Act 64/RCRA Clean Closure
- Real Estate Transactions
- Non-Act 64/RCRA Facilities
- Clean Declaration

HOW CLEAN IS CLEAN?

The State of Michigan has a straight forward position on the question of restoration of groundwater contaminated by an illegal discharge, how much clean-up is required when closing a hazardous waste facility (clean closure), or cleanup of a spill of hazardous materials. State Law, Act 245 and the associated "Groundwater Regulations" require restoration of a contaminated aquifer to its original condition (see paper by J. Bails entitled Aquifer Restoration, March 8, 1984).

Although some proposals will be made to leave some level of contaminants in the soils or groundwater, our position must be that contaminants be removed to non-detectable or, in the case of materials which naturally occur in soils, background levels. Soils and/or groundwater sampling must be included in any cleanup or closure to demonstrate that the site has been effectively restored to its original condition. Cleanups to any other level must be carefully worked out with Enforcement staff input and approval, taking into account applicable regulations and legal responsibilities. Waste and/or soil removed should be classified for disposal as hazardous or nonhazardous to determine disposal options and handling requirements (i.e. solid waste under Act 641 versus a hazardous waste under Act 64).

The following are recommended procedures for evaluating a proposed cleanup and site restoration. These procedures are not "absolutes". Other approaches may be developed and submitted for approval. This system, if used, however is acceptable.

A. ESTABLISHING SOIL BACKGROUND

1. Background should be established for site specific waste constituents or specific chemicals used in various processes or facility operations. These should fall into three general categories: a) the EP toxic METALS (arsenic, barium, cadmium, chromium, copper, lead, mercury, silver, selenium and zinc) using a total metals (dry-weight mg/kg) test procedure for the soil analysis, b) ORGANIC CONSTITUENTS, and c) other SITE SPECIFIC WASTE CONSTITUENTS (example Cyanide) as totals.

2. A bare minimum of 4 samples should be used to establish "background" in soils to account for natural occurrences and variability within each distinctive soil horizon. Background samples must be collected in an "uncontaminated" area. Based on waste type, contaminant mobility, operation practices and soil type (sand, silty sand, clay) an estimate of contamination depth should be made and background samples taken at comparable depths. Multiple soil horizons should have "background"

"Large size" sites (over 10 acres) — Use equation #1

2. Sampling format should include either a) all grid point stations as determined by B.1., or b) using the Systematic Random Sampling Method as referenced in SW-846, Section 9.1.1.3.3, or c) using an approved "phased" method of the grid coverage as determined in B.1.

3. Depth increments would be dependent on type of subsurface soils. For soil testing within the contaminated area we would generally recommend using 0.25-0.5 foot depth intervals for clays and 1.0 to 5.0 foot depth intervals for silts-sands. The selection of depth increments would also depend on initial soil contamination concentrations (i.e. at ground surface), mobility of contaminant, or height of liquid head on ground surface. Samples collected from specified depth(s) could be either single or in multiple replicates.

C. ORGANIC CONSTITUENT EVALUATION

1. Usually, non-detectable levels would be used to delineate clean versus contaminated soils. The following analytical methods are to be used on soil samples:

   a. For volatile organics, sample preparation should follow EPA SW-846 techniques (8.24, 8.82 or 8.83). Sample collection, preservation and handling is to be referenced to appropriate Method 8010, 8015, 8020, or 8030 for pertinent information. Analysis should be done following EPA Methods 5020 (head space) or 5030 (purge & trap) using EPA validated methods 601, 602, and/or 624 accordingly.

   b. For extractable compounds, sample preparation should follow EPA techniques (8.85 or 8.86). Procedures should be completed following EPA Methods 3540 (Soxhlet) or 3550 (Sonication). The resulting extract should be analyzed following the conditions described in EPA Method 625.

2. The quantitative limit of detection is defined as: st/sb =3.0, where st is the gross analyte response and sb is the average instrument background single response (noise). The instrument background signal response (sb) is based on the height of peak to peak response of the baseline in an area close to the actual or expected analytic peak. The detection limit is defined as the quantity of the analyte which produces a signal response greater than or equal to three (3.0) times the background instrument noise.

3. An alternative method which uses background levels in native soils may be used as a baseline for measuring contamination. Such an alternative method must be approved by the Waste Management Division in writing.

require sample data at each station to be two or more samples. No composite samples. (n 2)

3. Average Replicate T-test (TEGD Sept. 1986)

4. Using mean and variance of background values to establish an upper limit for delineating significant concentrations such as:

   a) $\bar{x} + 3S$ of "background" data as the maximum allowable limit, where 3S equals three times the standard deviation, and $\bar{x}$ equals the mean. Note this statistical method only requires one sample per station.

5. For non-detect values, it is recommended to use either of the following procedures for any of the preceding statistical methods:

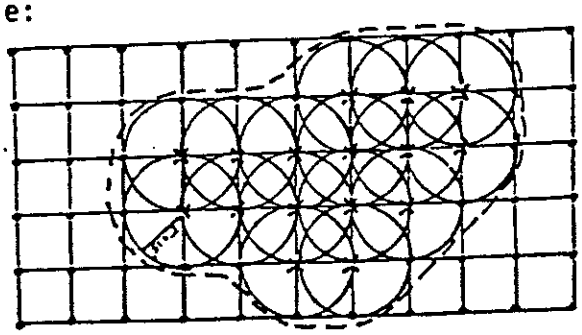
   a) alternate "0" and detection value (dv) for a net value of half the detection value with a variance, or

   b) the Continuity Correction procedure with the t-test, where if background data is non-detect then use S = ½ dv. Attachment 2 is a summary explanation for performing the t-test with Continuity Correction.

G. EXCAVATION

Excavation of contaminated areas should be based on the established grid system interval (as recommended in B.1). The radius of excavation around the contaminated sample point(s) is equal to the grid interval (GI = r). Excavation depth would be to the deepest point of contamination. After excavation, the grid must be resampled to verify that the area is free of contamination. If continued contamination is detected, the excavation format is repeated until a satisfactory result is obtained.

Example:



GL = 150
A = 11,250
GI = 15.3

° Sample Station
x Contaminated Station
r = GI = 15 feet

Contaminated soil removal in granular non-cohesive soils may stop at the water table, if encountered, except all waste material must be removed even if it is below the water table. If contaminated soils remain, groundwater monitoring must be done to check for contamination. If contamination is found, groundwater purging or some other method of plume management must be developed, approved and implemented.

- Inert designation - If soil concentrations are above background but can be demonstrated to meet the inert designation (12-14-87 Draft Document from Waste Evaluation and Manifests Unit - see Attachment 3) then soils can remain in place.

REAL ESTATE TRANSACTIONS/NON-REGULATED (RCRA-ACT 64) FACILITIES

Waste Material

- Characteristic - If ignitable reactive, corrosive, or EP Toxic, then waste must go to a licensed hazardous waste facility. If not characteristic, then waste may go Act 64/RCRA facility, or an Act 641 landfill if approved.

Soils

- Metals - If not EP Toxic, but above background, soil may go to an Act 641 landfill.
- Reactive - If not reactive or pretreated so no longer reactive, soil may go to an Act 641 landfill.
- Organics - Soils may go to a licensed Act 64/RCRA facility, or to an Act 641 landfill if the landfill will accept it.
- Inert designation - if soil concentrations are above background but meet criteria of inert designation (see Attachment 3) then the soils can remain in place.

I. CLEAN CLOSURE CERTIFICATION CHECKLIST

This checklist was developed to review RCRA clean closures. Due to direct reference to 40 CFR 264 Subpart G by Act 64, Rule 613; Act 64 closures should also be evaluated by this checklist.

Documentation supporting the independent registered professional engineer's certification can be requested under 40 CFR 264.115 and 265.115 (as of October 29, 1986). The owner/operator must submit at least two copies of certification documentation, one for MDNR, and one for the EPA files.

The checklist identifies items recommended to properly evaluate a closure certification. These items are not "absolutes". Other information or substitutions may be provided with technically justify and certify a "clean closure" or "clean declaration".

This checklist can be used for land disposal facilities and storage facilities. Several of the items would not be required for a storage facility where testing was minimal. Items 1 thru 5 would be required for all closures. Items 6 thru 11 would be optional for storage facilities, dependent on extent of testing required. Land disposal facilities would require all items listed.

Attachment 1

MICHIGAN BACKGROUND SOIL SURVEY

TOPSOIL - Results in ug/kg

TOPSOIL	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
INDIVIDUAL GLACIAL LOBES																	
a-Erie			1	1	1		1	1		1			1	1		1	1
mean			11.0	73.7	1.0		13.0	17.0		0.10			16.0	6.0		61.5	0.71
st. dev.			ERR	ERR	ERR		ERR	ERR		ERR			ERR	ERR		ERR	ERR
n-Saginaw		8	8	8	8		8	8	8	8		8	8	8	8	8	8
mean		4481	3.8	41.3	1.0		12.4	11.6	8063	0.11		237.5	7.8	16.0	0.28	39.1	0.16
st. dev.		869	0.8	8.7	0.0		4.1	3.4	1747	0.16		61.4	2.0	17.2	0.09	18.5	0.10
n-Michigan			4	4	4	4	4	4	4	4	4	4	4	4	4	4	
mean			2.3	45.8	1.0	2.5	12.0	10.4	4850	0.05	2.1	561.3	6.8	12.5	0.25	21.5	
st. dev.			1.2	10.3	0.0	0.0	1.2	4.3	451	0.00	0.8	290.7	1.2	1.3	0.00	2.9	
n-West U. P.		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
mean		1610	0.8	48.7	1.0	2.5	6.9	42.1	2475	0.05	1.0	177.5	3.3	24.0	0.25	61.0	
st. dev.		74	0.5	8.2	0.0	0.0	0.9	27.5	168	0.00	0.0	22.2	1.5	7.8	0.00	6.6	

COMBINED SUMMARY:	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
n		12	17	17	17	8	17	17	16	17	8	16	17	17	16	17	
minimum		1540	0.1	30.7	1.0	2.5	5.5	4.5	2320	0.05	1.0	110.0	2.5	6.0	0.25	18.0	0.1
maximum		6160	11.0	73.7	1.0	2.5	21.0	82.5	10500	0.50	2.5	835.0	16.0	56.0	0.50	79.0	0.7
mean		3524	3.2	46.0	1.0	2.5	11.0	18.8	5863	0.08	1.6	303.4	7.0	16.5	0.27	41.4	0.1
st. dev.		1575	2.5	11.2	0.0	0.0	3.7	18.2	2718	0.11	0.8	207.4	3.4	12.9	0.06	19.6	0.
mean + 2 SD		6674	8.1	68.5	1.0	2.5	18.4	55.2	11298	0.30	3.1	718.3	13.7	42.2	0.39	80.6	0.
mean + 3 SD		8249	10.6	79.7	1.0	2.5	22.1	73.3	14015	0.41	3.9	925.7	17.1	55.1	0.45	100.2	0.

n - number of samples for that parameter
minimum - lowest value in data set
maximum - highest value in data set
mean - average concentration of data
st. dev. - sample standard deviation
mean + 2 SD - mean value plus 2 standard deviations. If the data is normally distributed, then 95% of the values should be less than this number.
mean + 3 SD - mean value plus 3 standard deviations. If the data is normally distributed, then 99% of the values should be less that this number.

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WASTE MANAGEMENT DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

MICHIGAN BACKGROUND SOIL SURVEY

SANDY CLAY - Results in mg/kg

SANDY CLAY	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
INDIVIDUAL GLACIAL LOBES																	
n-Erie																	
mean																	
st. dev.																	
n-Saginaw	3	15	3	15	3	15	15	3	3	3	3	15	15	3	3	12	
mean	8063	8.1	40.1	1.0	7.2	14.8	15.5	15633	0.05	11.0	336.7	21.7	20.3	0.25	33.3	0.01	
st. dev.	59	8.4	1.5	0.2	0.3	8.1	4.9	115	0.00	0.0	20.8	8.4	8.9	0.00	2.1	0.00	
n-Michigan																	
mean																	
st. dev.																	
n-West U. P.																	
mean																	
st. dev.																	

COMBINED SUMMARY:	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
n		3	15	3	15	3	15	15	3	3	3	3	15	15	3	3	12
minimum		8020	1.1	38.7	0.6	7.0	8.0	10.0	15500	0.05	11.0	320.0	15.0	5.0	0.25	31.0	0.01
maximum		8130	22.4	41.7	1.4	7.5	31.0	24.0	15700	0.05	11.0	360.0	36.0	31.0	0.25	35.0	0.01
mean		8063	8.1	40.1	1.0	7.2	14.8	15.5	15633	0.05	11.0	336.7	21.7	20.3	0.25	33.3	0.01
st. dev.		59	8.4	1.5	0.2	0.3	8.1	4.9	115	0.00	0.0	20.8	8.4	8.9	0.00	2.1	0.00
mean + 2 SD		8181	24.8	43.1	1.4	7.7	30.9	25.3	15864	0.05	11.0	378.3	38.5	38.1	0.25	37.5	0.01
mean + 3 SD		8239	33.2	44.6	1.6	8.0	39.0	30.2	15980	0.05	11.0	399.1	46.9	47.0	0.25	39.6	0.01

n - number of samples for that parameter
minimum - lowest value in data set
maximum - highest value in data set
mean - average concentration of data
st. dev. - sample standard deviation
mean + 2 SD - mean value plus 2 standard deviations. If the data is normally distributed, then 95% of the values should be less than this number
mean + 3 SD - mean value plus 3 standard deviations. If the data is normally distributed, then 99% of the values should be less than this number.

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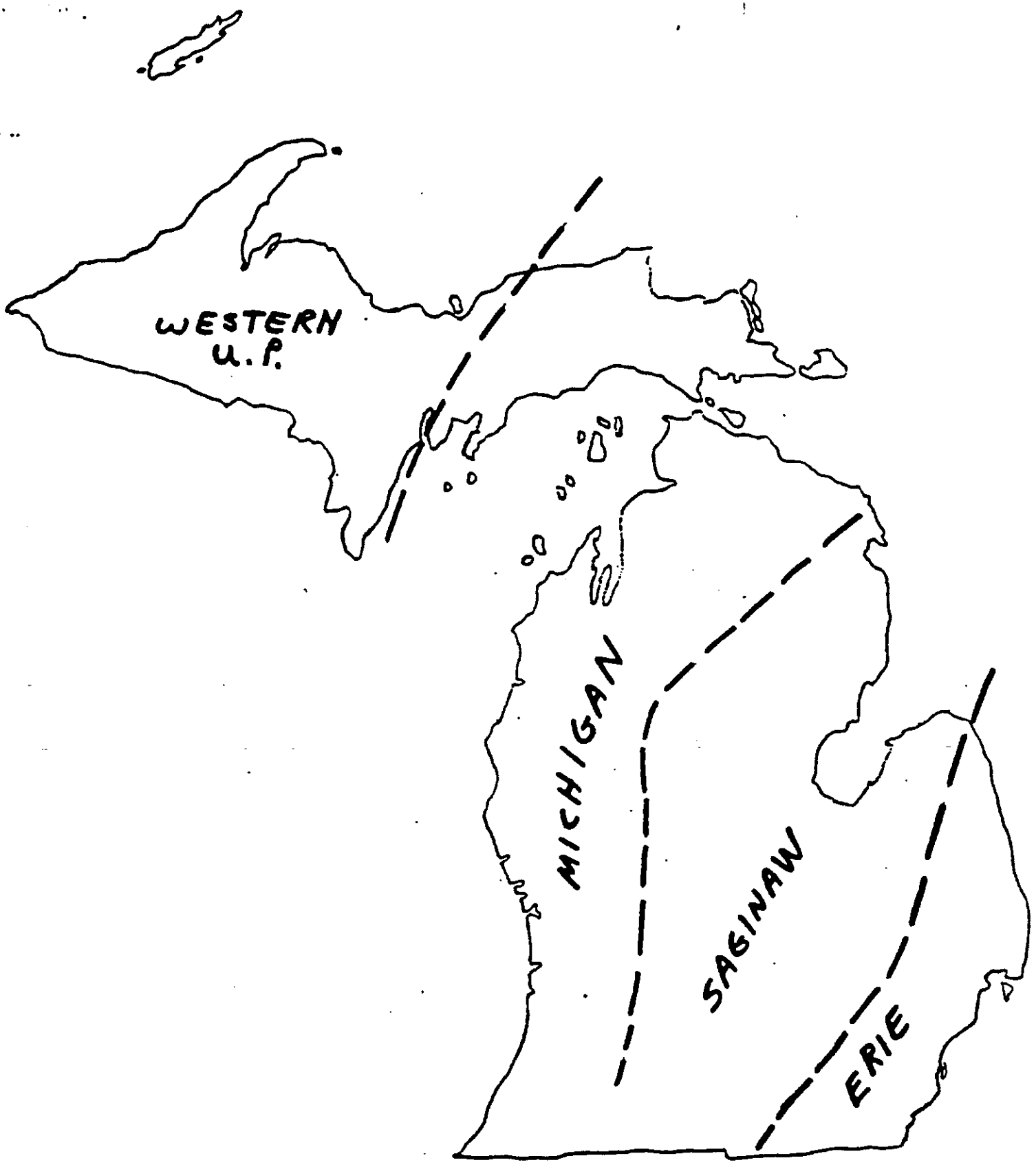
WASTE MANAGEMENT DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES



GENERAL BOUNDRIES
OF
GLACIAL LOBES

1967

Geological Survey Division

Small scale map L

MORAINIC SYSTEMS OF MICHIGAN

Revised and reprinted 1973

MICHIGAN BACKGROUND SOIL SURVEY

SAND - Results in mg/kg

SAND	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
INDIVIDUAL GLACIAL LOBES																	
n-Erie	15		15	15	15		15	15		14			1	15	15	15	
mean	0.17		2.3	125.9	0.2		3.3	8.7		0.02			18.0	4.5	0.20	25.2	
st. dev.	0.23		1.4	50.1	0.2		3.6	3.2		0.01			ERR	4.5	0.02	9.8	
n-Saginaw			8		8		8	8					8	8			8
mean			2.7		1.4		3.0	5.8					9.9	14.0			0.01
st. dev.			0.6		0.1		1.1	0.7					1.4	0.0			0.00
n-Michigan	3		3	4	3		7	7		3			7	3	3	7	
mean	0.20		0.5	6.5	0.2		3.6	6.1		0.04			7.6	7.0	0.20	9.9	
st. dev.	0.00		0.3	2.1	0.0		5.5	4.5		0.02			11.8	3.0	0.00	6.0	
n-West U. P.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
mean		1237	0.5	5.6	1.0	2.5	8.8	4.2	3033	0.05	1.0	37.0	3.3	2.5	0.25	6.3	
st. dev.		110	0.0	0.4	0.0	0.0	2.6	0.8	306	0.00	0.0	6.0	1.4	0.0	0.00	0.3	

COMBINED SUMMARY:	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
n	18	3	29	22	29	3	33	33	3	20	3	3	19	29	21	25	8
minimum	0.10	1110	0.2	5.2	0.1	2.5	1.0	1.2	2700	0.02	1.0	31.0	1.6	1.2	0.16	4.7	0.01
maximum	1.00	1310	5.5	200.0	1.6	2.5	16.0	15.0	3300	0.06	1.0	43.0	34.0	20.0	0.25	42.0	0.01
mean	0.18	1237	2.1	87.8	0.6	2.5	3.8	7.0	3033	0.03	1.0	37.0	8.4	7.1	0.21	18.7	0.01
st. dev.	0.21	110	1.3	70.3	0.6	0.0	3.8	3.3	306	0.01	0.0	6.0	7.6	5.5	0.02	11.5	0.00
mean + 2 SD	0.60	1457	4.7	228.4	1.8	2.5	11.4	13.7	3644	0.06	1.0	49.0	23.6	18.1	0.25	41.7	0.01
mean + 3 SD	0.81	1567	6.0	298.6	2.3	2.5	15.2	17.0	3950	0.07	1.0	55.0	31.2	23.6	0.28	53.2	0.01

n - number of samples for that parameter
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st. dev. - sample standard deviation
mean + 2 SD - mean value plus 2 standard deviations. If the data is normally distributed, then 95% of the values should be less than this number
mean + 3 SD - mean value plus 3 standard deviations. If the data is normally distributed, then 99% of the values should be less than this number.

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WASTE MANAGEMENT DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

MICHIGAN BACKGROUND SOIL SURVEY

CLAY - Results in mg/kg

CLAY	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
INDIVIDUAL GLACIAL LOBES																	
n-Erie	49		65	65	89	3	65	65	3	55	3	3	66	84	52	84	13
mean	0.99		14.7	103.1	1.0	12.3	24.2	19.6	21433	0.04	22.7	450.0	26.6	12.6	0.43	50.8	0.26
st. dev.	0.93		13.7	63.2	0.7	1.2	11.0	7.2	503	0.03	0.6	0.0	9.2	6.7	0.16	12.4	0.04
n-Saginaw			32		32		32	32					32	32			32
mean			7.7		1.7		12.1	16.4					26.0	23.3			0.01
st. dev.			8.4		0.5		3.5	5.0					8.4	5.7			0.00
n-Michigan	11		11		11		11	11		11			11	11	11	11	11
mean	0.45		2.2		0.2		8.5	16.1		0.12			33.6	19.1	0.20	40.6	0.05
st. dev.	0.49		0.8		ERR		0.6	2.0		0.20			4.0	6.9	ERR	7.0	ERR
n-West U. P.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
mean		9538	2.0	94.7	1.0	6.3	27.0	20.7	11017	0.05	11.0	256.7	20.0	2.5	0.25	30.7	
st. dev.		1177	0.2	2.9	0.0	0.8	1.0	1.5	1200	0.00	1.0	23.1	1.7	0.0	0.00	3.2	

COMBINED SUMMARY:	Ag	Al	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Li	Mn	Ni	Pb	Se	Zn	CN
n	60	3	111	68	135	6	111	111	6	69	6	6	112	130	66	98	56
minimum	0.10	8400	0.2	6.8	0.1	5.5	3.9	9.9	9650	0.01	10.0	230.0	4.0	2.5	0.12	22.0	0.01
maximum	3.10	10750	88.0	291.0	3.5	13.0	53.0	52.0	21900	0.70	23.0	450.0	53.0	32.0	0.70	90.0	0.33
mean	0.89	9538	11.1	102.8	1.1	9.3	19.2	18.4	16225	0.06	16.8	353.3	26.9	15.5	0.39	49.1	0.07
st. dev.	0.89	1177	12.3	61.8	0.8	3.4	10.8	6.3	5765	0.09	6.4	106.9	8.8	8.1	0.17	12.6	0.11
mean + 2 SD	2.67	11892	35.7	226.3	2.6	16.1	40.9	31.1	27754	0.23	29.7	567.1	44.5	31.8	0.73	74.2	0.29
mean + 3 SD	3.56	13068	47.9	288.1	3.4	19.5	51.8	37.4	33519	0.31	36.1	674.0	53.3	39.9	0.90	86.7	0.40

n - number of samples for that parameter
minimum - lowest value in data set
maximum - highest value in data set
mean - average concentration of data
st. dev. - sample standard deviation
mean + 2 SD - mean value plus 2 standard deviations. If the data is normally distributed, then 95% of the values should be less than this number.
mean + 3 SD - mean value plus 3 standard deviations. If the data is normally distributed, then 99% of the values should be less than this number.

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WASTE MANAGEMENT DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

1. Manifests (or some type of manifest/waste removal summary) of where and how much waste was shipped.

2. Certification statement is needed by the onwer/operator AND an independent registered engineer. All independent registered professional engineer certificates must have an original stamp on at least one copy.

3. Summary of decontamination procedures (pressure wash, steam clean, etc.) and how waste water was disposed.

4. Summary analysis (include conditions of haul roads, time table, soil and groundwater results, weather conditions, runoff controls, equipment decontamination, etc.).

5. Results of all tests used to determine clean closure (chart, tables, lab sheets).

6. Statistical comparisons on sampling results compared to background. This should include full computations on background and statistical analysis.

7. Sampling and analysis procedures (specify references).

8. Final depth and evaluations of excavations of wastes and soils.

9. Properly labelled and easily identified sampling grid stations (map); including background stations.

10. Groundwater data (and statistical evaluation) used to determine if groundwater degradation has occurred (usually four sets of replicate analysis for background compared to sampling event after closure activities). Monitor well construction details and sampling and analysis procedures may be required if documentation is not in the file.

11. Summary of final restoration of excavated area including information on fill material used and/or future land use outline. If clean closure cannot be achieved (e.g. contaminated soils to water table and groundwater results show contamination) this summary item should be used to address the post closure program and/or corrective action.

12. A copy of the approved closure plan and letter of closure approval.

H. DISPOSAL OPTIONS

Disposal of excavated waste or soil, and purged groundwater must be in accordance with all applicable State regulations. For example, air stripping of contaminated groundwater requires a permit from Air Quality Division. Disposal options in the following order of preference include:

1. Removal for incineration
2. Removal for treatment
3. Removal for landfilling
4. In-place treatment/stabilization
5. Encapsulation/control migration

Proposals for new or innovative technologies or solutions will also be considered. Specific situations are discussed below for off-site disposal options according to the current Michigan regulations. It must be determined whether the waste and the facility in question is regulated or not under RCRA and Act 64 (Hazardous Waste Laws).

RCRA/ACT 64 REGULATED HAZARDOUS WASTE SITES

Waste Material

- Listed waste - must go to Act 64/RCRA permitted TSD
- Characteristic waste - Act 64/RCRA TSD, or if treatment renders material non-hazardous, to Act 641 landfill.

Soils

- Metal contamination - If EP TOXIC, or a listed metal, contaminated soils must go to an Act 64/RCRA TSD. If soil concentrations are not EP TOXIC but still above background, they can go to an approved Act 641 landfill only if the metal(s) of concern is not listed.

- Reactive - a determination that the contaminated soils do not meet the criteria set forth in 40 CFR 261.23(a),5. The test method is "Test Method to Determine Hydrogen Cyanide Released from Waste". Interim proposed method recommended by U.S. EPA SW-846 Section 7.3.3.2. Contaminated soils containing more than 250 ppm total cyanide may be considered reactive. If soils are found reactive, no landfilling is allowed. Soils/wastes must be pretreated to reduce cyanide concentrations so that the contaminated soils are not reactive.

- Organics - if listed waste contaminants, then soils are a hazardous waste by the mixture rules. If not listed, then soils should be tested for appropriate waste characteristic test to determine waste classification.

If background sampling has established organic compounds in soils (e.g. coal fragments will given off naphthalene) then contamination would be determined by using a Student's T-test at the 99% level of confidence or other approved statistical method.

D. HEAVY METALS EVALUATION

For metals (for example: As, Ba, Cd, Cr, Cu, Pb, Hg, Ag, Se, Zn, Ni and Mn), it is recommended to use a total metals (dry weight basis mg/kg) test procedure to minimize additional sources of variation since these constituents are naturally occurring. After background is established as per section A.2., contamination would be determined by using a Student's T-test at the 99% level of confidence or other approved method to compare background data to the suspect samples. Any statistically significant increase above background will be considered contaminated.

Sample collection, preservation, handling and preparation is to be referenced to EPA Method 3050. Analysis is to be by flame or furnace atomic absorption spectroscopy. Attachment 1 is a summary of typical soil levels on a State-wide basis for comparison purposes only.

E. WASTE SPECIFIC CONSTITUENTS

For inorganic constituents and waste specific constituents we recommend use of total analysis (dry-weight basis) to minimize additional sources of variation since some of these constituents may be naturally occurring. After background is established (see A.2.), contamination would be determined by using a Student's T-test at the 99% level of confidence or other approved statistical method.

F. STATISTICAL COMPARISONS

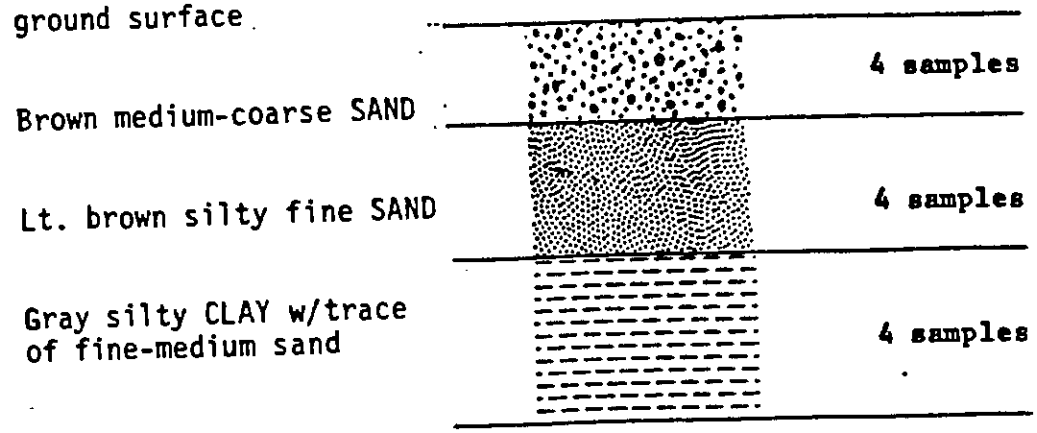
1. The t-test should be an "approved" method since there are a number of variations. We recommend the Gosset Student T-test (1908) where:

$$t = \frac{|\bar{x} - \bar{y}|}{\sqrt{S \frac{1+1}{N\ M}}} \qquad \text{with } S = \sqrt{\frac{M(s_1)^2 + N(s_2)^2}{N + M - 2}}$$

and / / denotes the absolute value sign, S represents the standard deviation, with N being the population of s_2 and M the population of s_1, N + M - 2 the degrees of freedom and s_1, s_2, ... s_n are the sample standard deviations.

2. Cochran's Approximation to the Behrens-Fisher Student's t-test is also available for evaluating background variance versus exceedences (i.e. contamination) as referenced in the 40 CFR 264, Appendix IV. Note this statistical comparison method does

established separately (i.e. minimum 4 samples per each soil unit).



B. SAMPLING GRID

1. A grid system should be established over the specified closure area. Grid point representation should be proportioned to size of area for equal weighting. It is recommended that one of the following equations be used to determine grid intervals for stationing.

using: 1) $\sqrt{\frac{A\pi}{GL}} = GI$ or 2) $\frac{\sqrt{A/\pi}}{2} = GI$

"large site" "small sites"

where: GL = length of area to be gridded
A = area to be gridded (sq. ft.)
GI = grid interval

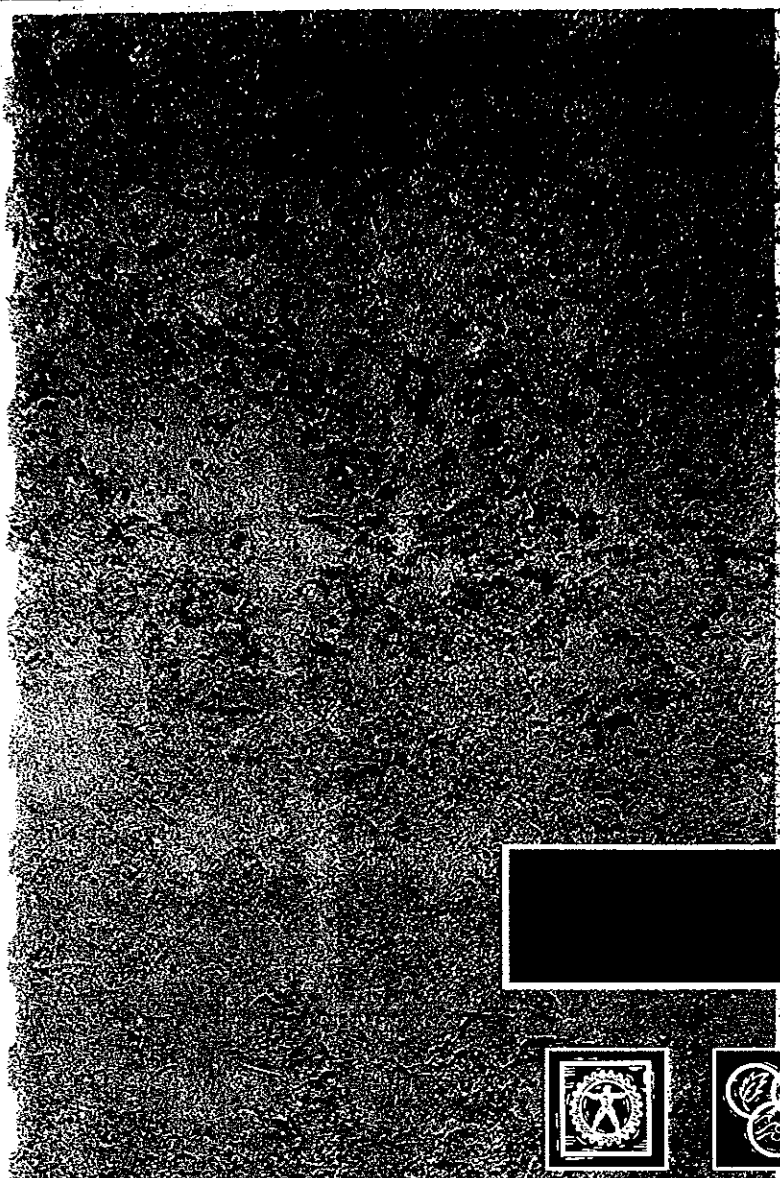
The first equation results in an extremely heavy weighting for small sites but good representation for large areas and the second equation results in a very light weighting for large sites but good representation for small sites. It appears that some boundaries for applying these equations to various size ranges of sites is appropriate. Possible ranges could be a) 0-0.25 acres, b) 0.25-3.0 acres and c) 3.0 acres and greater.

To even further simplify this application we have developed a chart based on an average size range of sites (1 acre = 43,560 sq. ft.).

Site Acreage	Sq. Feet	Grid Interval
0.001-0.25	43-10,890	20 ft. (minimum 9 sample stations)
0.025-3.00	10,890 - 130,680	40 ft.
3.00 +	130,680 +	60 ft.

APPENDIX B

CLAYTON SOIL ASSESSMENT REPORT



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Clayton
ENVIRONMENTAL
CONSULTANTS

Subsurface Investigation for the Former Emission Control Dust Storage Area at the Former McLouth Steel Products Corporation Facility Trenton, Michigan

Submitted to DSC Ltd. Trenton, Michigan

Clayton Project No. 13-97153.00

August 19, 1997

CONTENTS

1.0 INTRODUCTION

Clayton Environmental Consultants, Inc. is pleased to submit its report for a subsurface investigation conducted at the former McLouth Steel Products Corporation Facility located at 1491 West Jefferson Avenue in Trenton, Michigan. Clayton conducted this investigation of the closure plan in accordance with its proposal dated October 9, 1996 (Clayton Proposal No. 96DETEMR055) and a revised reporting schedule requested by DSC, Ltd.

The purpose of the subsurface investigation was to evaluate the horizontal and vertical extent of barium, cadmium, chromium, hexavalent chromium, and lead at the former emission control dust storage area located at the site. Clayton understands that McLouth Steel formerly stored a listed hazardous waste (Electric Arc Furnace Dust K061) in a diked area prior to the construction of a regulated storage unit for this material. The electric arc furnace dust (EAFD) was removed and properly disposed of by McLouth Steel.

2.0 SITE BACKGROUND

The former McLouth Steel Products Corporation Trenton, Michigan plant is now owned by DSC Ltd. The plant site is bounded on the west and north by Jefferson Avenue, on the south by King Road, and on the east by the Detroit River. The former stockpile area of EAFD is located on the north end of the property, just north of the east extension of Sibley Road. The EAFD was removed and properly disposed of by McLouth Steel. Figure 1 presents a site location map. A copy of the site health and safety plan has been included as Appendix A.

3.0 SUMMARY OF SUBSURFACE INVESTIGATION ACTIVITIES

The following is a summary of activities performed as a part of Clayton's subsurface investigation:

- Collection and analysis of closure fill material samples from the former EAFD storage area
- Collection and analysis of background fill material samples north of the former EAFD storage area
- Evaluation of background concentrations

The installation of monitoring wells and quarterly groundwater sampling events at the property will be addressed in a separate report.

3.1 CLOSURE FILL MATERIAL BORINGS

On November 6 and November 7, 1996 and February 5 and February 6, 1997, Clayton (1) retained a drilling contractor (Fibertec, Inc.) to drill fill material borings utilizing a Geoprobe®, (2) oversaw drilling of the borings, and (3) collected fill material samples. The drilling contractor extracted fill material samples while using the Geoprobe® from clear acetate liners installed within the Geoprobe® rods. At the completion of drilling and following collection of the samples, the borings were backfilled with bentonite chips.

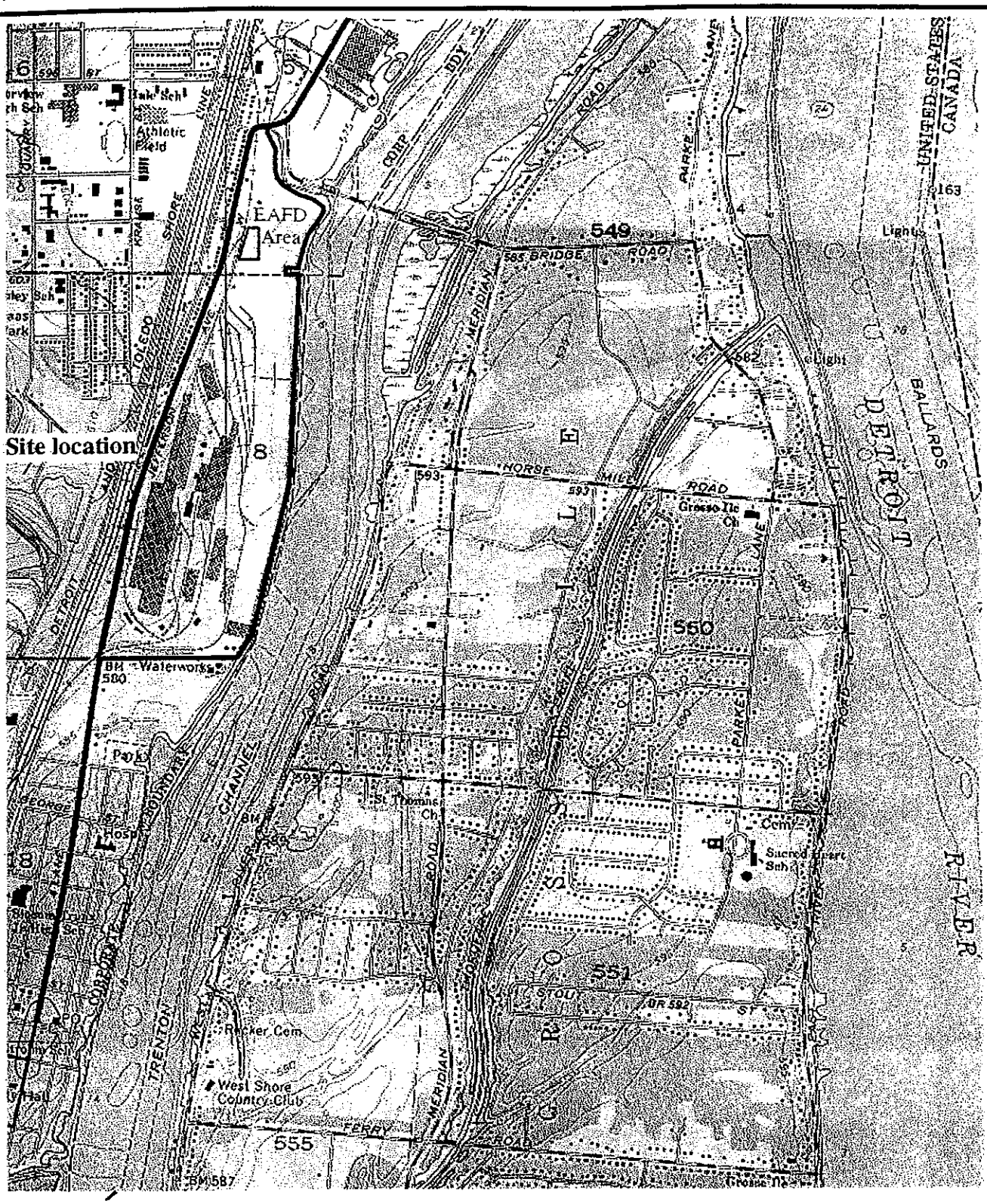

Figure 1
Site location

Clayton ENVIRONMENTAL CONSULTANTS

SITE **Former McLouth Steel Products Corporation Trenton Plant**
Trenton, Michigan

Project No. 13-97153.00 | August 19, 1997

A total of 27 borings (A1 through A4, B1 through B5, C1 through C5, D1 through D6, E1 through E4, and F2 through F4) were advanced on November 6 and November 7, 1996. An additional 19 borings (A1 South, A1 East, A2 South, A4 South, A5, B1 East, B2, B5, B6, C5, C6, D1 East, D2, D7, E1 East, E2, F1, G2, and G4) were advanced on February 5 and February 6, 1997 following receipt of analytical results from the November 6 and November 7, 1996 sampling and discussions with DSC Ltd. personnel.

Fill material samples were collected at the surface and at 2 feet below ground surface. Fill material samples from the surface were collected using a stainless-steel trowel. Fill material samples from beneath the surface were collected using a Geoprobe®. Based on visual inspections of samples collected from the borings, Clayton observed a dry, sandy, granular, metallic, slag fill material from the surface to the final depth of the borings (a maximum depth of 4 feet below surface [B2, B5, C5, D2, and E2]). Clayton encountered obstructions drilling Borings A3 and D2 and the borings were advanced to 1-foot-below ground surface. According to the SEG closure plan dated September 16, 1988, fill material samples were collected over a grid with a grid spacing of 50 feet. The fill material sampling locations are shown in Figure 2.

Fill material samples were analyzed for barium, cadmium, chromium, lead, hexavalent chromium, and pH. Following the receipt of analytical results on November 6 and 7, 1996 and discussions with DSC Ltd. personnel, additional fill material samples from the borings advanced on February 5 and 6, 1997 were analyzed for barium, cadmium, chromium, and lead to evaluate the horizontal and vertical extent of compounds of concern.

Clayton retained a surveyor (JCK & Associates, Inc.) to survey the relative locations and ground surface elevations of the borings.

3.2 BACKGROUND FILL MATERIAL SAMPLES

On November 6, 1996, Clayton collected four background fill material samples (BGDA through BGDD) from an area away from the EAFD area along the railroad tracks to determine background concentrations. These background samples were collected at the surface and at a depth of 2 feet below ground surface.

At the request of MDEQ Lansing Waste Management Division, Permits Section personnel, two additional background borings (BGD1 and BGD2) were advanced east of the original four background fill material borings. These background samples were collected at the surface and at a depth of 2 feet below ground surface.

Based on visual inspections of samples collected from the borings, Clayton observed a dry, sandy, granular, metallic, slag fill material from the surface to the final depth of the borings (a maximum depth of 2 feet below surface).

3.3 EQUIPMENT DECONTAMINATION

The drilling contractor and Clayton decontaminated sampling equipment (e.g., Geoprobe® rods, and stainless-steel trowels) before collecting samples. The sampling equipment was decontaminated in the following order:

1. Washing and scrubbing the equipment with a nonphosphate detergent solution
2. Rinsing the equipment with tap water

3. Rinsing the equipment with deionized water

4. Air-drying the equipment

Equipment blanks (Equipment Blanks EB-1 and EB-2) were collected by rinsing the Geoprobe® rods and samplers with deionized water and collecting the water in the appropriate containers.

Vehicles were not impacted by drilling activities and were not decontaminated. Fill material generated from drilling was left next to each hole. Decontamination fluid the drilling contractor generated from steam cleaning the Geoprobe® rods was placed on the ground.

3.4 SAMPLE COLLECTION AND PRESERVATION

Fill material samples were collected in laboratory-grade containers, and preserved and stored following United States Environmental Protection Agency (USEPA) Publication SW-846, *Testing Methods for Evaluating Solid Waste*. Clayton transported the samples in ice-cooled containers to Clayton's analytical laboratory in Novi, Michigan.

For samples intended for barium, cadmium, chromium, hexavalent chromium, and lead analyses, Clayton used sample jars that the supplier (1) washed with detergent, (2) rinsed three times with deionized water, (3) rinsed with acid, (4) rinsed three times with organic-free water, (5) oven dried, (6) rinsed with solvent, and (7) oven dried.

4.0 LABORATORY ANALYSIS

Clayton selected fill material samples for laboratory analysis from the surface and from the 2-foot-deep interval in fill material samples collected on November 6 and 7, 1996. Following the receipt of analytical results from the samples collected on November 6 and 7, 1996, Clayton collected additional samples at selected locations on February 5 and 6, 1997 from the surface, 2-feet below ground surface, and at 4-feet below ground surface.

Clayton analyzed the fill material samples for barium, cadmium, chromium, lead, and hexavalent chromium using USEPA 6000- and 7000-series methods. Clayton analyzed the fill material samples for pH using USEPA Method 9045.

5.0 ANALYTICAL RESULTS

Tables 1 and 2 summarize metal analytical results from the November 6 and 7, 1996 and February 5 and 6, 1997 fill material sampling. Detailed analytical reports are included as Appendix B.

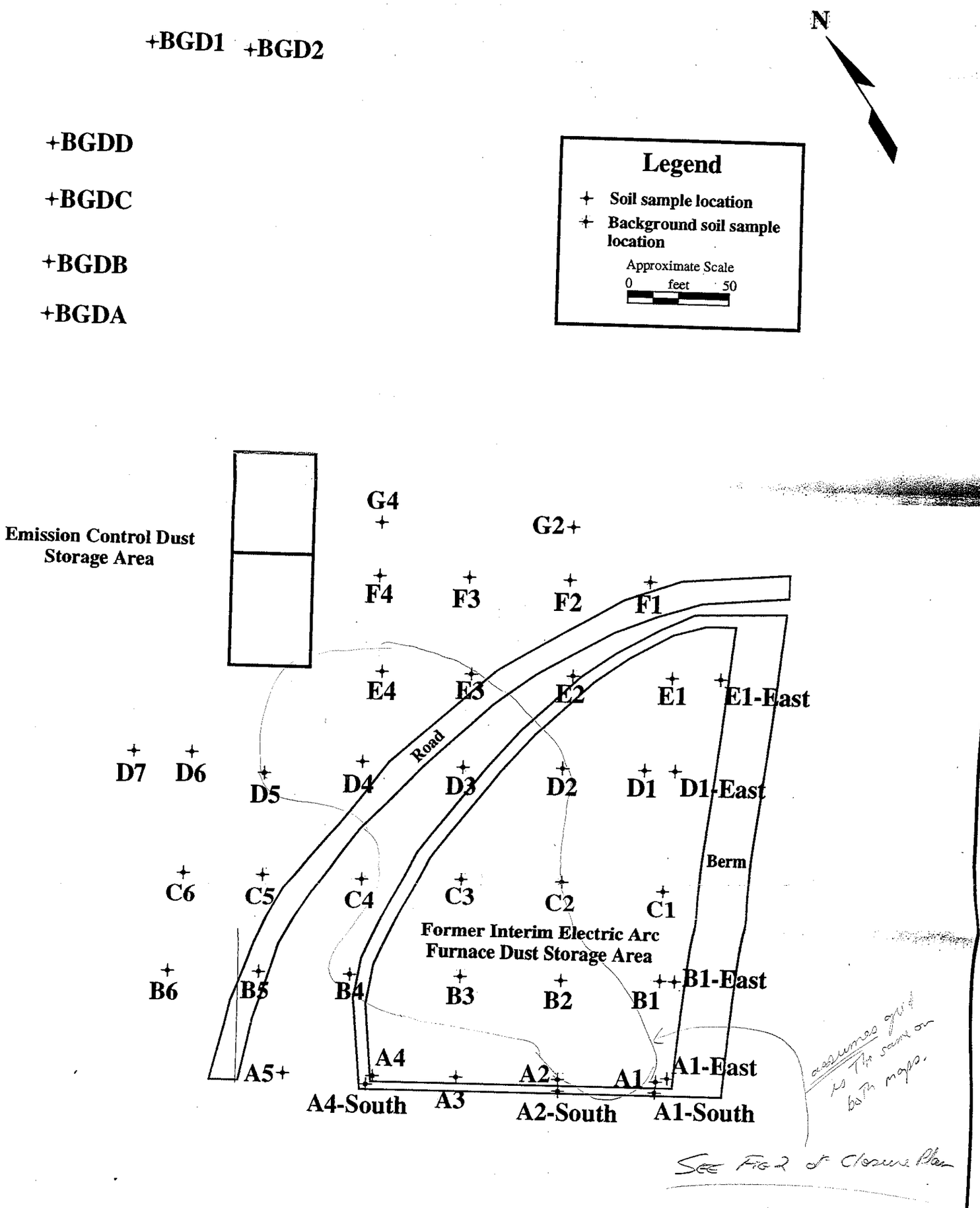

Figure 2 **Fill material and background fill material sample locations**	Clayton ENVIRONMENTAL CONSULTANTS	**DSC Ltd.** **Trenton, Michigan**	SITE **Former McLouth Steel Products Corporation Trenton Plant** **Trenton, Michigan**

Table 1
Summary of Analytical Results for Metals in Fill Material
Clayton Project No. 13-97153.00
Sampling Dates: November 6 and 7, 1996

	Sample Concentration (mg/kg)					
Analyte	Barium	Cadmium	Chromium	Chromium (VI)	Lead	pH
Sample Identification						
A1 (Surface)	190	5.4	480	NA	884	8.8
A1 (2')	150	<0.05	210	NA	739	11.1
A2 (Surface)	140	12	340	NA	7400	8.5
A2 (2')	82	0.56	1400	<0.1	<20	11.9
A3 (Surface)	120	3.2	540	NA	<50	8.4
A3 (1')	110	0.46	480	NA	<50	10.8
A4 (Surface)	54	5.2	620	NA	620	9.2
A4 (2')	44	6.6	2600	<0.1	110	12.2
B1 (Surface)	82	3.4	600	NA	860	7.9
B1 (2')	71	<0.05	950	NA	<50	12.0
B1 (2') Duplicate	81	<0.05	1200	NA	<50	12.3
B2 (Surface)	35	30	640	NA	7200	8.6
B2 (2')	83	1.7	600	NA	7200	11.9
B3 (Surface)	49	22	270	NA	330	9.0
B3 (2')	24	<0.05	760	NA	<50	12.4
B4 (Surface)	54	3.9	540	NA	880	8.8
B4 (2')	90	1.1	960	<0.1	150	11.7
B5 (Surface)	37	<0.05	420	NA	<50	11.1
B5 (2')	37	<0.05	1300	NA	<50	12.3
C1 (Surface)	26	0.34	460	NA	120	8.9
C1 (Surface) Duplicate	55	0.52	820	NA	180	8.8
C1 (2')	63	0.78	760	<0.1	110	12.3
C2 (Surface)	34	2.6	650	NA	1300	8.4
C2 (2')	51	<0.05	810	NA	130	11.6
C3 (Surface)	65	0.4	410	NA	220	9.2
C3 (2')	61	0.13	1100	<0.1	<20	12.4
C4 (Surface)	58	1.4	470	NA	320	9.5
C4 (2')	40	<0.05	960	NA	<50	12.3
C5 (Surface)	27	1.1	380	NA	430	8.9
C5 (2')	32	1.5	1500	0.1	<20	12.4
D1 (Surface)	70	3	510	NA	1100	8.8
D1 (2')	50	0.29	690	NA	<50	12.2
D1 (2') Duplicate	44	0.4	550	NA	<50	12.4
D2 (Surface)	26	7.2	410	NA	1400	9.2
D2 (1')	210	2.4	270	<0.1	230	11.0
D3 (Surface)	71	4.1	1200	<0.1	510	10.1
D3 (2')	32	0.13	680	NA	<50	12.4
D4 (Surface)	42	4	280	NA	560	9.1
D4 (2')	29	0.23	820	NA	<50	12.3
D5 (Surface)	56	2.6	470	<0.1	620	8.6
D5 (2')	18	0.1	870	NA	<50	12.3
D6 (Surface)	42	12	180	NA	1700	8.9
D6 (Surface) Duplicate	42	12	<130	NA	1800	8.8
D6 (2')	26	0.38	680	NA	<50	12.3
E1 (Surface)	77	11	770	<0.1	2900	8.5
E1 (2')	100	<0.05	660	NA	<20	12.4
E2 (Surface)	110	0.22	350	NA	440	9.2
E2 (2')	89	<0.05	1500	NA	95	12.0
E3 (Surface)	73	3.6	440	<0.1	630	9.6
E3 (2')	52	<0.05	910	NA	94	12.4
E4 (Surface)	63	<0.05	490	NA	690	9.0
E4 (2')	86	0.3	1000	NA	<20	12.1
F2 (Surface)	61	4.7	490	NA	780	9.4
F2 (2')	86	<0.05	630	NA	210	11.2
F2 (2') Duplicate	930	3.5	620	NA	430	11.4
F3 (Surface)	47	3.5	350	NA	380	9.1
F3 (2')	57	0.55	220	<0.1	<20	11.5
F4 (Surface)	50	1.9	440	NA	1100	9.0
F4 (2')	76	<0.05	380	NA	<50	11.8
BGDA (Surface)	270	3.6	480	<0.1	450	8.6
BGDA (2')	110	0.33	690	<0.1	<20	11.4
BGDB (Surface)	82	1.3	650	<0.1	130	8.8
BGDB (2')	36	0.77	430	<0.1	55	11.5
BGDB (Surface) Duplicate	92	1.7	420	<0.1	260	8.9
BGDC (Surface)	50	0.78	330	<0.1	170	8.5
BGDC (2')	110	0.4	690	<0.1	100	11.2
BGDD (Surface)	68	1	360	<0.1	240	8.2
BGDD (2')	61	0.38	930	<0.1	<20	11.3
BGD1 (Surface)	100	<0.05	250	<0.1	120	9.3
BGD1 (2')	17	<0.05	530	<0.1	13	12.3
BGD2 (Surface)	140	<0.05	290	<0.1	270	8.9
BGD2 (2')	34	<0.05	540	<0.1	43	12.3

mg/kg = milligrams per kilogram or parts per million (ppm)
NA = Not analyzed

Table 2
Summary of Analytical Results for Metals in Fill Material
Clayton Project No. 13-97153.00
Sampling Dates: February 5 and 6, 1997

	Sample Concentration (mg/kg)			
Analyte	Barium	Cadmium	Chromium	Lead
Sample Identification				
A1 South Surface	NA	10	NA	740
A1 South (2')	NA	NA	NA	270
A1 East Surface	NA	<0.05	NA	190
A1 East (2')	NA	NA	NA	99
A2 South Surface	NA	<0.05	NA	19
A2 South Surface Dup.	NA	2	NA	270
A2 South (2')	NA	NA	500	NA
A4 South Surface	NA	4.3	NA	270
A4 South (2')	NA	2.4	460	NA
A5 Surface	NA	1.7	NA	220
A5 (2')	NA	0.52	630	NA
B1 East Surface	NA	NA	NA	550
B2 (4')	NA	0.06	NA	5
B5 (4')	NA	<0.05	1,600	NA
B6 (2')	NA	NA	740	NA
C5 (4')	NA	<10	7,400	NA
C6 Surface	NA	3.3	700	NA
C6 (2')	NA	1.5	800	NA
D1 East Surface	NA	NA	NA	520
D2 (4')	52	0.28	NA	15
D7 Surface	NA	3.1	NA	460
E1 East Surface	NA	0.61	NA	90
E2 (4')	NA	NA	580	NA
F1 Surface	64	NA	NA	440
F1 (2')	140	1	NA	160
G2 Surface	55	NA	NA	640
G2 Surface Duplicate	58	NA	NA	990
G2 (2')	86	0.95	NA	270
G4 (Surface)	NA	NA	NA	490

mg/kg = milligrams per kilogram or parts per million (ppm)
NA = Not analyzed

Subsurface Investigation
for
Approved Emission Control Dust Storage Area
at the
Former McLouth Steel Products Corporation
Trenton, Michigan

Submitted to
DSC Ltd.
Trenton, Michigan

Clayton Project No. 13-97153.00

August 19, 1997

Limitations

The information and opinions rendered in this report are exclusively for use by DSC Ltd. Clayton Environmental Consultants, Inc. will not distribute or publish this report without DSC Ltd.'s consent except as required by law or court order. The information and opinions are given in response to a limited assignment and should be implemented only in light of that assignment. Clayton Environmental Consultants, Inc. accepts responsibility for the competent performance of its duties in executing the assignment and preparing reports in accordance with the normal standards of the profession, but disclaims any responsibility for consequential damages.

This report submitted by:

Gary T. Blinkiewicz
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Environmental Management and Remediation
Detroit Regional Office

This report reviewed by:

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Senior Geologist and Supervisor of Geosciences
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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This report reviewed by:

Derek R. Wong, Ph.D., P.E.
Senior Hydrogeologist and Manager
Environmental Management and Remediation
Detroit Regional Office

APPENDIX A

SITE HEALTH AND SAFETY PLAN

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Clayton
ENVIRONMENTAL
CONSULTANTS

Site Health and Safety Plan for the Former McLouth Steel Plant Trenton, Michigan

Submitted to
DSC, Ltd.
Trenton, Michigan

Clayton Project No. 13-97153.00

October 25, 1996

CONTENTS

1.0 INTRODUCTION

This health and safety plan describes the procedures that will be implemented and followed by Clayton Environmental Consultants, Inc. during work activities at the former McLouth Steel Plant in Trenton, Michigan.

This health and safety plan is based on the planned work activities and environmental investigations to be conducted at the site and the requirements of Title 29 of the Code of Federal Regulations, Section 1910.120 (29 CFR 1910.120). This health and safety plan should be available onsite during work activities.

2.0 WORK ACTIVITIES

The following is a brief description of the work activities to be performed at the site.

- Install three monitoring wells
- Install 31 soil borings in the former emission control dust storage area
- Sample groundwater from two existing and three new monitoring wells

3.0 ONSITE ORGANIZATION

Each person shall be responsible for following the health and safety plan's guidelines at the site. The site safety officer is Mr. Gary T. Blinkiewicz. The safety officer's duties are to:

- Oversee implementation of the health and safety plan
- Confirm that all personnel have proper training and protective equipment
- Conduct a "tailgate" meting on the first day before field activities commence
- Stop work if the health and safety of workers is in question
- Observe workers for signs and symptoms of exposure to contaminants
- Evaluate the effectiveness of the personal protective program on an ongoing basis and upgrade the program as needed
- Inform workers of any changes in the health and safety practices
- Perform daily reviews of the work practices and compliance with the health and safety plan
- Note any signs of worker exposure or stress and take proper action immediately

All personnel who enter the work area must comply with the health and safety practices and procedures described in this health and safety plan.

All incidents at the site, such as injuries or near misses, must be reported to the following people as soon as possible:

- Gary T. Blinkiewicz
  Site Safety Officer
  Clayton Environmental Consultants, Inc.
  (810) 344-1770

4.0 HEALTH AND SAFETY HAZARDS

The health and safety concerns onsite can be categorized as chemical hazards and physical hazards. The potential chemical hazards, based on previous site investigations, are presented by the chemicals listed in the following table.

Hazardous Substance	Potential Health Effects	Permissible Exposure Limit (PEL)	Immediately Dangerous to Life or Health
Barium	eyes, skin, respiratory system damage, heart, CNS damage	0.5 mg/m^3	50 mg/m^3
Cadmium	NIOSH Potential Occupational Carcinogen (prostatic & lung cancer);respiratory system and kidney damage	0.005 mg/m^3	9 mg/m^3
Chromium	eye and skin damage; respiratory system damage	0.5 mg/m^3	250 mg/m^3
Lead	eye damage; GI tract damage; CNS damage; kidney, blood, gingival tissue damage	0.050 mg/m^3	100 mg/m^3

Physical hazards present at the site are limited to unstable footing.

4.1 CHEMICAL HAZARDS

Hazards generally associated with chemicals used onsite and chemical contamination present in soil and/or groundwater include overexposure through the following possible routes of entry: (1) Skin or eye contact resulting in skin damage and in some cases, dermal absorption, (2) Inhalation of chemical vapors, dust or gases, (3) Ingestion of chemicals. To minimize exposure to chemical contaminants, personal protective equipment as specified in this plan must be worn. Site control measures must also be taken to minimize exposures and to provide for contingency measures. Air monitoring/sampling as specified in this plan will be used to assess potential airborne exposure. Material Safety Data Sheets for any chemicals brought onsite should be available for review.

4.2 PHYSICAL HAZARDS

The following subsections describe possible health and safety hazards associated with work activities at the site.

4.2.1 Traffic and Heavy Equipment Hazards

Stay at least 10 feet away from moving equipment. If closer than 10 feet:

- Keep equipment in sight at all times.
- Inform the operator of your location.

The working area will be closed to traffic with barricades, caution tape, cones, or other traffic control equipment.

No unauthorized or unessential vehicle will be allowed to enter the barricaded area. Only trained personnel may operate heavy equipment.

4.2.2 Underground Utilities Hazards

Extreme care will be taken in invasive drilling/excavation techniques to ensure that no utility lines exist at that location.

If an underground utility line is encountered or damaged during the work:

- Stop all activities immediately and clear the area.
- Stop all engines and mechanical and electrical equipment.
- Call MISSDIG (1-800-482-7171) immediately.

4.2.3 Lifting Heavy Objects

To prevent back injury resulting from lifting heavy objects:

- Bend your knees
- Lift with your legs not your back
- Keep your feet centered under you
- Keep the load close to your body

4.2.4 Unstable Footing, Physical Obstacles and Falling Objects

Inspect the work areas carefully before entering and make sure of safe footing. Use caution when navigating physical obstacles, and beware of falling objects.

4.2.5 Overhead Utility Lines

Extreme care must be taken to avoid overhead utility lines with equipment brought onsite.

If an overhead utility line is encountered or damaged during the work:

- Stop all activities immediately and clear the area.
- Stop all engines and mechanical and electrical equipment
- Call US ALERT (1-800-642-2444) immediately.

5.0 ONSITE SAFETY EQUIPMENT

The following subsections describe personal and general safety equipment that will be required onsite.

5.1 PERSONAL SAFETY EQUIPMENT

The following personal protective equipment (PPE) will be required at all times:

- Hard Hat
- Steel toed shoes
- Gloves (vinyl and nitrile)
- Safety glasses or goggles

5.2 GENERAL SAFETY EQUIPMENT

The following items must be available and easily accessible for use:

- First aid kit
- Fire extinguisher (foam, dry chemical, or carbon dioxide)
- Eye wash

6.0 TRAINING

All personnel who may be exposed to onsite contaminants must provide documentation of the following:

- Current training that meets the requirements of 29 CFR 1910.120 to include:
  - 40 hours of classroom instruction/hands-on training
  - Three days of field experience under the supervision of an experienced supervisor
  - Eight hours of annual classroom refresher training, as appropriate
- Eight hours of supervisory training as specified in 29 CFR 1910.120 if a person is a designated supervisor.

Project-specific training and information will be provided either before traveling to the site or at the site before entry into contaminated areas onsite. The information and training will be documented, and will include the following:

- The contents of the health and safety plan
- A discussion of the site specific health and safety hazards, protective measures, and work practices

7.0 MEDICAL SURVEILLANCE

Prior to being assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials, employees must receive a baseline physical exam. The contents of the physical exam is to be determined by the employee's medical consultant. The baseline physical exam should categorize employees as fit-for-duty and able to wear respiratory protection.

In addition to the baseline physical, employees must have a periodic physical exam every 12 months. All personnel working in contaminated or potentially contaminated areas at the site must have current medical monitoring (i.e., exam within 12 months).

8.0 AIR MONITORING/SAMPLING

During field operations, the air will be monitored with an Hnu Photo Ionization Detector (PID). If organic vapors are consistently detected at a concentration of 50 parts per million (ppm) in the breathing zone, an exclusion zone will be set up to conduct work activities. The exclusion zone limit is set based on the lowest PEL of the contaminants listed. (Personal protective equipment associated with the zones are discussed in greater detail in Section 5.0).

9.0 SITE CONTROL MEASURES

The following safe work practices apply for the entire site: (include applicable restrictions/safe work practices)

- Observe the "buddy system," never enter or exit contaminated areas alone
- Maintain line-of-sight of radio communication between personnel in contaminated and non-contaminated areas
- No smoking, eating or drinking except in a designated "clean zone"
- No horse play
- No matches or lighters in contaminated areas

A site map is attached as Figure 1.

10.0 DECONTAMINATION PLAN

Decontamination involves the orderly controlled removal of contaminants. All personnel and equipment must be decontaminated in the Contamination Reduction Zone. The following are specific procedures for decontamination on this site

Level D: Remove outer garments (i.e., coveralls), remove and discard gloves, wash hands, and face in the offices prior to leaving the site

11.0 WASTE HANDLING AND DISPOSAL

The waste handling procedures discussed in the work plan will be followed. Waste generated by implementation of this health and safety program may include spent protective clothing, such as Tyvek™ suits or gloves, and wash rinse solutions. Protective clothing will be collected in a lined container or DOT drum. Liquid wastes will be collected and pumped or poured into DOT approved drums with equipment decontamination rinsate.

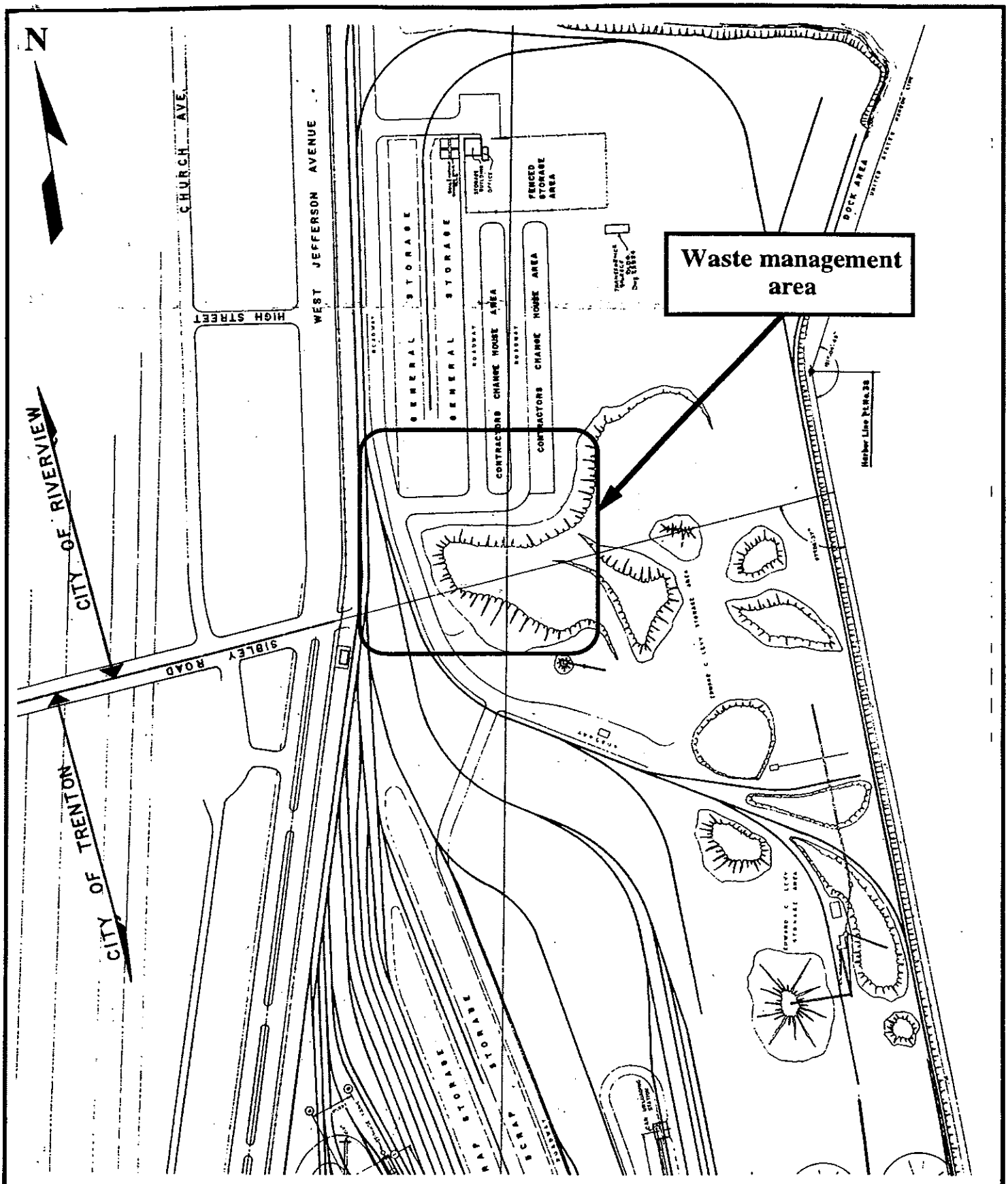

Figure 1
Site diagram

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SITE **Former McLouth Steel Company**
Trenton, Michigan

Project No. 13-97153.00 | October 25, 1996

12.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

12.1 PERSONAL INJURY

In case of a minor personal injury, general first aid procedures will apply. A first aid kit will be available at the site in a designated location or in company vehicles. All injuries or accidents will be reported to the site safety officer immediately.

More serious injuries may require assistance from paramedics. The project manager, site safety officer, or another designated person will contact the appropriate emergency personnel by dialing 911.

12.2 EYE AND SKIN EXPOSURE TO CHEMICALS

These chemicals and substances are irritants to eyes and skin. In case of exposure:

- Remove contaminated clothing and shoes.
- Flush affected areas with plenty of water.
- IF IN EYE, hold eyelids open and flush with plenty of water.
- If irritation or discomfort continues, call for medical aid immediately.

12.3 INTERNAL EXPOSURE TO CHEMICALS

Chemicals can be harmful if swallowed. In case of exposure:

- Call for medical aid.
- Get immediate medical attention.

12.4 INHALATION EXPOSURE TO CHEMICALS

Inhalation of these chemicals can cause upper respiratory problems, tight chest, muscle aches, headache, nausea, and eye, nose, and throat irritation. In case of exposure:

- Move victim to fresh air.
- If discomfort continues, call for medical aid immediately.
- If breathing has stopped, give artificial respiration.
- If breathing is difficult, give oxygen.

12.5 FIRE HAZARD

In case of fire, leave the area and call fire department immediately.

12.6 EMERGENCY CONTACTS

Emergency contacts will be made, as necessary, from the list in this section:

Hospital

Name: Oakwood Hospital Seaway Center
Address: 5450 Fort Street, Trenton, Michigan
Phone: (313) 671-3800

Ambulance: Call 911 or (313) 671-3883

Fire Dept. Call 911

Police Dept. Call 911 or (313) 256-9636

See Figure 2 for locations of emergency facilities.

Other Telephone Numbers

US ALERT: 1-800-642-2444

National Response Center: 1-800-424-8802

13.0 SPILL CONTAINMENT PROGRAM

The following spill containment program applies for activities at the site:

- All drums and containers used during the cleanup will meet DOT requirements for the wastes they will contain. Drums will be inspected and integrity assured before they are used and moved. Only drums found to be sound will be used. Drum and container movement will be minimized to reduce the potential for spills.
- Where spills may occur, adequate quantities of spill containment materials (absorbent, pillows, etc.) will be stationed in the immediate area.

This plan prepared by : Susan J. Boddy
Staff Geologist

This plan reviewed by : Robert A. Ferree, CPG
Senior Geologist and Supervisor of Geosciences

Reviewed and accepted by : _____ (Name) _____ (Date)

Reviewed and accepted by : _____ _____

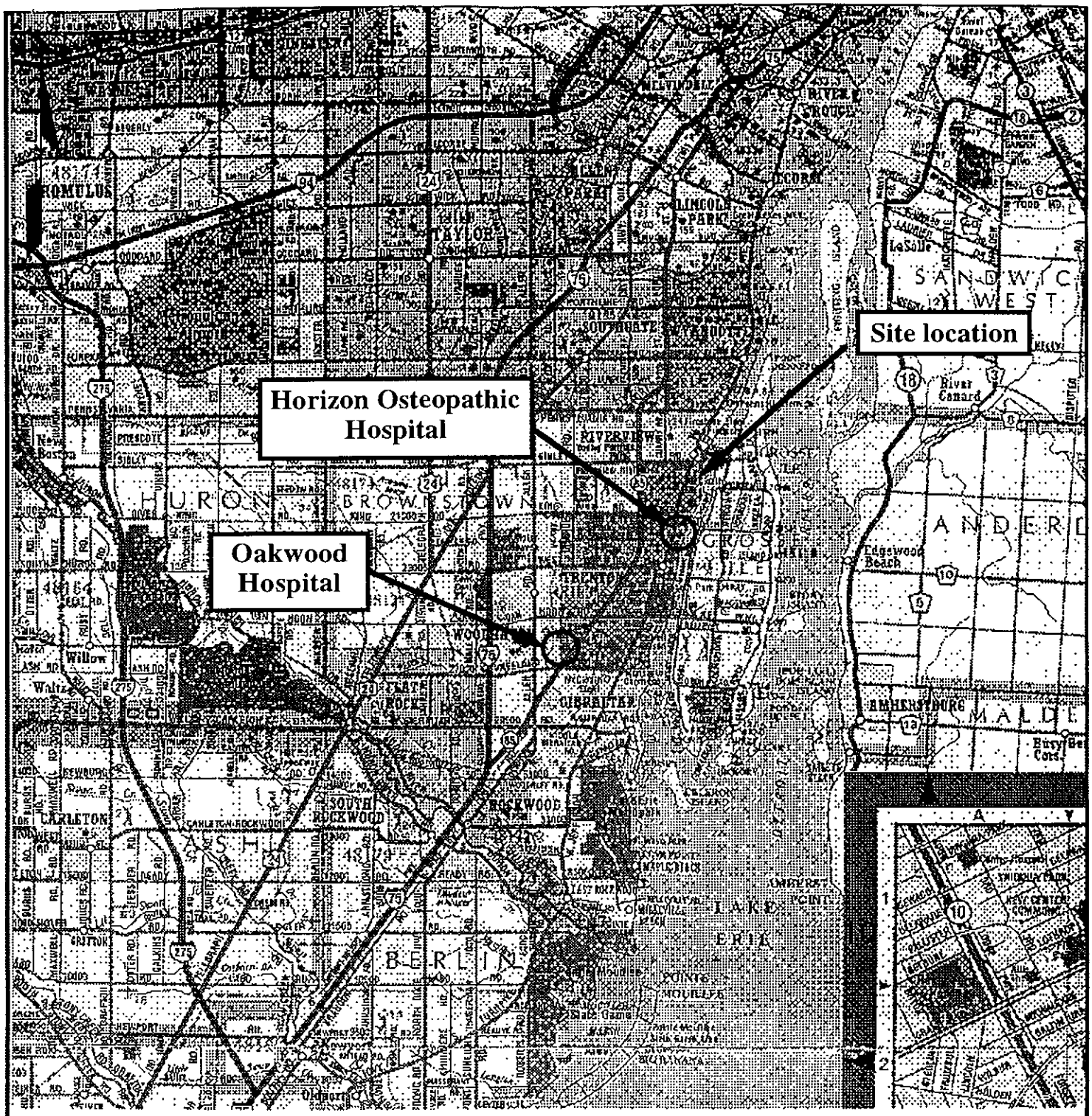

Figure 2
Location of nearest emergency centers

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SITE: **Former McLouth Steel Plant**
Trenton, Michigan

Project No. 13-97153.00 | October 25, 1996

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EMERGENCY INFORMATION

IN CASE OF AN EMERGENCY, USE THIS SHEET

Emergency Phone No.:	911
	or
	(313) 671-3883
Site Address:	1491 W. Jefferson Avenue Trenton, Michigan
Nearest Intersection:	Jefferson Avenue and Sibley Road

APPENDIX B

ANALYTICAL RESULTS OF FILL MATERIAL SAMPLES

Clayton
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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Barium (mg/kg)	LOD (mg/kg)
001a	A1 (SURFACE)	190	1
002a	A1 (2')	150	1
003a	A2 (SURFACE)	140	1
004a	A3 (SURFACE	120	1
005a	A3 (1')	110	1
006a	A4 (SURFACE)	54	1
007a	B1 (SURFACE)	82	1
008a	B1 (2')	71	1
009a	B1 (2') DUPLICATE	81	1
010a	B2 (SURFACE)	35	1
011a	B2 (2')	83	1
012a	B3 (SURFACE)	49	1
013a	B3 (2')	24	1
014a	B4 (SUFACE)	54	1
015a	B5 (SURFACE)	37	1
016a	B5 (2')	37	1
017a	C1 (SURFACE)	26	1
018a	C1 (SURFACE) DUPLICATE	55	1
021a	C2 (SURFACE)	34	1
022a	C2 (2')	51	1
023a	C3 (SURFACE)	65	1
024a	F4 (2')	76	1
025a	C4 (SUFACE)	58	1
026a	C4 (2')	40	1
027a	C5 (SURFACE)	27	1
028a	D1 (SURFACE)	70	1
029a	D1 (2')	50	1
030a	D2 (SUFACE)	26	1
031a	D1 (2') DUPLICATE	44	1
032a	D3 (2')	32	1
033a	D4 (SURFACE)	42	1
034a	D4 (2')	29	1

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Barium (mg/kg)	LOD (mg/kg)
035a	D5 (2')	18	1
036a	D6 (SURFACE)	42	1
037a	D6 (2')	26	1
038a	D6 (SURFACE) DUPLICATE	42	1
041a	E1 (2')	100	1
042a	E2 (SURFACE)	110	1
043a	E2 (2')	89	1
044a	E3 (2')	52	1
045a	E4 (SURFACE)	63	1
046a	E4 (2')	86	1
047a	F2 (SURFACE)	61	1
048a	F2 (2')	86	1
049a	F2 (2') DUPLICATE	930	1
050a	F3 (SURFACE)	47	1
051a	F4 (SURFACE)	50	1
052a	A2 (2')	82	1
053a	A4 (2')	44	1
054a	B4 (2')	90	1
055a	C1 (2')	63	1
056a	C3 (2')	61	1
057a	C5 (2')	32	1
058a	D2 (1')	210	1
059a	D3 (SURFACE)	71	1
060a	D5 (SURFACE)	56	1
061a	E1 (SURFACE)	77	1
062a	E3 (SURFACE)	73	1
063a	F3 (2')	57	1
064a	BGDA (SURFACE)	270	1
065a	BGDA (2')	110	1
066a	BGDB (SURFACE)	82	1
067a	BGDB (2')	36	1
068a	BGDB (SURFACE) DUPLICATE	92	1

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Barium (mg/kg)	LOD (mg/kg)
071a	BGDC (SURFACE)	50	1
072a	BGDC (2')	110	1
073a	BGDD (SURFACE)	68	1
074a	BGDD (2')	61	1
075a	LAB BLANK	<1	1

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6020	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Cadmium (mg/kg)	LOD (mg/kg)
001a	A1 (SURFACE)	5.4	0.05
002a	A1 (2')	<0.05	0.05
003a	A2 (SURFACE)	12	0.05
004a	A3 (SURFACE	3.2	0.05
005a	A3 (1')	0.46	0.05
006a	A4 (SURFACE)	5.2	0.05
007a	B1 (SURFACE)	3.4	0.05
008a	B1 (2')	<0.05	0.05
009a	B1 (2') DUPLICATE	<0.05	0.05
010a	B2 (SURFACE)	30	0.05
011a	B2 (2')	1.7	0.05
012a	B3 (SURFACE)	22	0.05
013a	B3 (2')	<0.05	0.05
014a	B4 (SUFACE)	3.9	0.05
015a	B5 (SURFACE)	<0.05	0.05
016a	B5 (2')	<0.05	0.05
017a	C1 (SURFACE)	0.34	0.05
018a	C1 (SURFACE) DUPLICATE	0.52	0.05
021a	C2 (SURFACE)	2.6	0.05
022a	C2 (2')	<0.05	0.05
023a	C3 (SURFACE)	0.4	0.05
024a	F4 (2')	<0.05	0.05
025a	C4 (SUFACE)	1.4	0.05
026a	C4 (2')	<0.05	0.05
027a	C5 (SURFACE)	1.1	0.05
028a	D1 (SURFACE)	3	0.05
029a	D1 (2')	0.29	0.05
030a	D2 (SUFACE)	7.2	0.05
031a	D1 (2') DUPLICATE	0.4	0.05
032a	D3 (2')	0.13	0.05
033a	D4 (SURFACE)	4	0.05
034a	D4 (2')	0.23	0.05

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6020	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Cadmium (mg/kg)	LOD (mg/kg)
035a	D5 (2')	0.1	0.05
036a	D6 (SURFACE)	12	0.05
037a	D6 (2')	0.38	0.05
038a	D6 (SURFACE) DUPLICATE	12	0.05
041a	E1 (2')	<0.05	0.05
042a	E2 (SURFACE)	0.22	0.05
043a	E2 (2')	<0.05	0.05
044a	E3 (2')	<0.05	0.05
045a	E4 (SURFACE)	<0.05	0.05
046a	E4 (2')	0.3	0.05
047a	F2 (SURFACE)	4.7	0.05
048a	F2 (2')	<0.05	0.05
049a	F2 (2') DUPLICATE	3.5	0.05
050a	F3 (SURFACE)	3.5	0.05
051a	F4 (SURFACE)	1.9	0.05
052a	A2 (2')	0.56	0.05
053a	A4 (2')	6.6	0.05
054a	B4 (2')	1.1	0.05
055a	C1 (2')	0.78	0.05
056a	C3 (2')	0.13	0.05
057a	C5 (2')	1.5	0.05
058a	D2 (1')	2.4	0.05
059a	D3 (SURFACE)	4.1	0.05
060a	D5 (SURFACE)	2.6	0.05
061a	E1 (SURFACE)	11	0.05
062a	E3 (SURFACE)	3.6	0.05
063a	F3 (2')	0.55	0.05
064a	BGDA (SURFACE)	3.6	0.05
065a	BGDA (2')	0.33	0.05
066a	BGDB (SURFACE)	1.3	0.05
067a	BGDB (2')	0.77	0.05
068a	BGDB (SURFACE) DUPLICATE	1.7	0.05

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6020	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Cadmium (mg/kg)	LOD (mg/kg)
071a	BGDC (SURFACE)	0.78	0.05
072a	BGDC (2')	0.4	0.05
073a	BGDD (SURFACE)	1	0.05
074a	BGDD (2')	0.38	0.05
075a	LAB BLANK	<0.05	0.05

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	Cw	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Chromium (mg/kg)	LOD (mg/kg)
001a	A1 (SURFACE)	480	130
002a	A1 (2')	210	130
003a	A2 (SURFACE)	340	130
004a	A3 (SURFACE	540	130
005a	A3 (1')	480	130
006a	A4 (SURFACE)	620	130
007a	B1 (SURFACE)	600	130
008a	B1 (2')	950	130
009a	B1 (2') DUPLICATE	1200	130
010a	B2 (SURFACE)	640	130
011a	B2 (2')	600	130
012a	B3 (SURFACE)	270	130
013a	B3 (2')	760	130
014a	B4 (SUFACE)	540	130
015a	B5 (SURFACE)	420	130
016a	B5 (2')	1300	130
017a	C1 (SURFACE)	460	130
018a	C1 (SURFACE) DUPLICATE	820	130
021a	C2 (SURFACE)	650	130
022a	C2 (2')	810	130
023a	C3 (SURFACE)	410	130
024a	F4 (2')	380	130
025a	C4 (SUFACE)	470	130
026a	C4 (2')	960	130
027a	C5 (SURFACE)	380	130
028a	D1 (SURFACE)	510	130
029a	D1 (2')	690	130
030a	D2 (SUFACE)	410	130
031a	D1 (2') DUPLICATE	550	130
032a	D3 (2')	680	130
033a	D4 (SURFACE)	280	130
034a	D4 (2')	820	130

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Chromium (mg/kg)	LOD (mg/kg)
035a	D5 (2')	870	130
036a	D6 (SURFACE)	180	130
037a	D6 (2')	680	130
038a	D6 (SURFACE) DUPLICATE	<130	130
041a	E1 (2')	660	50
042a	E2 (SURFACE)	350	50
043a	E2 (2')	1500	50
044a	E3 (2')	910	50
045a	E4 (SURFACE)	490	50
046a	E4 (2')	1000	50
047a	F2 (SURFACE)	490	50
048a	F2 (2')	630	50
049a	F2 (2') DUPLICATE	620	50
050a	F3 (SURFACE)	350	50
051a	F4 (SURFACE)	440	50
052a	A2 (2')	1400	50
053a	A4 (2')	2600	50
054a	B4 (2')	960	50
055a	C1 (2')	760	50
056a	C3 (2')	1100	50
057a	C5 (2')	1500	50
058a	D2 (1')	270	50
059a	D3 (SURFACE)	1200	50
060a	D5 (SURFACE)	470	50
061a	E1 (SURFACE)	770	50
062a	E3 (SURFACE)	440	50
063a	F3 (2')	220	50
064a	BGDA (SURFACE)	480	50
065a	BGDA (2')	690	50
066a	BGDB (SURFACE)	650	50
067a	BGDB (2')	430	50
068a	BGDB (SURFACE) DUPLICATE	420	50

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Chromium (mg/kg)	LOD (mg/kg)
071a	BGDC (SURFACE)	330	50
072a	BGDC (2')	690	50
073a	BGDD (SURFACE)	360	50
074a	BGDD (2')	930	50
075a	LAB BLANK	<2.5	2.5

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

Clayton
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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 7196	Date Received:	11/08/96
Analyst:	CC	Date Analyzed:	11/14/96

Lab No.	Sample Identification	Hexavalent chromium (mg/kg)	LOD (mg/kg)
052a	A2 (2')	<0.1	0.1
053a	A4 (2')	<0.1	0.1
054a	B4 (2')	<0.1	0.1
055a	C1 (2')	<0.1	0.1
056a	C3 (2')	<0.1	0.1
057a	C5 (2')	0.1	0.1
058a	D2 (1')	<0.1	0.1
059a	D3 (SURFACE)	<0.1	0.1
060a	D5 (SURFACE)	<0.1	0.1
061a	E1 (SURFACE)	<0.1	0.1
062a	E3 (SURFACE)	<0.1	0.1
063a	F3 (2')	<0.1	0.1
064a	BGDA (SURFACE)	<0.1	0.1
065a	BGDA (2')	<0.1	0.1
066a	BGDA (SURFACE)	<0.1	0.1
067a	BGDA (2')	<0.1	0.1
068a	BGDA (SURFACE) DUPLICATE	<0.1	0.1
071a	BGDC (SURFACE)	<0.1	0.1
072a	BGDC (2')	<0.1	0.1
073a	BGDC (SURFACE)	<0.1	0.1
074a	BGDD (2')	<0.1	0.1

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Lead (mg/kg)	LOD (mg/kg)
001a	A1 (SURFACE)	884	50
002a	A1 (2')	739	50
003a	A2 (SURFACE)	7400	50
004a	A3 (SURFACE)	<50	50
005a	A3 (1')	<50	50
006a	A4 (SURFACE)	620	50
007a	B1 (SURFACE)	860	50
008a	B1 (2')	<50	50
009a	B1 (2') DUPLICATE	<50	50
010a	B2 (SURFACE)	7200	50
011a	B2 (2')	7200	50
012a	B3 (SURFACE)	330	50
013a	B3 (2')	<50	50
014a	B4 (SUFACE)	880	50
015a	B5 (SURFACE)	<50	50
016a	B5 (2')	<50	50
017a	C1 (SURFACE)	120	50
018a	C1 (SURFACE) DUPLICATE	180	50
021a	C2 (SURFACE)	1300	50
022a	C2 (2')	130	50
023a	C3 (SURFACE)	220	50
024a	F4 (2')	<50	50
025a	C4 (SUFACE)	320	50
026a	C4 (2')	<50	50
027a	C5 (SURFACE)	430	50
028a	D1 (SURFACE)	1100	50
029a	D1 (2')	<50	50
030a	D2 (SUFACE)	1400	50
031a	D1 (2') DUPLICATE	<50	50
032a	D3 (2')	<50	50
033a	D4 (SURFACE)	560	50
034a	D4 (2')	<50	50

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Lead (mg/kg)	LOD (mg/kg)
035a	D5 (2')	<50	50
036a	D6 (SURFACE)	1700	50
037a	D6 (2')	<50	50
038a	D6 (SURFACE) DUPLICATE	1800	50
041a	E1 (2')	<20	20
042a	E2 (SURFACE)	440	20
043a	E2 (2')	95	20
044a	E3 (2')	94	20
045a	E4 (SURFACE)	690	20
046a	E4 (2')	<20	20
047a	F2 (SURFACE)	780	20
048a	F2 (2')	210	20
049a	F2 (2') DUPLICATE	430	20
050a	F3 (SURFACE)	380	20
051a	F4 (SURFACE)	1100	20
052a	A2 (2')	<20	20
053a	A4 (2')	110	20
054a	B4 (2')	150	20
055a	C1 (2')	110	20
056a	C3 (2')	<20	20
057a	C5 (2')	<20	20
058a	D2 (1')	230	20
059a	D3 (SURFACE)	510	20
060a	D5 (SURFACE)	620	20
061a	E1 (SURFACE)	2900	20
062a	E3 (SURFACE)	630	20
063a	F3 (2')	<20	20
064a	BGDA (SURFACE)	450	20
065a	BGDA (2')	<20	20
066a	BGDB (SURFACE)	130	20
067a	BGDB (2')	55	20
068a	BGDB (SURFACE) DUPLICATE	260	20

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 6010	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/13/96

Lab No.	Sample Identification	Lead (mg/kg)	LOD (mg/kg)
071a	BGDC (SURFACE)	170	20
072a	BGDC (2')	100	20
073a	BGDD (SURFACE)	240	20
074a	BGDD (2')	<20	20
075a	LAB BLANK	<1	1

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 9045	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	pH
001a	A1 (SURFACE)	8.8
002a	A1 (2')	11.1
003a	A2 (SURFACE)	8.5
004a	A3 (SURFACE	8.4
005a	A3 (1')	10.8
006a	A4 (SURFACE)	9.2
007a	B1 (SURFACE)	7.9
008a	B1 (2')	12.0
009a	B1 (2') DUPLICATE	12.3
010a	B2 (SURFACE)	8.6
011a	B2 (2')	11.9
012a	B3 (SURFACE)	9.0
013a	B3 (2')	12.4
014a	B4 (SUFACE)	8.8
015a	B5 (SURFACE)	11.1
016a	B5 (2')	12.3
017a	C1 (SURFACE)	8.9
018a	C1 (SURFACE) DUPLICATE	8.8
021a	C2 (SURFACE)	8.4
022a	C2 (2')	11.6
023a	C3 (SURFACE)	9.2
024a	F4 (2')	11.8
025a	C4 (SUFACE)	9.5
026a	C4 (2')	12.3
027a	C5 (SURFACE)	8.9
028a	D1 (SURFACE)	8.8
029a	D1 (2')	12.2
030a	D2 (SUFACE)	9.2
031a	D1 (2') DUPLICATE	12.4
032a	D3 (2')	12.4
033a	D4 (SURFACE)	9.1
034a	D4 (2')	12.3

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for
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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 9045	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	pH
035a	D5 (2')	12.3
036a	D6 (SURFACE)	8.9
037a	D6 (2')	12.3
038a	D6 (SURFACE) DUPLICATE	8.8
041a	E1 (2')	12.4
042a	E2 (SURFACE)	9.2
043a	E2 (2')	12.0
044a	E3 (2')	12.4
045a	E4 (SURFACE)	9.0
046a	E4 (2')	12.1
047a	F2 (SURFACE)	9.4
048a	F2 (2')	11.2
049a	F2 (2') DUPLICATE	11.4
050a	F3 (SURFACE)	9.1
051a	F4 (SURFACE)	9.0
052a	A2 (2')	11.9
053a	A4 (2')	12.2
054a	B4 (2')	11.7
055a	C1 (2')	12.3
056a	C3 (2')	12.4
057a	C5 (2')	12.4
058a	D2 (1')	11.0
059a	D3 (SURFACE)	10.1
060a	D5 (SURFACE)	8.6
061a	E1 (SURFACE)	8.5
062a	E3 (SURFACE)	9.6
063a	F3 (2')	11.5
064a	BGDA (SURFACE)	8.6
065a	BGDA (2')	11.4
066a	BGDB (SURFACE)	8.8
067a	BGDB (2')	11.5
068a	BGDB (SURFACE) DUPLICATE	8.9

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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Soil	Date Sampled:	11/06/96
Analytical Method:	EPA 9045	Date Received:	11/08/96
Analyst:	CR	Date Analyzed:	11/13/96

Lab No.	Sample Identification	pH
071a	BGDC (SURFACE)	8.5
072a	BGDC (2')	11.2
073a	BGDD (SURFACE)	8.2
074a	BGDD (2')	11.3

General Notes:
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--: Information not available or not applicable

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Analytical Results
for
DSC LTD.
Clayton Project No. 44091.00/13-97153.00

Sample Identification:	BGD1 (SURFACE)	Date Sampled:	11/06/96
Lab Number:	001a	Date Received:	11/15/96
Sample Type:	Soil/Sludge	Moisture (%):	6
Analyst:	DH		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	100	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Cadmium	<0.5	0.5	EPA 3050A	11/19/96	EPA 6020A	12/04/9
Chromium	250	25	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Lead	120	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9

Sample Identification:	BGD1 (2')	Date Sampled:	11/07/96
Lab Number:	002a	Date Received:	11/15/96
Sample Type:	Soil/Sludge	Moisture (%):	12
Analyst:	DH		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	17	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Cadmium	<0.5	0.5	EPA 3050A	11/19/96	EPA 6020A	12/04/9
Chromium	530	25	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Lead	13	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9

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Analytical Results
for
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Clayton Project No. 44091.00/13-97153.00

Sample Identification:	BGD2 (SURFACE)	Date Sampled:	11/07/96
Lab Number:	003a	Date Received:	11/15/96
Sample Type:	Soil/Sludge	Moisture (%):	25
Analyst:	DH		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	140	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Cadmium	<0.5	0.5	EPA 3050A	11/19/96	EPA 6020A	12/04/9
Chromium	290	25	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Lead	270	20	EPA 3050A	11/19/96	EPA 6010A	11/21/9

Sample Identification:	BGD2 (2')	Date Sampled:	11/07/96
Lab Number:	004a	Date Received:	11/15/96
Sample Type:	Soil/Sludge	Moisture (%):	22
Analyst:	DH		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	34	10	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Cadmium	<0.5	0.5	EPA 3050A	11/19/96	EPA 6020A	12/04/9
Chromium	540	25	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Lead	43	20	EPA 3050A	11/19/96	EPA 6010A	11/21/9

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Clayton Project No. 44091.00/13-97153.00

Sample Identification:	LAB BLANK	Date Sampled:	--
Lab Number:	005a	Date Received:	11/15/96
Sample Type:	Soil/Sludge	Moisture (%):	0
Analyst:	DH		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	<1	1	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Cadmium	<0.05	0.05	EPA 3050A	11/19/96	EPA 6020A	12/04/9
Chromium	<2.5	2.5	EPA 3050A	11/19/96	EPA 6010A	11/21/9
Lead	<1	1	EPA 3050A	11/19/96	EPA 6010A	11/21/9

General Notes
--: Information not available or not applicable.
The results are reported on a dry weight basis.

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Analytical Results
for
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Clayton Project No. 44091.00/13-97153.00

Sample Identification:	BGD1 (SURFACE)	Date Sampled:	11/06/96
Lab Number:	001	Date Received:	11/15/96
Sample Type:	Soil		
Analyst:	BB		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.1	0.1	EPA 7196	11/27/96

Sample Identification:	BGD1 (SURFACE)	Date Sampled:	11/06/96
Lab Number:	001	Date Received:	11/15/96
Sample Type:	Soil		
Analyst:	MR		

Analyte	Concentration	LOD	Analytical Method	Date Analyzed
pH	9.3	--	EPA 9045	11/22/96

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Clayton Project No. 44091.00/13-97153.00

Sample Identification: BGD1 (2')
Lab Number: 002
Sample Type: Soil
Analyst: BB

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.1	0.1	EPA 7196	11/27/96

Sample Identification: BGD1 (2')
Lab Number: 002
Sample Type: Soil
Analyst: MR

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration	LOD	Analytical Method	Date Analyzed
pH	12.3	--	EPA 9045	11/22/96

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Analytical Results
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Sample Identification: BGD2 (SURFACE)
Lab Number: 003
Sample Type: Soil
Analyst: BB

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.1	0.1	EPA 7196	11/27/96

Sample Identification: BGD2 (SURFACE)
Lab Number: 003
Sample Type: Soil
Analyst: MR

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration	LOD	Analytical Method	Date Analyzed
pH	8.9	--	EPA 9045	11/22/96

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Analytical Results
for
DSC LTD.
Clayton Project No. 44091.00/13-97153.00

Sample Identification: BGD2 (2')
Lab Number: 004
Sample Type: Soil
Analyst: BB

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.1	0.1	EPA 7196	11/27/96

Sample Identification: BGD2 (2')
Lab Number: 004
Sample Type: Soil
Analyst: MR

Date Sampled: 11/07/96
Date Received: 11/15/96

Analyte	Concentration	LOD	Analytical Method	Date Analyzed
pH	12.3	--	EPA 9045	11/22/96

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Sample Identification:	LAB BLANK	Date Sampled:	--
Lab Number:	005	Date Received:	--
Sample Type:	Soil		
Analyst:	MR		

Analyte	Concentration	LOD	Analytical Method	Date Analyzed
pH	7.0	--	EPA 9045	11/22/96

General Notes:
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--: Information not available or not applicable

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Analytical Results
for
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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Water	Date Sampled:	11/06/96
Analytical Method:	EPA 200.8	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/14/96

Lab No.	Sample Identification	Barium (mg/L)	Barium LOD (mg/L)
076a	EB-1	<0.2	0.2
077a	EB-2	<0.2	0.2
078a	LAB BLANK	<0.2	0.2

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Analytical Results
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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Water	Date Sampled:	11/06/96
Analytical Method:	EPA 200.8	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/14/96

Lab No.	Sample Identification	Cadmium (mg/L)	Cadmium LOD (mg/L)
076a	EB-1	0.007	0.0005
077a	EB-2	0.006	0.0005
078a	LAB BLANK	0.006	0.0005

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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Water	Date Sampled:	11/06/96
Analytical Method:	EPA 200.8	Date Received:	11/08/96
Analyst:	CW	Date Analyzed:	11/14/96

Lab No.	Sample Identification	Chromium (mg/L)	LOD (mg/L)
076a	EB-1	<0.05	0.05
077a	EB-2	<0.05	0.05
078a	LAB BLANK	<0.05	0.05

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Analytical Results
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Clayton Project No. 43861.00/13-97153.00

Sample Type:	Water	Date Sampled:	11/06/96
Analytical Method:	EPA 200.8	Date Received:	11/08/96
Analyst:	cw	Date Analyzed:	11/14/96

Lab No.	Sample Identification	Lead (mg/L)	LOD (mg/L)
076a	EB-1	<0.003	0.003
077a	EB-2	0.005	0.003
078a	LAB BLANK	<0.003	0.003

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Analytical Results
for
DSC LTD.
Clayton Project No. 43861.00/13-97153.00

Sample Type:	Water	Date Sampled:	11/06/96
Analytical Method:	EPA 150.1	Date Received:	11/08/96
Analyst:	LH	Date Analyzed:	11/11/96

Lab No.	Sample Identification	pH
076a	EB-1	1.8
077a	EB-2	1.8

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Table 1
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification: A5 (2')
Lab Number: 001a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/07/97
Moisture (%): 29

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	0.52	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Chromium	630	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification: B5 (4')
Lab Number: 002a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/9
Date Received: 02/07/9
Moisture (%): 9

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	<0.05	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/
Chromium	1600	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/

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Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification: B5 (4') MS
Lab Number: 003a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/07/97
Moisture (%): 8

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	<0.05	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Chromium	1500	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification: B5 (4') MSD
Lab Number: 004a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/07/97
Moisture (%): 7

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	0.06	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Chromium	1500	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	C6 SURFACE	Date Sampled:	02/06/9
Lab Number:	005a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	23
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	3.3	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/
Chromium	700	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/

Sample Identification:	C6 (2')	Date Sampled:	02/06/9
Lab Number:	006a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	9
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	1.5	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/
Chromium	800	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification: C5 (4')
Lab Number: 007a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/06/97
Date Received: 02/07/97
Moisture (%): 6

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	<10	10	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Chromium	7400	27	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification: A4 SOUTH (2')
Lab Number: 008a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/07/97
Moisture (%): 13

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	2.4	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Chromium	460	2.5	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification: B6 (2')
Lab Number: 009a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/06/97
Date Received: 02/07/97
Moisture (%): 15

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Chromium	740	2.5	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Sample Identification: A2 SOUTH (2')
Lab Number: 010a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/07/97
Moisture (%): 17

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Chromium	500	2.5	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	E2 (4')	Date Sampled:	02/06/9
Lab Number:	011a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	11
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Chromium	580	2.5	EPA 3050A 02/13/97	EPA 6010A 02/19/

Sample Identification:	B1 EAST SURFACE	Date Sampled:	02/06/9
Lab Number:	012a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	22
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Lead	550	1	EPA 3050A 02/13/97	EPA 6010A 02/19/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	G4 SURFACE	Date Sampled:	02/06/97
Lab Number:	013a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	19
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Lead	490	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification:	A1 EAST SURFACE	Date Sampled:	02/05/97
Lab Number:	014a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	13
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	<0.05	0.05	EPA 3050A	02/13/97	EPA 6020	02/18/9
Lead	190	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

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Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	A1 SOUTH SURFACE	Date Sampled:	02/05/97
Lab Number:	015a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	20
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	10	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Lead	740	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification:	A2 SOUTH SURFACE	Date Sampled:	02/05/97
Lab Number:	016a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	16
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	<0.05	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	19	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	A5 SURFACE	Date Sampled:	02/05/97
Lab Number:	017a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	22
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	1.7	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Lead	220	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification:	A4 SOUTH SURFACE	Date Sampled:	02/05/97
Lab Number:	018a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	18
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	4.3	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Lead	270	1	EPA 3050A	02/13/97	EPA 6010A	02/18/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	B2 (4')	Date Sampled:	02/05/9
Lab Number:	019a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	7
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	0.06	0.05	EPA 3050A	02/13/97	EPA 7131A	02/20/9
Lead	5	1	EPA 3050A	02/13/97	EPA 6020	02/18/9

Sample Identification:	D7 SURFACE	Date Sampled:	02/06/97
Lab Number:	020a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	17
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	3.1	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	460	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	E1 EAST SURFACE	Date Sampled:	02/06/97
Lab Number:	021a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	21
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	0.61	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	90	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification:	A2 SOUTH SURFACE DUPLICATE	Date Sampled:	02/05/97
Lab Number:	022a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	19
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Cadmium	2	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	270	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification: D2 (4')
Lab Number: 023a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/06/97
Date Received: 02/07/97
Moisture (%): 10

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	52	1	EPA 3050A	02/13/97	EPA 6010A	02/18/9
Cadmium	0.28	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	15	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Sample Identification: F1 (2')
Lab Number: 024a
Sample Type: Soil/Sludge
Analyst: CW

Date Sampled: 02/06/97
Date Received: 02/07/97
Moisture (%): 12

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	140	1	EPA 3050A	02/13/97	EPA 6010A	02/18/9
Cadmium	1	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/9
Lead	160	1	EPA 3050A	02/13/97	EPA 6010A	02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	G2 (2')	Date Sampled:	02/06/9
Lab Number:	025a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	11
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	86	1	EPA 3050A	02/13/97	EPA 6010A	02/18/
Cadmium	0.95	0.05	EPA 3050A	02/13/97	EPA 7131A	02/19/
Lead	270	1	EPA 3050A	02/13/97	EPA 6010A	02/19/

Sample Identification:	F1 SURFACE	Date Sampled:	02/06/9
Lab Number:	026a	Date Received:	02/07/9
Sample Type:	Soil/Sludge	Moisture (%):	14
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date		Analytical Method and Date	
Barium	64	1	EPA 3050A	02/13/97	EPA 6010A	02/18/
Lead	440	1	EPA 3050A	02/13/97	EPA 6010A	02/19/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	G2 SURFACE	Date Sampled:	02/06/97
Lab Number:	027a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	22
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Barium	55	1	EPA 3050A 02/13/97	EPA 6010A 02/18/9
Lead	640	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Sample Identification:	G2 SURFACE DUPLICATE	Date Sampled:	02/06/97
Lab Number:	028a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	26
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Barium	58	1	EPA 3050A 02/13/97	EPA 6010A 02/18/9
Lead	990	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	A1 EAST (2')	Date Sampled:	02/05/97
Lab Number:	029a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	16
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Lead	99	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Sample Identification:	A1 SOUTH (2')	Date Sampled:	02/05/97
Lab Number:	030a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	12
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Lead	270	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 46378.00/13-97153.00

Sample Identification:	D1 EAST SURFACE	Date Sampled:	02/06/97
Lab Number:	031a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	17
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Lead	520	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

Sample Identification:	LAB BLANK	Date Sampled:	--
Lab Number:	032a	Date Received:	02/07/97
Sample Type:	Soil/Sludge	Moisture (%):	0
Analyst:	CW		

Analyte	Concentration (mg/kg)	LOD (mg/kg)	Preparation Method and Date	Analytical Method and Date
Barium	<1	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9
Cadmium	<0.05	0.05	EPA 3050A 02/13/97	EPA 7131A 02/20/9
Chromium	<2.5	2.5	EPA 3050A 02/13/97	EPA 6010A 02/19/9
Lead	<1	1	EPA 3050A 02/13/97	EPA 6010A 02/19/9

General Notes
--: Information not available or not applicable.
The results are reported on a dry weight basis.

APPENDIX C

CLAYTON HYDROGEOLOGICAL ASSESSMENT REPORT

Hydrogeological Investigation
for the Former
Approved Electric Arc Furnace Dust Storage Area
at the
Former McLouth Steel Products Corporation Facility
Trenton, Michigan

Submitted to
DSC Ltd.
Trenton, Michigan

Clayton Project No. 13-97153.00

December 9, 1997

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Hydrogeological Investigation for the Former Approved Electric Arc Furnace Dust Storage Area at the Former McLouth Steel Products Corporation Facility Trenton, Michigan

Submitted to DSC Ltd. Trenton, Michigan

Clayton Project No. 13-97153.00

December 9, 1997

CONTENTS

1.0 INTRODUCTION

Clayton Environmental Consultants, Inc. is pleased to submit its report of a hydrogeologic investigation conducted at the former McLouth Steel Products Corporation Trenton Plant located at 1491 West Jefferson Avenue in Trenton, Michigan. Clayton conducted this investigation in accordance with the approved plan for closure of the Electric Arc Furnace Dust (EAFD) interim status hazardous waste storage pile.

The purpose of the investigation was to evaluate barium, cadmium, chromium, hexavalent chromium, and lead in groundwater at the former emission control dust storage area located at the site.

2.0 SITE BACKGROUND

The former McLouth Steel Products Corporation Trenton, Michigan plant is now owned by DSC Ltd. The plant site is bounded on the west and north by Jefferson Avenue, on the south by King Road, and on the east by the Detroit River. The former interim status EAFD storage area is located on the north end of the property, just north of the east extension of Sibley Road. Figure 1 presents a site location map.

3.0 SUMMARY OF SUBSURFACE INVESTIGATION ACTIVITIES

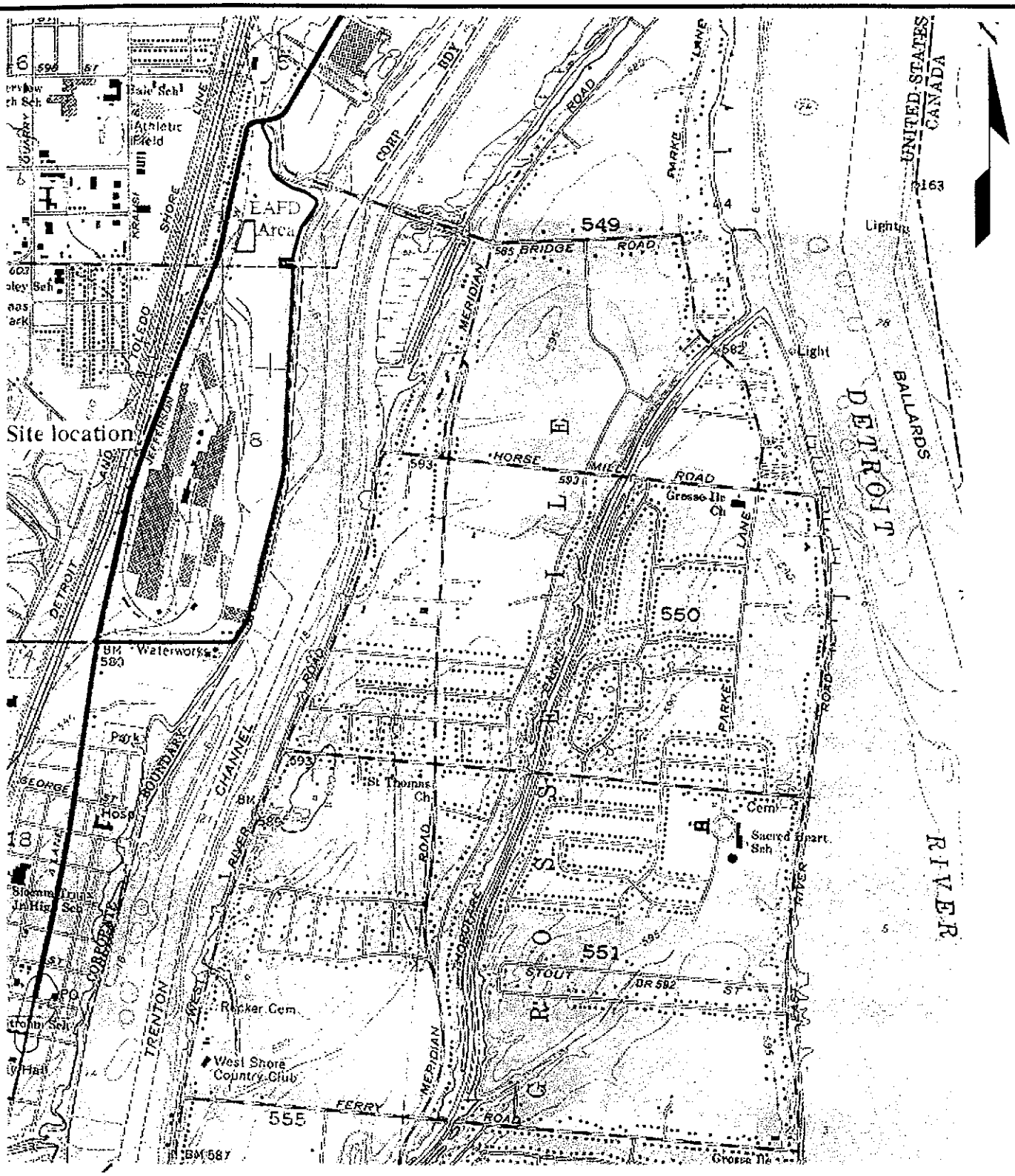
The following is a summary of activities performed as a part of Clayton's hydrogeological investigation:

- Installation of three additional monitoring wells and replacement of one existing monitoring well downgradient of the former EAFD storage area
- Collection of groundwater samples from the five monitoring wells on a quarterly basis
- Measurement of water levels in the five monitoring wells on a quarterly basis

3.1 MONITORING WELL INSTALLATION

On October 30, October 31, November 1, and November 20, 1996, Clayton installed Monitoring Wells MW-2, MW-3, MW-4, and MW-5 (Figure 2). Two monitoring wells existed from a previous hydrogeologic investigation conducted at the property (Monitoring Wells MW-1 and MW-3). Clayton was unable to utilize existing Monitoring Well MW-3 due to a bent casing and metal debris blockage within the monitoring well. A replacement Monitoring Well MW-3 was installed in approximately the same location. Following the drilling of Monitoring Well MW-2 on October 30, 1996, dry conditions were encountered. On November 20, 1996, Clayton permanently abandoned Monitoring Well MW-2 by (1) removing the well from the ground and (2) filling the hole to the surface with bentonite and cement grout. Clayton installed a replacement Monitoring Well MW-2 on November 20, 1996 approximately 20 feet southeast of the former Monitoring Well MW-2 in an accessible area near the access road.

Hollow-stem augers (4-1/4-inch inside diameter) were used to advance the boreholes. Soil samples were extracted from the borings using a 2-foot-long split-spoon at 5-foot deep intervals from ground surface to the final depths of the borings for soil conditions and types. The soil samples collected were not submitted for laboratory analysis.



Portion of 7.5-minute Series Topographic Map
United States Department of the Interior
Geological Survey

Wyandotte, Michigan-Ontario, Canada
Quadrangle
1967
Photorevised in 1981

Approximate Scale
0 feet 2000

Figure 1
Site location

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SITE **Former McLouth Steel Products Corporation Trenton Plant Trenton, Michigan**

Project No. 13-97153.00 | December 9, 1997

Each monitoring well was constructed using a threaded, 2-inch-diameter, polyvinyl chloride (PVC) casing and a 5-foot-long section of 10-slot PVC well screen. The screens had a slot thickness of 0.01 inches. Glues were not used on the casing joints and screen connectors. The well screens were placed at a depth to straddle the top of the water table to allow for seasonal fluctuations in the water table. The monitoring wells were designed to allow (1) groundwater in the water-bearing soil surrounding the screen to seep into the well casing until the static water level (groundwater surface depth) in the well equaled the static water level in surrounding soil, (2) measurement of groundwater surface depth, and (3) collection of groundwater samples at the depth of the screens for laboratory analyses. Clayton developed each monitoring well by bailing at least three times the initial volume of groundwater from the well casing (equal to the cross-sectional area of the riser times the length of the water column in the riser). The monitoring wells were constructed as follows:

1. The annular void between the well screen and the borehole was filled with a noncementing, coarse-grained, silica sand filter pack (from the bottom of the boring to a vertical position of 1 foot above the well screen); this filter pack minimized the concentration of soil particulates in the groundwater sample.

2. A 2-foot-long column of bentonite pellets was placed above the sand to seal the annular void.

3. The remainder of the borehole was filled with a bentonite and cement grout. A water-resistant locking cap was placed on each well casing and an aboveground protective steel cover was installed over the top of the monitoring well.

Clayton examined soil samples from each boring as the drilling contractor (Rau Drilling) extracted soil from each boring; placed the samples in labeled, precleaned glass jars; and stored the sample jars in ice-cooled containers. Clayton prepared a geologic log for each boring based on soil inspection. Clayton visually inspected soil samples from each boring for indications of contamination and screened the samples with a photoionization detector (PID). Soil boring logs including the PID field screening results have been included as Appendix A.

3.2 EQUIPMENT DECONTAMINATION

The drilling contractors and Clayton decontaminated sampling equipment (e.g., split spoons, augers) before collecting soil samples. The sampling equipment was decontaminated in the following order:

1. Washing and scrubbing the equipment with a nonphosphate detergent solution

2. Rinsing the equipment with tap water

3. Rinsing the equipment with deionized water

4. Air-drying the equipment

3.3 GROUNDWATER SAMPLES

On November 8 and 20, 1996, February 5, 1997, May 23, 1997, and August 27, 1997, Clayton collected groundwater samples from each monitoring well (Monitoring Wells MW-1 through MW-5). Groundwater elevations were measured during each sampling

event. On December 9, 1996, Clayton performed an additional measurement of water levels in each of the five monitoring wells.

Clayton collected groundwater samples from the five monitoring wells after (1) measuring the water depth in each well and (2) purging at least three times the initial volume of groundwater in the well. Clayton then collected the sample using a dedicated disposable bailer after sufficient groundwater seeped into the well.

All groundwater samples were analyzed for barium, cadmium, chromium, lead, hexavalent chromium, and measured for pH. All groundwater samples collected for barium, cadmium, chromium, and lead were field filtered using a dedicated 0.45-micron filter into containers preserved with nitric acid. All groundwater samples collected for hexavalent chromium were placed directly into the appropriate container. All groundwater samples collected for pH were measured in the field.

Clayton collected Equipment Blank EB-3 on November 8, 1996, Equipment Blank EB-1 on February 5, 1997, and Equipment Blank EB-1 on August 27, 1997 after (1) rinsing the disposable bailers with deionized water and (2) placing the water in the appropriate containers. An equipment blank was not collected during the May 23, 1997 sampling event. Matrix spike and matrix spike duplicate samples were collected from Monitoring Well MW-3 and a duplicate sample was collected from Monitoring Well MW-4 on November 8, 1996.

3.4 SAMPLE COLLECTION AND PRESERVATION

Groundwater samples were collected in laboratory-grade containers, and preserved and stored following United States Environmental Protection Agency (USEPA) Publication SW-846, *Testing Methods for Evaluating Solid Waste*. Clayton transported the samples in ice-cooled containers to Clayton's analytical laboratory in Novi, Michigan.

For samples intended for barium, cadmium, chromium, hexavalent chromium, and lead analyses, Clayton used sample jars that the supplier (1) washed with detergent, (2) rinsed three times with deionized water, (3) rinsed with acid, (4) rinsed three times with organic-free water, (5) oven dried, (6) rinsed with solvent, and (7) oven dried.

3.5 SURVEYING

On December 9 and 10, 1996, a surveyor (JCK & Associates, Inc.) retained by Clayton surveyed the relative locations of four new and one existing monitoring wells and the top-of-casing elevations (refer to Figure 2). The elevations of the top of the monitoring well casings were measured relative to a benchmark located at King Road and Jefferson Avenue.

3.6 SITE HYDROGEOLOGY

Clayton typically encountered fill materials (e.g., metals debris, bricks, concrete, refuse) from ground surface to a depth of approximately 12 feet below ground surface except at Monitoring Well MW-4 (see below). Clayton also typically encountered a moist, native clayey sand from 12 feet below ground surface to the final depths of the borings. Monitoring Well MW-2 was advanced to a depth of 17 feet below ground surface, Monitoring Wells MW-3 and MW-5 were advanced to a depth of 18 feet below ground surface, and Monitoring Well MW-4 was advanced to a depth of 30 feet below ground surface. Monitoring Well MW-4 was advanced in an elevated area of debris created by activities conducted at the site.

The groundwater depths in each monitoring well were measured using an electric water-level indicator. The depth to groundwater measured in each well was from the surveyed mark on the top of the well casing to the groundwater surface in the well. The water depth was recorded to the nearest 0.01 feet. The elevation of the top of each well casing was measured by the surveyor. Groundwater surface elevations (piezometric head) were computed from the top of casing elevations and the measured water depths. Groundwater moves in accordance with the hydraulic gradient from points of high hydraulic head to points of low hydraulic head. The contour lines on the groundwater surface map connect points of equal head. The movement of groundwater is perpendicular to these equal head contour lines.

The piezometric heads in monitoring wells for each groundwater measurement date (November 20, 1996; December 9, 1996, February 5, 1997, May 23, 1997, and August 27, 1997) have been included in Table 1.

Using the elevations of the monitoring wells and depth to groundwater measurements in each monitoring well from December 9, 1996, Clayton triangulated the piezometric elevation differences between the EAFD monitoring wells and estimated the groundwater flow direction is toward the south-southeast. Groundwater surface elevations and interpolated flow direction for the December 9, 1996 elevations have been included on Figure 2.

4.0 LABORATORY ANALYSIS

Clayton analyzed the groundwater samples for barium, cadmium, chromium, lead, and hexavalent chromium using USEPA 6000- and 7000-series methods.

5.0 ANALYTICAL RESULTS

Tables 2 through 5 summarize groundwater analytical results for metals in samples from the November 8 and 20, 1996, February 5, 1997, May 23, 1997, and August 27, 1997 groundwater sampling events. Detailed analytical reports are included as Appendix B.

Table 1
Piezometric Head in Monitoring Wells

Monitoring Well	Elevation of Top of Monitoring Well Casing (feet)	Depth from Top of Casing to Groundwater Surface (feet)	Elevation of Groundwater Surface (feet)
Groundwater Measurement Date: November 20, 1996			
MW-1	590.88	10.70	580.18
MW-2	593.19	18.33	574.86
MW-3	592.92	17.47	575.45
MW-4	603.02	27.86	575.16
MW-5	591.72	16.46	575.26
Groundwater Measurement Date: December 9, 1996			
MW-1	590.88	11.03	579.85
MW-2	593.19	17.07	576.12
MW-3	592.92	17.82	575.10
MW-4	603.02	28.20	574.82
MW-5	591.72	16.93	574.79
Groundwater Measurement Date: February 5, 1997			
MW-1	590.88	10.63	580.25
MW-2	593.19	16.58	576.61
MW-3	592.92	17.29	575.63
MW-4	603.02	27.88	575.14
MW-5	591.72	16.38	575.34
Groundwater Measurement Date: May 23, 1997			
MW-1	590.88	10.86	580.02
MW-2	593.19	16.99	576.20
MW-3	592.92	16.88	576.04
MW-4	603.02	27.16	575.86
MW-5	591.72	15.78	575.94
Groundwater Measurement Date: August 27, 1997			
MW-1	590.88	10.96	579.92
MW-2	593.19	17.02	576.17
MW-3	592.92	16.95	575.97
MW-4	603.02	27.22	575.80
MW-5	591.72	15.73	575.99

Table 2
Summary of Analytical Results for Metals in Groundwater
Clayton Project No. 13-97153.00
Sampling Dates: November 8 and 20, 1996

	Sample Concentration (mg/L)					
Analyte	Barium	Cadmium	Chromium	Chromium (VI)	Lead	pH
Sample Identification						
MW-1	<0.2	0.015	0.1	<0.05*	0.013	11.27
MW-2	<0.2	<0.0005	0.08	<0.05*	<0.003	11.70
MW-3	0.55	0.013	0.12	<0.05*	0.012	12.52
MW-3 MS	0.61	0.016	0.12	NA	0.013	NA
MW-3 MSD	0.53	0.014	<0.05	NA	0.02	NA
MW-4	0.54	0.017	<0.05	<0.05*	0.026	12.61
MW-4 Duplicate	0.46	0.016	<0.05	NA	0.022	NA
MW-5	<0.2	0.017	0.11	<0.05*	0.011	12.02
EB-3	<0.2	0.015	0.12	NA	0.011	11.40

mg/L = milligrams per liter or parts per million (ppm)
NA = not analyzed or applicable
* Limit of detection was raised due to matrix interference

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Table 4
Summary of Analytical Results for Metals in Groundwater
Clayton Project No. 13-97153.00
Sampling Date: May 23, 1997

	Sample Concentration (mg/L)					
Analyte	Barium	Cadmium	Chromium	Chromium (VI)	Lead	pH
Sample Identification						
MW-1	<0.2	0.0078	<0.05	<0.05	0.004	11.59
MW-2	<0.2	0.011	<0.05	<0.05	0.021	12.32
MW-3	0.5	0.0083	<0.05	<0.05	0.079	12.75
MW-4	0.4	0.0068	<0.05	<0.05	0.073	12.73
MW-5	<0.2	0.0074	<0.05	<0.05	0.085	12.69

mg/L = milligrams per liter or parts per million (ppm)

Table 3
Summary of Analytical Results for Metals in Groundwater
Clayton Project No. 13-97153.00
Sampling Date: February 5, 1997

	Sample Concentration (mg/L)					
Analyte	Barium	Cadmium	Chromium	Chromium (VI)	Lead	pH
Sample Identification						
MW-1	<0.2	<0.0005	<0.05	<0.005	<0.003	11.45
MW-2	0.2	<0.0005	<0.05	<0.05*	<0.003	12.30
MW-3	0.6	<0.0005	<0.05	<0.05*	<0.003	12.75
MW-4	0.4	<0.0005	<0.05	<0.05*	<0.003	12.82
MW-5	0.2	<0.0005	<0.05	<0.05*	<0.003	12.65
EB-1	<0.2	<0.0005	<0.05	<0.005	<0.003	10.73

mg/L = milligrams per liter or parts per million (ppm)
* Limit of detection was raised due to sample matrix

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Table 5
Summary of Analytical Results for Metals in Groundwater
Clayton Project No. 13-97153.00
Sampling Date: August 27, 1997

	Sample Concentration (mg/L)					
Analyte	Barium	Cadmium	Chromium	Chromium (VI)	Lead	pH
Sample Identification						
MW-1	<0.2	<0.0005	<0.05	<0.05*	<0.003	11.74
MW-2	0.2	<0.0005	<0.05	<0.05*	0.023	12.42
MW-3	0.5	<0.0005	<0.05	<0.005	0.007	13.17
MW-4	0.4	<0.0005	<0.05	<0.05*	0.004	13.24
MW-5	0.5	<0.0005	0.15	<0.05*	0.19	13.13
EB-1	<0.2	<0.0005	<0.05	<0.05*	<0.003	NA

mg/L = milligrams per liter or parts per million (ppm)
NA = not analyzed
* Limit of detection was raised due to sample matrix

**Hydrogeological Investigation
for the Former
Approved Electric Arc Furnace Dust Storage Area
at the
Former McLouth Steel Products Corporation
Trenton, Michigan**

**Submitted to
DSC Ltd.
Trenton, Michigan**

Clayton Project No. 13-97153.00

December 9, 1997

Limitations

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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This report reviewed by:

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Detroit Regional Office

APPENDIX A

SOIL BORING LOGS

Boring Log

Clayton ENVIRONMENTAL CONSULTANTS

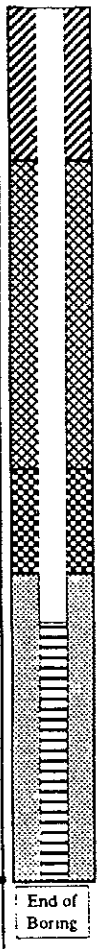
Clayton Boring MW-2

Final depth	17 feet BGS
Page	1 of 1
Boring location	Former McLouth Steel Plant
Client	DSC Ltd.
Project No.	13-97153.00.004
Site	Former McLouth Steel Plant
Clayton geologist	Gary Blinkiewicz
Driller	Rau Drilling
Start date	20 Nov 96
Final date	20 Nov 96
Method	Hollow stem auger
Auger OD	4.25 inches
Sampler	
Elevation Datum	
Ground surface	feet

Monitoring Well	MW-2
TOC elevation	feet
Grout	3.0 feet BGS
interval	9.0 feet BGS
Bentonite plug	2.0 feet thick
Filter pack	11.0 feet BGS
interval	17.0 feet BGS
Screen length	5.0 feet
Slot size	0.10 inches
Screen bottom	17.0 feet BGS
Grout method	
Pack material	sand
Grout material	
Development	purge
Well lock No	

Groundwater	Date 1
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	
	Date 2
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	

ft	R	Soil	N	Soil Type	Color	Soil Moisture	Comment	PID ppm
0								
2								
4								
6								
8								
10								
12								
14	80		18	CLAYEY SAND with pebbles	Black	Moist	No odor	0
			62			Moist		
			9			Moist		
16			7			Moist		
18								
20								
22								
24								
26								
28								
30								



Clayton ENVIRONMENTAL CONSULTANTS

Boring Log

Clayton ENVIRONMENTAL CONSULTANTS

Clayton Boring MW-3

Final depth	18 feet BGS
Page	1 of 1
Boring location	Former McLouth Steel Plant
Client	DSC Ltd.
Project No.	13-97153.00.004
Site	Former McLouth Steel Plant
Clayton geologist	Nick McCullough
Driller	Rau Drilling
Start date	1 Nov 96
Final date	1 Nov 96
Method	Hollow stem auger
Auger OD	4.25 inches
Sampler	
Elevation	
Datum	
Ground surface	feet

Monitoring Well	MW-3
TOC elevation	feet
Grout interval	3.0 feet BGS
	9.0 feet BGS
Bentonite plug	2.0 feet thick
Filter pack interval	11.0 feet BGS
	18.0 feet BGS
Screen length	5.0 feet
Slot size	0.10 inches
Screen bottom	18.0 feet BGS
Grout method	
Pack material	sand
Grout material	
Development	purge
Well lock No	

Groundwater	Date 1
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	
	Date 2
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	

ft	R	Soil	N	Soil Type	Color	Soil Moisture	Comment	PID ppm
0								
2								
4								
	50		30	SAND fill with pieces of cement	Dark Brown	Dry	No odor	
			25			Dry		
6			25			Dry		0
			25			Dry		
8								
10	50		36	CLAYEY SILT fill with pieces of concrete and rock	Brown	Dry	No odor	
			18			Dry		
			50			Dry		0
12			4			Dry		
14								
	10		12	SAND, medium- to coarse-grained	Black	Moist	No odor	
			12			Moist		
16			13			Moist		0
			13			Moist		
18								
20								
22								
24								
26								
28								
30								

End of Boring

Clayton ENVIRONMENTAL CONSULTANTS

Boring Log

Clayton ENVIRONMENTAL CONSULTANTS

Clayton Boring MW-4

Final depth	30 feet BGS
Page	1 of 1
Boring location	Former McLouth Steel Plant
Client	DSC Ltd.
Project No.	13-97153.00.004
Site	Former McLouth Steel Plant

Clayton geologist	Gary Blinkiewicz
Driller	Rau Drilling
Start date	31 Oct 96
Final date	1 Nov 96
Method	Hollow stem auger
Auger OD	4.25 inches
Sampler	
Elevation Datum	
Ground surface	feet

Monitoring Well	MW-4
TOC elevation	feet
Grout interval	3.0 feet BGS
	21.0 feet BGS
Bentonite plug	2.0 feet thick
Filter pack interval	23.0 feet BGS
	30.0 feet BGS
Screen length	5.0 feet
Slot size	0.10 inches
Screen bottom	30.0 feet BGS
Grout method	
Pack material	sand
Grout material	
Development	purge
Well lock No.	

Groundwater	Date 1
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	
	Date 2
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	

ft	R	Soil	N	Soil Type	Color	Soil Moisture	Comment	PID ppm
0								
2								
4	50		7	SAND fill with pebbles, pieces of brick, metal debris,	Black	Dry	No odor	0
			9	and refuse		Dry		
6			11			Dry		
			13			Dry		
8								
10	70		46	CLAYEY SAND fill with pebbles, pieces of brick,	Black	Dry	No odor	0
			45	and metal debris		Dry		
			50			Dry		
12			50			Dry		
14								
16								
18								
20	100		20	CLAYEY SAND fill with pebbles, rock, and	Brown	Dry	No odor	0
			18	pieces of brick		Dry		
			8			Dry		
22			7			Dry		
24								
	20		33	CLAYEY SAND with pebbles	Black/ Gray	Dry	No odor	0
26			36			Dry		
			50			Moist		
28			4			Moist		
30								

End of Boring

Clayton ENVIRONMENTAL CONSULTANTS

Boring Log

Clayton ENVIRONMENTAL CONSULTANTS

Clayton Boring MW-5

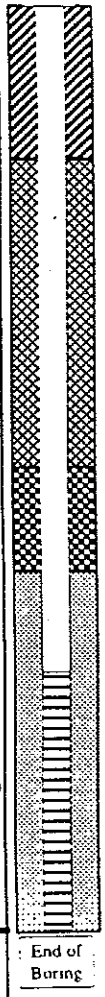
Final depth	18 feet BGS
Page	1 of 1
Boring location	Former McLouth Steel Plant
Client	DSC Ltd.
Project No.	13-97153.00.004
Site	Former McLouth Steel Plant

Clayton geologist	Gary Blinkiewicz
Driller	Rau Drilling
Start date	30 Oct 96
Final date	30 Oct 96
Method	Hollow stem auger
Auger OD	4.25 inches
Sampler	
Elevation Datum	
Ground surface	feet

Monitoring Well	MW-4
TOC elevation	feet
Grout interval	3.0 feet BGS 9.0 feet BGS
Bentonite plug	2.0 feet thick
Filter pack interval	11.0 feet BGS 18.0 feet BGS
Screen length	5.0 feet
Slot size	0.10 inches
Screen bottom	18.0 feet BGS
Grout method	
Pack material	sand
Grout material	
Development	purge
Well lock No.	

Groundwater	Date 1
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	
	Date 2
Static level	feet below TOC
Elevation	feet
Volume purged	gallons
Conductivity	µmhos
Temperature	°F
pH	

ft	R	Soil	N	Soil Type	Color	Soil Moisture	Comment	PID ppm
0								
2								
4	40		36		Black	Dry	No odor	0
			25			Dry		
6			26			Dry		
			30			Dry		
8								
10	60		26		Dark Brown	Dry	No odor	0
			20			Dry		
			18			Dry		
12			18			Dry		
14								
	40		9		Brown	Dry	No odor	0
			11			Dry		
16			15			Moist		
			17			Moist		
18								
20								
22								
24								
26								
28								
30								



Clayton ENVIRONMENTAL CONSULTANTS

APPENDIX B

ANALYTICAL RESULTS OF GROUNDWATER SAMPLES

Table 1
Analytical Results
for
DSC LTD.
Clayton Project No. 43906.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	0.015	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	0.1	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	0.013	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

Sample Identification: MW-3
Lab Number: 002a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.55	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/
Cadmium	0.013	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/
Chromium	0.12	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/
Lead	0.012	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 43906.00/13-97153.00

Sample Identification: MW-4
Lab Number: 003a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.54	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	0.017	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	<0.05	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	0.026	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

Sample Identification: MW-5
Lab Number: 004a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/
Cadmium	0.017	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/
Chromium	0.11	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/
Lead	0.011	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 43906.00/13-97153.00

Sample Identification: EB-3
Lab Number: 005a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	0.015	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	0.12	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	0.011	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

Sample Identification: MW-4 DUPLICATE
Lab Number: 006a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.46	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	0.016	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	<0.05	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	0.022	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 43906.00/13-97153.00

Sample Identification: MW-3 MS
Lab Number: 007a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/96
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.61	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	0.016	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	0.12	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	0.013	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

Sample Identification: MW-3 MSD
Lab Number: 008a
Sample Type: Water
Analyst: CW

Date Sampled: 11/08/9
Date Received: 11/11/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.53	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/
Cadmium	0.014	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/
Chromium	<0.05	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/
Lead	0.02	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/

Table 1 (continued)
Analytical Results
for
DSC LTD.
Clayton Project No. 43906.00/13-97153.00

Sample Identification: LAB BLANK
Lab Number: 009a
Sample Type: Water
Analyst: CW

Date Sampled: --
Date Received: 11/11/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.20	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Cadmium	<0.0005	0.0005	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Chromium	<0.05	0.05	EPA 3020A	11/19/96	EPA 200.8	11/26/9
Lead	<0.003	0.003	EPA 3020A	11/19/96	EPA 200.8	11/26/9

General Notes
--: Information not available or not applicable.

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Analytical Results
for
DSC LTD.
Clayton Project No. 44250.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001
Sample Type: Water
Analyst: CR

Date Sampled: 11/20/96
Date Received: 11/21/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05	EPA 7196	11/21/96

Sample Identification: MW-2
Lab Number: 002
Sample Type: Water
Analyst: CR

Date Sampled: 11/20/96
Date Received: 11/21/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05	EPA 7196	11/21/96

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Analytical Results
for
DSC LTD.
Clayton Project No. 44250.00/13-97153.00

Sample Identification:	MW-2	Date Sampled:	11/20/96
Lab Number:	002b	Date Received:	11/21/96
Sample Type:	Water		
Analyst:	CW		

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.2	EPA 3020A	11/26/96	EPA 6020A	12/04/9
Cadmium	<0.0005	0.0005	EPA 3020A	11/26/96	EPA 6020A	12/04/9
Chromium	0.08	0.05	EPA 3020A	11/26/96	EPA 6020A	12/04/9
Lead	<0.003	0.003	EPA 3020A	11/26/96	EPA 6020A	12/04/9

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Analytical Results
for
DSC LTD.
Clayton Project No. 44250.00/13-97153.00

Sample Identification: MW-3
Lab Number: 003
Sample Type: Water
Analyst: CR

Date Sampled: 11/20/96
Date Received: 11/21/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05	EPA 7196	11/21/96

Sample Identification: MW-4
Lab Number: 004
Sample Type: Water
Analyst: CR

Date Sampled: 11/20/96
Date Received: 11/21/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05	EPA 7196	11/21/96

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Analytical Results
for
DSC LTD.
Clayton Project No. 44250.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005
Sample Type: Water
Analyst: CR

Date Sampled: 11/20/96
Date Received: 11/21/96

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05	EPA 7196	11/21/96

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

Limit of detection was raised due to matrix interference.

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Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/9
Date Received: 02/06/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/

Sample Identification: MW-2
Lab Number: 002a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/9
Date Received: 02/06/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.2	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/

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Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-3
Lab Number: 003a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/9
Date Received: 02/06/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.6	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/

Sample Identification: MW-4
Lab Number: 004a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/9
Date Received: 02/06/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.4	0.2	EPA 3020A	02/17/97	EPA 6020	02/19
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19

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Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	0.2	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/9
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/9
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/9
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/9

Sample Identification: EB-1
Lab Number: 006a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/

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Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: LAB BLANK
Lab Number: 007a
Sample Type: Water
Analyst: CW

Date Sampled: 02/05/97
Date Received: 02/05/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Barium	<0.2	0.2	EPA 3020A	02/17/97	EPA 6020	02/19/9
Cadmium	<0.0005	0.0005	EPA 3020A	02/17/97	EPA 6020	02/19/9
Chromium	<0.05	0.05	EPA 3020A	02/17/97	EPA 6020	02/19/9
Lead	<0.003	0.003	EPA 3020A	02/17/97	EPA 6020	02/19/9

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Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.005	0.005	EPA 7196	02/06/97

Sample Identification: MW-2
Lab Number: 002
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05 (a)	EPA 7196	02/06/97

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-3
Lab Number: 003
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05 (a)	EPA 7196	02/06/97

Sample Identification: MW-4
Lab Number: 004
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05 (a)	EPA 7196	02/06/97

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 46319.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05	0.05 (a)	EPA 7196	02/06/97

Sample Identification: EB-1
Lab Number: 006
Sample Type: Water
Analyst: CR

Date Sampled: 02/05/97
Date Received: 02/06/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.005	0.005	EPA 7196	02/06/97

(a) Limit of detection was raised due to sample matrix.
General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 50210.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001a
Sample Type: Water
Analyst: CW

Date Sampled: 05/23/97
Date Received: 05/23/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	<0.2	0.2	EPA 6020	06/06/97	EPA 6020	06/09/9
Cadmium	0.0078	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/9
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/9
Lead	0.004	0.003	EPA 6020	06/06/97	EPA 6020	06/09/9

Sample Identification: MW-2
Lab Number: 002a
Sample Type: Water
Analyst: CW

Date Sampled: 05/23/97
Date Received: 05/23/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	<0.2	0.2	EPA 6020	06/06/97	EPA 6020	06/09/
Cadmium	0.011	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/
Lead	0.021	0.003	EPA 6020	06/06/97	EPA 6020	06/09/

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 50210.00/13-97153.00

Sample Identification: MW-3
Lab Number: 003a
Sample Type: Water
Analyst: CW

Date Sampled: 05/23/9
Date Received: 05/23/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	0.5	0.2	EPA 6020	06/06/97	EPA 6020	06/09/9
Cadmium	0.0083	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/9
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/9
Lead	0.079	0.003	EPA 6020	06/06/97	EPA 6020	06/09/9

Sample Identification: MW-4
Lab Number: 004a
Sample Type: Water
Analyst: CW

Date Sampled: 05/23/9
Date Received: 05/23/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	0.4	0.2	EPA 6020	06/06/97	EPA 6020	06/09/9
Cadmium	0.0068	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/9
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/9
Lead	0.073	0.003	EPA 6020	06/06/97	EPA 6020	06/09/9

Clayton
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CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 50210.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005a
Sample Type: Water
Analyst: CW

Date Sampled: 05/23/97
Date Received: 05/23/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	<0.2	0.2	EPA 6020	06/06/97	EPA 6020	06/09/9
Cadmium	0.0074	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/9
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/9
Lead	0.085	0.003	EPA 6020	06/06/97	EPA 6020	06/09/9

Sample Identification: LAB BLANK
Lab Number: 006a
Sample Type: Water
Analyst: CW

Date Sampled: --
Date Received: 05/23/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	<0.2	0.2	EPA 6020	06/06/97	EPA 6020	06/09/9
Cadmium	<0.0005	0.0005	EPA 6020	06/06/97	EPA 6020	06/09/9
Chromium	<0.05	0.05	EPA 6020	06/06/97	EPA 6020	06/09/9
Lead	<0.003	0.003	EPA 6020	06/06/97	EPA 6020	06/09/9

General Notes
--: Information not available or not applicable.

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC, LTD.
Clayton Project No. 50210.00/13-97153.00

Sample Type:	Water	Date Sampled:	05/23/97
Analytical Method:	EPA 7196	Date Received:	05/23/97
Analyst:	CR	Date Prepared:	05/23/97
		Date Analyzed:	05/23/97

Lab No.	Sample Identification	Hexavalent chromium (mg/L)	LOD (mg/L)
001b	MW-1	<0.05	0.05
002b	MW-2	<0.05	0.05
003b	MW-3	<0.05	0.05
004b	MW-4	<0.05	0.05
005b	MW-5	<0.05	0.05

General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	<0.2	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/9
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/9
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/9
Lead	<0.003	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/9

Sample Identification: MW-2
Lab Number: 002a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	0.2	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/
Lead	0.023	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/

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ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: MW-3
Lab Number: 003a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/9
Date Received: 08/27/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	0.5	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/9
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/9
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/9
Lead	0.007	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/9

Sample Identification: MW-4
Lab Number: 004a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/9
Date Received: 08/27/9

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	0.4	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/
Lead	0.004	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/

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CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	0.5	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/9
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/9
Chromium	0.15	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/9
Lead	0.19	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/9

Sample Identification: EB-1
Lab Number: 006a
Sample Type: Water
Analyst: CW

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Dissolved Metals						
Barium	<0.2	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/9
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/9
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/9
Lead	<0.003	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/9

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CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification:	LAB BLANK	Date Sampled:	--
Lab Number:	007a	Date Received:	08/27/97
Sample Type:	Water		
Analyst:	CW		

Analyte	Concentration (mg/L)	LOD (mg/L)	Preparation Method and Date		Analytical Method and Date	
Metals						
Barium	<0.2	0.2	EPA 3020A	09/05/97	EPA 6020	09/08/9
Cadmium	<0.0005	0.0005	EPA 3020A	09/05/97	EPA 6020	09/08/9
Chromium	<0.05	0.05	EPA 3020A	09/05/97	EPA 6020	09/08/9
Lead	<0.003	0.003	EPA 3020A	09/05/97	EPA 6020	09/08/9

General Notes
--: Information not available or not applicable.

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Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: MW-1
Lab Number: 001
Sample Type: Water
Analyst: SC

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05 (a)	0.05	EPA 7196	08/28/97

Sample Identification: MW-2
Lab Number: 002
Sample Type: Water
Analyst: SC

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05 (a)	0.05	EPA 7196	08/28/97

Clayton
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Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification:	MW-3	Date Sampled:	08/27/97
Lab Number:	003	Date Received:	08/27/97
Sample Type:	Water		
Analyst:	SC		

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.005	0.005	EPA 7196	08/28/97

Sample Identification:	MW-4	Date Sampled:	08/27/97
Lab Number:	004	Date Received:	08/27/97
Sample Type:	Water		
Analyst:	SC		

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05 (a)	0.05	EPA 7196	08/28/97

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: MW-5
Lab Number: 005
Sample Type: Water
Analyst: SC

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05 (a)	0.05	EPA 7196	08/28/97

Sample Identification: EB-1
Lab Number: 006
Sample Type: Water
Analyst: SC

Date Sampled: 08/27/97
Date Received: 08/27/97

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.05 (a)	0.05	EPA 7196	08/28/97

Clayton
ENVIRONMENTAL CONSULTANTS

Analytical Results
for
DSC LTD.
Clayton Project No. 53532.00/13-97153.00

Sample Identification: LAB BLANK
Lab Number: 008
Sample Type: Water
Analyst: SC

Date Sampled: --
Date Received: --

Analyte	Concentration (mg/L)	LOD (mg/L)	Analytical Method	Date Analyzed
Hexavalent chromium	<0.005	0.005	EPA 7196	08/28/97

(a) Limit of detection raised due to sample matrix.
General Notes:
<: Less than the indicated limit of detection (LOD)
--: Information not available or not applicable

APPENDIX D

FINAL WASTE REMOVAL MANIFESTS

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. M I D 0 1 7 4 2 3 3 0 4 — Manifest Document No. F L 9107

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDKLER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Document Number PAC 4900571

B. State Gen. ID

5. Transporter 1 Company Name AUTUMN INDUSTRIES, INC.

6. US EPA ID Number O H D 9 8 6 9 7 4 7 8 0

C. State Trans. ID PA-

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ( )

E. State Trans. ID PA-

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number P A D 0 0 2 3 9 5 8 8 7

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone 215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	T	60000	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.			c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a. S07 c.

b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 24
SCALE TICKET #
P.O. NUMBER - HSI5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
		9	19	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space Generator, please fill in Item 9, D, Shipped 41000 lbs in J.2. and date in 16., please be sent Item 9. and 17. as LEGIBLE on ALL Copies and please see Complete

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
Richard F. Koch & Corp		9/24/91		

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 3 - TSD Facility: Mail to Generator

4900571

ER-WM-51 REV. 1/91

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of	Information in the shaded areas is not required by Federal law but is required by State law.
MID017423304	CL 9105	1	

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

C. State Transporter's ID: PA
E. State Transporter's ID: PA
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	D	474	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above — Lab Pack / Physical State: a. b. c. d.

K. Handling Codes for Wastes Listed Above: a. S03

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 201
SCALE TICKET # PM6003
P.O. NUMBER - HSX5094

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
Steve R. Comstock	Steve R. Comstock/pc	09	24	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Robert Lemasters	Robert Lemasters	09	24	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space: Generator, please fill in items C, D, and Physical State in item J. and please use complete ID Number in item 11. Deborah S Cope 9/26/91
46640

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
DE Koch	DEKoch	09	25	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

GENERATOR · TRANSPORTER · FACILITY

PAC4900556

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 6-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: H I D 0 1 7 4 2 3 3 9 4 | Manifest Document No.: C L 9188 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC. | 6. US EPA ID Number: O H D 9 8 6 9 7 4 7 8 0

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
NORSHEHAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | 10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

G. State Facility ID

H. Facility Phone ([redacted])

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	State No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	0 0 1	D T	41 460	P	[redacted]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.			c.		
b.			d.		

K. Handling Codes for Wastes Listed Above: a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 23
SCALE TICKET #
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
		9	19	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]	1	4	11

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space Please review Item 16. in LEGIBLE on ALL Copies
41,460 Generator please fill in Item 13 (41,460 from Scale ticket), 14 P Physical State in Item 13. and 41,460 Date in Item 16 and please send complete ID Number (NA9189) in Item 11.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
9/24/91 DE Kolb Deborah	[signature] & Copy	09	23	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAD 990582

GENERATOR

TSD

FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator: Retain This Copy

ER-WM-51 REV. 1/91

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No. CL 9106
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183
4. Generator's Phone (313) 285-1200

A. State Manifest Document Number PAC 4900560
B. State Gen. ID

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: OHD986974780
C. State Trans. ID PA-
D. Transporter's Phone (

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID PA-
F. Transporter's Phone (216) 372-5002

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887
G. State Facility's ID
H. Facility's Phone (215 826-2111

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	DT	424 00	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State: a. b. c. d.

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 206
SCALE TICKET # PM6001
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Steve R Comstock | Signature: Steve R Comstock / PD | Month Day Year 09 24 91

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Robert Hudson | Signature: Robert Hudson | Month Day Year 09 24 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space: Generator please fill in Item J and physical state in Item J and please use complete ID number in Item 11 Deborah G. Cope 9/26/91 (H770)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible] | Signature: [illegible] | Month Day Year 09 25 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC 4900560

Copy 5 - TSD Facility: Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: M I D 0 1 7 4 2 3 3 0 4
Manifest Document No.: C L 9109

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

A. State Manifest Document Number: PAC 4900593

4. Generator's Phone (313) 285-1200

B. State Gen. ID

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: O H D 9 8 6 9 7 4 7 8 0

C. State Trans. ID: PA-

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone ( )

9. Designated Facility Name and Site Address
NORSKEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

E. State Trans. ID: PA-

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	0 0 1	D T	44240	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.			c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a. S03 c.
b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 203
SCALE TICKET #
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | MONTH DAY YEAR

GENERATOR

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: David Jones | Signature | MONTH DAY YEAR

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

TRANSPORTER

19. Discrepancy Indication Space: Generator please fill in Item G, D, 14 & I. Physical State in Item J.c. please use complete ID Number in Item 11 and please insert Item No. in LEGIBLE on ALL

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Lloyd F. Koch Copy | Signature | MONTH DAY YEAR: 7/24/91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAL 4900593

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the DEP (717) 787-

Copy 5 - TSD Facility Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: M I D 0 1 7 4 2 3 3 0 4
Manifest Document No.: C L 9110
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

A. State Manifest Document Number: PAC 4900604

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

B. State Gen. ID

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: O H D 9 8 6 9 7 4 7 8 0

C. State Trans. ID: PA-

D. Transporter's Phone (216) 372-5002

7. Transporter 2 Company Name:
8. US EPA ID Number:

E. State Trans. ID: PA-

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

G. State Facility's ID

H. Facility's Phone (215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	0 0 1	D T	42 ...	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.			c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 204
SCALE TICKET # PM6002
P.O. NUMBER - HSX5094

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: Steve R. Comstock
Signature: Steve R. Comstock /pc
Month Day Year: 09 24 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Joe CAMPANA
Signature: Joe Campana
Month Day Year: 09 24 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space
(BOR) Generator please fill in Item C and Physical State in Item J, and please use complete ID Number in Item 11 Deborah A Crage 1/26/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE Kocu
Signature: [illegible]
Month Day Year: 09 25 91

GENERATOR / TRANSPORTER / FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC 4900604

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility Mail to Generator
Copy 3 - Generator Retain This Copy

AND CHEMOTHERAPEUTIC WASTE.

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304
Manifest Document No.: CL 9113
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

A. State Manifest Document Number: PAC4900630

3. Generator's Name and Mailing Address:
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

B. State Gen. ID

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: K&D INDUSTRIES WEST, INC.
6. US EPA ID Number: MID072790710

C. State Trans. ID: PA-
D. Transporter's Phone (313) 343

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Trans. ID: PA-
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address:
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

G. State Facility's ID
H. Facility's Phone (215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	D	324 20	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State: a. b. c. d.

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # T-36 DT2-1
SCALE TICKET # PMG004
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: STEVE R. COMSTOCK | Signature | MONTH DAY YEAR

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Clarence Brown | Signature: Clarence Brown | MONTH 7 DAY 24 YEAR 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

19. Discrepancy Indication Space: Generator, please fill in Item C and Physical State in Item J.a. and please use complete ID Number in Item 11. Deborah G Cope 9/26/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE Koch | Signature | MONTH 07 DAY 25 YEAR 91

GENERATOR / TRANSPORTER / FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC 4900630

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator Return Trip Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 Manifest Document No. CL9101
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183
4. Generator's Phone (313) 285-1200

A. State Manifest Document Number PAC 4900512
B. State Gen. ID

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: OHD986974780
C. State Trans. ID PA-
D. Transporter's Phone ( )

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID PA-
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887
G. State Facility's ID
H. Facility's Phone 215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	DT	[illegible]	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State: a. b. c. d.

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 43301
SCALE TICKET # FG0006
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: [illegible] Signature: [illegible] Month Day Year: 09 26 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Mark Gorman Signature: Mark Gorman Month Day Year: 09 26 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space: Generator please fill in Items C, D, Physical State in Item J, please use complete ID Number in Item 11, and please have Item 16 (Steve R. Comstock) in LEGIBLE on ALL (13546)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Copy DF Kocal 9/30/91 Signature: DF Kocal Month Day Year: 09 30 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator
Copy 3 - Generator Retain This Copy

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC 4900512

ER-WM-51 REV. 1/91

Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304 | Manifest Document No.: CL9102

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC4900523
B. State Gen. ID:
C. State Trans. ID: PA-
D. Transporter's Phone ( )
E. State Trans. ID: PA-
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (215 826-2111)

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	DT	46640	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 40802
SCALE TICKET # P60009
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature | Month 9 | Day 26 | Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space: Generator please fill in Item 9 D. Physical State in Item 13. and Unit Wt/Vol in Item 16., please include complete ID Number in Item 11. and please be sure Item 16 & 17 are LEGIBLE & ALL COPIES

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D E Koch | Signature | Month 10 | Day 2 | Year 91

PAC4900523

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 3 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved, OMB No. 2050-0039 Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No. CL9103 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Document Number PAC 4900534

B. State Gen. ID

5. Transporter 1 Company Name
AUTUMN INDUSTRIES, INC.

6. US EPA ID Number OHD986974780

C. State Trans. ID PA-

D. Transporter's Phone

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Trans. ID PA-

F. Transporter's Phone

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number PAD002395887

G. State Facility's ID

H. Facility's Phone (215 826-2111)

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	DT	46,700	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State a. b. c. d.

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 39202
SCALE TICKET # P60008
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month 9 Day 26 Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name GARY MALONEY | Signature Gary Maloney | Month 9 Day [illegible] Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space Generator please fill in Items C, D, [illegible] Physical State in Item J, and date in Item 16, please use complete STD Number in Item 11, and please describe Item 16 (Steve R. Comstock)

16,600

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name [illegible] ILLEGIBLE Deborah G. Cope | Signature [illegible] on 9/30/91 | Month 9 Day 30 Year 91

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PAC 4900534

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304
Manifest Document No.: CL9100 1
2. Page 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. PAC [illegible]
B. [illegible]

5. Transporter 1 Company Name: AUTUMN INDUSTRIES, INC.
6. US EPA ID Number: OHD986974780

C. State Transporter's ID: PA
D. Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID: PA
F. Transporter's Phone

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

G. State Facility's ID
H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	D	38120	P	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State a. b. c. d.

K. Handling Codes for Wastes Listed Above
a. S02
b.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 40201
SCALE TICKET # P60007
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature | MONTH 09 DAY 26 YEAR 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: VERN SLOOGENHOOP | Signature | MONTH DAY YEAR

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

19. Discrepancy Indication Space: Weight disc [illegible] resolved [illegible] 39060 weights (77,280 HRD, 71,400 - MS) [illegible] Item 13 [illegible] complete

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D.E. Koch/dsc | Signature: D.E. Koch/dsc | MONTH 09 DAY 27 YEAR 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

ALL Copies [illegible]
1/30/91 (Carbon was turned up. dsc 9/30/91)

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC490U545

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MIP0174233O4
Manifest Document No.: CL 9211
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183
4. Generator's Phone (313 285-1200

A. State Trans. ID: PA
B. State Trans. ID:
C. State Trans. ID: PA
D. Transporter's Phone:
E. State Facility's ID:
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone:

5. Transporter 1 Company Name: KSD INDUSTRIAL SERVICES, INC.
6. US EPA ID Number: MID072790710
7. Transporter 2 Company Name:
8. US EPA ID Number:
9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. ORM-E 9189 ELECTRIC ARC FURNACE SLUDGE K061	001	D	38560	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.			c.		
b.			d.		

K. Handling Codes for Wastes Listed Above: a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31
TRUCK # T-19 DAR 3
SCALE TICKET # P68005
P.O. NUMBER - 88X5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: STEVE R. COMSTOCK
Signature: Steve R. Comstock
Month: 09 Day: 26 Year: 91

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Dan Totten
Signature: Dan Totten
Month: 09 Day: 26 Year: 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month: Day: Year:

FACILITY

19. Discrepancy Indication Space: 3860 lbs Generator please fill in Item C.D. and Physical State in Item J.a. and please complete ID Number in Item 11. Driver's Copy 9/30/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D E Koch
Signature: D E Koch
Month: 09 Day: 27 Year: 91

EPA Form 8700-22 (Rev. 3/88) Previous editions are obsolete

PAL 4900615

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 — Manifest Document No. 9115 — 1

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WENDLER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone 313)285-1200

5. Transporter 1 Company Name — 6. US EPA ID Number
AUTUMN INDUSTRIES INC | OHD986974780

7. Transporter 2 Company Name — 8. US EPA ID Number

9. Designated Facility Name and Site Address — 10. US EPA ID Number
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 PAD002395887

A. [redacted] PAC
B. State Gen. ID
C. State Trans. ID
PA
D. Transporter 2 Name
E. State Trans. ID
PA
F. State Facility's ID
G. Facility's Phone [redacted]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	State No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA3007, PGIII,(K061)	001	T	42920	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03 c.
b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 10603
SCALE TICKET # PG0013
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK — Signature: S Comstock/pc — Month/Day/Year: 10/10/91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeffrey D Balint — Signature: Jeffrey D Balint — Month/Day/Year: 10/10/91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month/Day/Year

19. Discrepancy Indication Space
43000 lbs in Item 11. Generator please use Correct "ID Number" Deborah K. Cope 10/8/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D E Kalt — Signature: D E Kalt — Month/Day/Year: 10/8/91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR
TRANSPORTER
FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and PA DER (717) 787-9702

PAC4900652

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.: N I D 0 1 7 4 2 3 3 0 4 | 9116

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

A. State Generator's ID: PAC [redacted]
B. State Transporter's ID:
C. State Transporter's ID: PA [redacted]
D. Transporter's Phone:
E. State Facility's ID: PA [redacted]
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone:

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	46060	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		S
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 4020
SCALE TICKET # P60012
P.O. NUMBER - HSI5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK	SRComstock/joe	10	01	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
John C. Hall	John Hall	10	01	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
Generator please use Correct ID Number in Item 11 Debbie S Copy 10/3/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
D F KOCH	[signature]	10	03	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR — TRANSPORTER — TSD FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC4900663

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

OFFICIAL PENNSYLVANIA MANIFEST FORM

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.: M I D 0 1 7 4 2 3 3 0 4 | C 5 9117

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: P A D 0 0 2 3 9 5 8 6 7

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA3007, PGIII,(K061)	0 0 1	DT	44800	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack | Physical State

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. 803 | c.
b. | d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 43301
SCALE TICKET # P60011
P.O. NUMBER - 88X5094

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GENERATOR

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK		11	01	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Mark Gorman	Mark Gorman	11	01	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

TRANSPORTER

19. Discrepancy Indication Space
Generator please use correct ID Number (NA 3077) in Item 11. Deborah A Cope 10/3/91

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
D F Katt	D F Katt	10	08	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator: Retain This Copy

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAL 4900674

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 — Manifest Document No. 91218 1

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone 313) 285-1200

5. Transporter 1 Company Name — 6. US EPA ID Number
AUTUMN INDUSTRIES INC OHD986974780

7. Transporter 2 Company Name — 8. US EPA ID Number

9. Designated Facility Name and Site Address — 10. US EPA ID Number
BORSHEIMAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 PAD002395887

A. State — PA
B. State — PA
C. State — PA
D. State — PA
E. State — PA
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA3007, PGIII,(K061)	001	BT	43260	P	K061
b.					
c.					
d.					

GENERATOR

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. T03 — c.
b. — d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 40802
SCALE TICKET # PG00014
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: STEVE R. COMSTOCK — Signature: [signature] — Month/Day/Year: 10/01/91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month/Day/Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month/Day/Year

TRANSPORTER

19. Discrepancy Indication Space
13200 Generator, Please use Correct ID Number in Item 11. and please re-sign [redacted] Item 19 (Gary Sigley, 10/1/91) in LEGIBLE on ALL Copies. Deborah P. Cox

FACILITY

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D E Kath — 10/3/91 — Signature: [signature] — Month/Day/Year: 10 03 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC4900685

Copy 5 - TSD Facility: Mail to Generator
Copy 3 - Generator: Retain This Copy

ER-WM-51 REV. 1/91

Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. M I D 0 1 7 4 2 3 3 0 4 — Manifest Document No. F [redacted] 9215 — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name — 6. US EPA ID Number
AUTUMN INDUSTRIES INC | OHD986974780

7. Transporter 2 Company Name — 8. US EPA ID Number

9. Designated Facility Name and Site Address — 10. US EPA ID Number
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 — PAD002395887

A. [redacted]
B. State Generator's ID
C. State Transporter's ID PA [redacted]
D. Transporter's Phone
E. State Transporter's ID PA [redacted]
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone [redacted]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	F. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA3007, PGIII,(K061)	001	DT	42320	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. [redacted]303 — c.
b. — d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 39202
SCALE TICKET # PG0010
P.O. NUMBER - MSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE K. COMSTOCK — Signature: [signature] — Month/Day/Year: 11/20/91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: VERN SLAUGENHOUP — Signature: [signature] — Month/Day/Year: 11/20/91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month/Day/Year

19. Discrepancy Indication Space
Generator please use Correct ID Number
Witness: Deborah L. Cope 10/3/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [signature] — Signature: [signature] — Month/Day/Year: 10/3/91

PA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAL 490696

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. MID017423304	Manifest Document No. CL 9121	2. Page 1 of 1	Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: Autumn Industries Inc — 6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name — 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC4900711
B. State Gen. ID
C. State Trans. ID: PA AH10264
D. Transporter's Phone
E. State Trans. ID: PA
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA3007, PGIII,(K061)	001	DT	45680	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

Lab Pack	Physical State		Lab Pack	Physical State
a.	S	c.		
b.		d.		

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 40201
SCALE TICKET # P6019
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	MONTH	DAY	YEAR
STEVE R. COMSTOCK	[signature]			91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	MONTH	DAY	YEAR
John Catt	[signature]			

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	MONTH	DAY	YEAR

19. Discrepancy Indication Space
Generator, please use correct ID Number in item 11. Deborah S. Cope 10/7/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	MONTH	DAY	YEAR
DF Kath	[signature]	10	04	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC 4900711

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Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | MIB017423304 | Manifest Document No. | CL 9122

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Document Number: PAC 4900722

B. State Generator ID:

C. State Transporter ID: PA AH1026 21

D. Transporter's Phone: 800 441-2116

E. State Transporter ID: PA

F. Transporter's Phone:

G. State Facility's ID:

H. Facility's Phone: 215 826-7211

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: IND986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
NORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste Nos.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	43580	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above: a. S03 | c. | b. | d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 10603
SCALE TICKET # P66017
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK | Signature: [signature] | Month: 10 | Day: 2 | Year: 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeff Balut | Signature: [signature] | Month: 10 | Day: 03 | Year: 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space
43710 Generator Receives Correct ID Number in Item 11 Per Letter & Copy 10/7/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D E KOCH | Signature: [signature] | Month: 10 | Day: 04 | Year: 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR

NSPC

FILE

PAC4900722

Copy 5 - TSD Facility Mail to Generator

Copy 3 - Generator Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304
Manifest Document No.: CL 9123
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183
4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC
6. US EPA ID Number: 10HD986974780
7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887

A. State ID: PAC4900733
B. State Trans. ID:
C. State Trans. ID: PA IAH 1026 FL
D. Transporter's Phone: 441-5715
E. State Facility's ID: PA
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 215-826-7161

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	46260	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 43301
SCALE TICKET # P6018
P.O. NUMBER - H8X5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK		10	3	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Mark Gorman		10	03	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
Generator please use Correct ID Number in Item 11 D. Worden & Copy 10/7/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC4900733

Copy 5 - TSD Facility: Mail to Generator

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ER-WM-51 REV. 1/91

Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No. C 2 9124

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

A. State Gen. ID PAC400074

4. Generator's Phone (313) 285-1200

B. State Gen. ID

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: 10HD986974780

C. State Trans. ID PA IA1102 6 PA

7. Transporter 2 Company Name | 8. US EPA ID Number

D. Trans. 2 State ID

E. State Trans. ID PA

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

F. Transporter's Phone

G. State Facility's ID

H. Facility's Phone (215) 826-6615

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	46660	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a. 503	c.
b.	d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 4340
SCALE TICKET # R60016
P.O. NUMBER - RSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: [illegible] | Signature: [signature] | MONTH 10 DAY 3 YEAR 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Mike Rose | Signature: Mike Rose | MONTH 10 DAY 03 YEAR 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

19. Discrepancy Indication Space: Generator please use Correct ID Number in Item 11. Waste to Copy 10/7/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D F Kott | Signature: [signature] | MONTH 10 DAY 04 YEAR 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR

TRANSPORTER

FACILITY

FHD 490074 4

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Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | MID017423304 | Manifest Document No. | CL 9125

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name | 6. US EPA ID Number
AUTUMN INDUSTRIES INC | OHD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address | 10. US EPA ID Number
NORSHEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | PAD002395887

A. State Manifest Document Number: PA [redacted]
B. State Generator's ID:
C. State Transporter's ID: PA [redacted] 102-71
D. State Transporter's Phone: (412) 447-2116
E. State Facility's ID: PA
F. Transporter's Phone: ( )
G. State Facility's ID:
H. Facility's Phone: (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	46000	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a. S03	c.
b.	d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 42701
SCALE TICKET # PG0015
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature | MONTH | DAY | YEAR
[illegible] | [signature] | 10 | 3 | 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Pete Barbus | Signature | MONTH 10 | DAY 3 | YEAR 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH | DAY | YEAR

19. Discrepancy Indication Space
Y6110 Generator please use correct "ID Number" in Item 11. Waterwise & Copy 10/7/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | MONTH 10 | DAY 04 | YEAR 91

PA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR
TRANSPORTER
FACILITY

PAC 4900755

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PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
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OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017422304
Manifest Document No.: CL 9126
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: JOHN PFROMMER INC
6. US EPA ID Number: PAD008781072

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC4900781
B. State Gen. ID: SAME
C. State Trans. ID: PA AH 1 0 0 A Z 1
D. Transporter's Phone: [illegible]
E. State Trans. ID: PA
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (215) [illegible]-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	47100	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # TUC-1
SCALE TICKET # P60021
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: | Signature: [signature] | Month 10 Day 8 Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: MICHAEL TUCKER | Signature: [signature] | Month 10 Day 08 Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: | Signature: | Month Day Year

19. Discrepancy Indication Space
Generator, please use correct ID Number - Item 11 [illegible] 10/14/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D. E. KOCH | Signature: [signature] | Month 10 Day 09 Year 91

PA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC4900781

Copy 5 - TSD Facility: Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No. CL 9127

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: JOHN P. ROMMER INC | 6. US EPA ID Number: PAD008781072

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
NORSHEAD RESOURCE DEVELOPMENT CO,
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | 10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC 4900792
B. State Generator's ID: SAME
C. State Transporter's ID: PA- 14H 1094-21
D. Transporter's Phone: [illegible]
E. State Transporter's ID: PA- [illegible]
F. Transporter's Phone: [illegible]
G. State Facility's ID: [illegible]
H. Facility's Phone: [illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	48340	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03 | c.
b. | d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 285-1200
TRUCK # 298
SCALE TICKET # Rec22
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford

Printed/Typed Name | Signature | Month Day Year
[illegible] | [signature] for | 10 8 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Richard Baal | Signature: Richard Baal | Month Day Year: 10 08 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space
18140 Number in Item 11. Generator please [illegible] Correct ID Laboratory Copy 10/11/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible] | Signature: [signature] | Month Day Year: 10 09 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

PAC 4900792

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

ER-WM-61 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304
Manifest Document No.: CL 3128
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183
4. Generator's Phone (313) 285-1200

A. State Manifest Document Number: PAC4[illegible]
B. State Gen. ID: Same

5. Transporter 1 Company Name: JOHN PFROMMER INC
6. US EPA ID Number: PAD008781072
C. State Trans. ID: PA- [illegible]
D. Transporter's Phone [illegible]

7. Transporter 2 Company Name:
8. US EPA ID Number:
E. State Trans. ID: PA-
F. Transporter's Phone

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887
G. State Facility's ID
H. Facility's Phone [illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	DT	43480	P	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. Lab Pack [ ] Physical State S
b. Lab Pack [ ] Physical State
c. Lab Pack [ ] Physical State
d. Lab Pack [ ] Physical State

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 285-1200
TRUCK # HLLC
SCALE TICKET # P60023
P.O. NUMBER - H8X5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature: [signature] | Month 10 Day 8 Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Sam Alcott | Signature: Sam Alcott | Month 10 Day 08 Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space
Generator Please use correct "ID Number" in (1)36(A) Item 11. Deborah S Copp 10/11/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: BF Koch | Signature: [signature] | Month 10 Day 09 Year 91

PAC4900803

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

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Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | MID017423304 | Manifest Document No. | C 4 9130

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name | 6. US EPA ID Number
JOHN PFROMMER INC | PAD087810720

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address | 10. US EPA ID Number
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | PAD002395887

A. State Manifest Document Number: PAC4900825
B. State Generator's ID:
C. State Transporter's ID: PA
D. Transporter's Phone: 313-285-1200
E. State Transporter's ID: PA
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone (215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3007, PGIII,(K061)	001	D	46720	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03 c.
b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 310
SCALE TICKET # P60020
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature | Month 10 | Day 8 | Year 91

17. Transporter Acknowledgement of Receipt of Materials
Printed/Typed Name: Clarence A Bush | Signature | Month 10 | Day 09 | Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space 16500 Generator please correct "ID Number in Item 11. Deborah S Cope 10/11/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE KOCH | Signature | Month 10 | Day 09 | Year 91

PA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC4900825

Copy 5 - TSD Facility Mail to Generator

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Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

FER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law but is required by State law.
	N I D 0 1 7 4 2 3 3 9 4	C L 9133		

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC
6. US EPA ID Number: PHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

A. State Facility's ID: PA [redacted]
B. State Generator's ID: [redacted]
C. State Transporter's ID: PA [redacted]
D. Transporter's Phone: [redacted]
E. State Transporter's ID: PA [redacted]
F. Transporter's Phone: [redacted]
G. State Facility's ID: [redacted]
H. Facility's Phone: [redacted]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	0 0 1	D T	41760	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

Lab Pack	Physical State		Lab Pack	Physical State
a.	S	c.		
b.		d.		

K. Handling Codes for Wastes Listed Above
e. 507
f.
b.
d.

15. Special Handling Instructions and Additional Information
24 HOUR EMERGENCY RESPONSE NUMBER 1-800-800-0427
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 3120Z
SCALE TICKET # P60024
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	MONTH	DAY	YEAR
		10	10	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	MONTH	DAY	YEAR
[redacted]		10	10	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	MONTH	DAY	YEAR

19. Discrepancy Indication Space
NONE

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	MONTH	DAY	YEAR
[redacted]		10	11	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAD 490076 6

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator/State Trans Copy

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Bureau of Waste Management
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FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304 | Manifest Document No.: CL 9132

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: HD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | 10. US EPA ID Number: PAD002395887

A. State: PA
B. State:
C. State: PA
D.
E. State: PA
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone:

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	001	D	46240	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.	1	S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. 503
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 24 HOUR EMERGENCY RESPONSE NUMBER - 1-800-800-0427
TRUCK # 20001
SCALE TICKET # P60023
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMPROST		1	1	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Jerome Klein	Jerome Klein	1	01	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
4/6060

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
M.L. Hinkle	M.L. Hinkle	1	11	91

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PAC 4900770

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Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017422304
Manifest Document No.: C L 9131
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDKLER
1650 W. JEFFERSON AVENUE TRENTON. MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC
6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: PAD002395887

A. State ID: PAC
B. State Trans. ID:
C. State Trans. ID: PA
D. [illegible]
E. State Facility ID: PA
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone (215 826-2211

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	001	DT	44940	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
c.
b.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 24 HOUR EMERGENCY RESPONSE NUMBER 1-800-666-0427
TRUCK # 10603
SCALE TICKET # PG0022
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: [illegible]
Signature: [signature] Month 10 Day 11 Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeff Balint
Signature: [signature] Month 10 Day 11 Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature: Month Day Year

19. Discrepancy Indication Space
44460

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible]
Signature: [signature] Month 10 Day 11 Year 91

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

PAC4900840

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.: PAD017423304 | CL9134

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
McLouth Steel - ATTN: D. Winkler
1650 W. Jefferson Avenue, Trenton, Michigan 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC
6. US EPA ID Number: 10HD986974780

7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Keystone Resource Development Co.
East Plant, Delaware Avenue
Palmerton, PA 18071

10. US EPA ID Number: PAD002395887

A. State [illegible] PAD [illegible]
B. State [illegible]
C. State [illegible] PA-[illegible]
D. [illegible]
E. [illegible] PA-[illegible]
F. Transporter's Phone [illegible]
G. State Facility's ID [illegible]
H. Facility's Phone (610) [illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ Hazardous waste solid, n.o.s. (emission control dust/sludge from primary production of steel in electric furnaces), Class 9, NA3077, (K061)	001	DT	47080	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. 507
b.
c.
d.

15. Special Handling Instructions and Additional Information
Emergency response guide No. 31a 24 HOUR EMERGENCY RESPONSE NUMBER 1-800-800-0427
Truck # 39204
Scale ticket # PG0073
P.O. number - ESX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: Steve R. Comstock
Signature: SRComstock/pc
Month: 10 Day: 10 Year: 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: MERL HOFFMAN
Signature: Merl Hoffman 31204
Month: 10 Day: 10 Year: 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month: Day: Year:

19. Discrepancy Indication Space: 47080 Generator please complete US DOT Description in Item 11. Deborah D. Cope 10/14/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible]
Signature:
Month: 10 Day: 11 Year: 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR

TRANSPORTER

FACILITY

PAC 4900851

Copy 5 - TSD Facility: Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | M I D 9 1 7 4 2 3 3 0 4 | Manifest Document No. | C L 9120 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: K+D INDUSTRIAL [illegible] | 6. US EPA ID Number: M I D 0 7 2 7 9 0 7 1 0

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
NORSHEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

A. State Manifest Document Number: PAC 4900700
B. State Generator's ID: [illegible]
C. State Transporter's ID: PA: IRH 1032 01
D. Transporter's Phone: 313 729 3350
E. State Facility's ID: PA: [illegible]
F. Transporter's Phone: ( )
G. State Facility's ID
H. Facility's Phone: 215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES),CLASS 9,NA[illegible], PGIII,(K061)	0 0 1	D T	38660	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		S
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above
a. 307
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 24 HOUR EMERGENCY RESPONSE NUMBER 31
TRUCK # T-19 1-313-729-3350
SCALE TICKET #
P.O. NUMBER - HEX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK	[signature]	10	15	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Dan Tatton	[signature]	10	15	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
38100

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[signature]	10	16	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR
TRANSPORTER
FACILITY

PAC4900700

Copy 5 - TSD Facility: Mail to Generator

Copy 6 - Generator Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | M I D 0 1 7 4 2 3 8 4 | Manifest Document No. | C L 9 1 2 0

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address

MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE, TRENTON, MICHIGAN 48184

4. Generator's Phone (313) 285-1200

A. State Manifest Document Number: PAC 4900862

B. State Gen. ID:

5. Transporter 1 Company Name: AUTUMN INDUSTRIES

6. US EPA ID Number: OHD 986 924 780

C. State Trans. ID: PA 1011026 7

7. Transporter 2 Company Name:

8. US EPA ID Number:

D. Transporter's Phone: ( )

9. Designated Facility Name and Site Address

HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

E. State Trans. ID: PA

F. Transporter's Phone: ( )

G. State Facility's ID:

H. Facility's Phone: (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	F. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII, (K061)	0 0 1	D T	45620	P	K 0 6 1
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		S
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above

a.	S03
b.	
c.	
d.	

15. Special Handling Instructions and Additional Information

EMERGENCY RESPONSE GUIDE NO. 31 24 HOUR EMERGENCY RESPONSE NUMBER (313)729-3350
TRUCK # 40101
SCALE TICKET # ~~40104~~
P.O. NUMBER - HSI5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK		10	15	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Dale Hutchison	Dale Hutchison	10	15	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

4 x 100

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
DF Kath		10	16	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator Retains This Copy

PAC4900862

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved, OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | E I D 0 1 7 4 2 3 3 0 4 | Manifest Document No. | C 4 9 1 2 0 |

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE, TRENTON, MICHIGAN 48184

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES
6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

A. State [illegible] PAC 4900873
B. State Gen. ID SAME
C. State Trans. ID PA-AH102674
D. Transporter's Phone (216) 332-5000
E. State Trans. ID PA-[illegible]
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII, (K061)	0 0 1	D T	45720	P	K 0 6 1
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information

EMERGENCY RESPONSE GUIDE NO. 31 24 HOUR EMERGENCY RESPONSE NUMBER (313)729-3350
TRUCK # 39202
SCALE TICKET # ~~35230~~
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. CONROCK	[signature]	10	15	11

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[signature]	10	15	11

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
NONE

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[signature]	10	16	97

PA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator
Copy 6 - Generator Retain This Copy

TRANSPORTER

FACILITY

PAC 4900873

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | M I D 0 1 7 4 2 3 3 0 4 | Manifest Document No. | C L 9 1 2 0

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE, TRENTON, MICHIGAN 48184

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: ANTUMA INDUSTRIES INC
6. US EPA ID Number: OHD986974280

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
MORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071
10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

A. State Manifest Document Number: PAC4900884
B. State Gen. ID: SAME
C. State Trans. ID: PA 1811026 7
D. Transporter's Phone: (412) 372-9004
E. State Trans. ID: PA
F. Transporter's Phone: ( )
G. State Facility's ID:
H. Facility's Phone: (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII, (K061)	0 0 1	D T	42320	P	K 0 6 1
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31 24 HOUR EMERGENCY RESPONSE NUMBER (313)729-3350
TRUCK #2001
SCALE TICKET #
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford

Printed/Typed Name: STEVE E. COMSTOCK
Signature: SEComstock/pe
Month/Day/Year: 10/5/91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jerome Klein
Signature: Jerome Klein
Month/Day/Year: 10/5/91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month/Day/Year:

19. Discrepancy Indication Space
42440

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: R. Kahl
Signature: R. Kahl
Month/Day/Year: 10/16/91

Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 3 - TSD Facility Mail to Generator

PAC4900884

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

R-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.: MXD017423304 | CL9120

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE, TRENTON, MICHIGAN 48184

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES INC | 6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC [redacted]
B. State Generator's ID: [redacted]
C. State Transporter's ID: PA MH102671
D. Transporter's Phone: 734-722-9000
E. State Transporter's ID: PA [redacted]
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone: 610-826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII, (K061)	001	DT	41320	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a.	S03	c.	
b.		d.	

15. Special Handling Instructions and Additional Information

EMERGENCY RESPONSE GUIDE NO. 31 24 HOUR EMERGENCY RESPONSE NUMBER (313)729-3350
TRUCK # 10603
SCALE TICKET #
P.O. NUMBER - 88X5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK | Signature: [signature] | Month 10 Day 15 Year 97

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Jeff Balint | Signature: [signature] | Month 10 Day 15 Year 97

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space
41320

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE KOCH | Signature: [signature] | Month 10 Day 16 Year 97

Form 6700-22 (Rev. 9/88) Previous editions are obsolete

PAC 4900895

Copy 5 - TSD Facility Mail to Generator
Copy 3 - Generator Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550

AND CHEMOTHERAPEUTIC WASTE.

R-WM-51 REV. 1/91

OFFICIAL PENNSYLVANIA MANIFEST FORM

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
McLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: K&D INDUSTRIAL SERVICES | 6. US EPA ID Number: MID072790710

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | 10. US EPA ID Number: PAD002395887

A. State Transporter's ID: PAC [redacted]
B. State Transporter's Phone: SAME
C. State Transporter's ID: PA HH 10320
D. State Transporter's Phone: 313-729-3350
E. State Facility's ID: PA [redacted]
F. Transporter's Phone:
G. State Facility's ID:
H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES), CLASS 9, NA3077, PG III, (K061)	001	DT	40080	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a. S03	c.
b.	d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31 24 HOUR EMERGENCY RESPONSE NUMBER
1-313-729-3350
TRUCK # T-39
SCALE TICKET P60023
P.O. NUMBER HSX5094
P60023

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford

Printed/Typed Name: STEVE R. COMSTOCK | Signature | Month 10 | Day 17 | Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: [illegible] | Signature | Month 10 | Day 17 | Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space: Generator to have filled in Manifest Document No. in Item 1 Deborah D Cope 10/21/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: [illegible] | Signature | Month 10 | Day 18 | Year 91

PAC4900906

Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423 3041 Manifest Document No.
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

A. State Manifest Document Number PAC 4900910

3. Generator's Name and Mailing Address
MCLOUTH STEEL – ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

B. State Gen. ID SAME

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name AIM INDUSTRIES
6. US EPA ID Number OHD986974780

C. State Trans. ID PA-

D. Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Trans. ID PA-

F. Transporter's Phone

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON PA. 18071

10. US EPA ID Number PAD002395887

G. State Facility's ID

H. Facility's Phone 215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES), CLASS 9, NA 3077, PG III, (K061)	001	DT	44660	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03 b. c. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31 / 24 HOUR EMERGENCY RESPONSE NUMBER 1-313-729-3350
TRUCK # 41204
SCALE TICKET # P60025
P.O. # HS45694

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: D. Comstock Signature: DComstock/pc Month Day Year: 10 17 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JAMES IVORY Signature: [signature] Month Day Year: 10 17 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: Signature: Month Day Year:

19. Discrepancy Indication Space
Generator please fill in Manifest Document No. (14910) – Alan L. Detweiler, Clayco 10/21/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE KOCH Signature: DEKoch Month Day Year: 10 18 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC 4900910

Copy 5 - TSD Facility: Mail to Generator
Copy 3 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

ER-WM-51 REV. 1/91

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MID017423304
Manifest Document No.:
2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address:
McLOUTH STEEL – ATTN: D. WINDEIER
1650 W. JEFFERSON AVENUE, TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Document Number: PAC4900921
B. State Gen. ID: SAME

5. Transporter 1 Company Name: AUTUMN INDUSTRIES
6. US EPA ID Number: OHD986974780

C. State Trans. ID: PA AH 0267
D. Transporter's Phone: 216-533-5002

7. Transporter 2 Company Name:
8. US EPA ID Number:

E. State Trans. ID: PA
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address:
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON P.A. 18071

10. US EPA ID Number: PAD002395887

G. State Facility's ID
H. Facility's Phone (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES), CLASS 9, NA3077, PGIII (K061)	001	DT	47640	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above: a. S03 b. c. d.

15. Special Handling Instructions and Additional Information:
EMERGENCY RESPONSE GUIDE NO. 31 / 24 HOUR EMERGENCY RESPONSE NUMBER 1-313-729-3350
TRUCK # 39204
SCALE TICKET # PG0022
P.O. # HSX5094

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford

Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK	SRComstock/pc	10	17	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
MERL HOFFMAN	Merl Hoffman 39204	10	17	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space: Generator please fill in Manifest Doc. # No. [illegible] (41700) in Item 1 [illegible] 10/21/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
DF KOCH	DF Koch	10	18	91

PAC4900921

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

Copy 3 - Generator: Retain This Copy

ER-WM-51 REV. 1/91

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304
Manifest Document No.
2. Page 1 of 1
Information in the shaded areas is not required by Federal law but is required by State law.

A. State Manifest Document Number: PAC4900932

3. Generator's Name and Mailing Address
McLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE, TRENTON MICH 48183
B. State Gen. ID: SAME

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES
6. US EPA ID Number: OHD986974780
C. State Trans. ID: PA AH0267
D. Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Trans. ID: PA
F. Transporter's Phone

9. Designated Facility Name and Site Address
HORSE HEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON PA. 18071
10. US EPA ID Number: PAD002395887
G. State Facility's ID
H. Facility's Phone (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES), CLASS 9, NA 3077, PG III (K061)	001	DT	46800	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above
a. S03 c.
b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31 / 24 HOUR EMERGENCY RESPONSE NUMBER 1-313-729-3350
TRUCK# 41101
SCALE TICKET #60026
P.O. NUMBER HS7 5094

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK
Signature: [signature]
Month Day Year: 10 17 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Mike Stewart
Signature: [signature]
Month Day Year: 10 17 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space
Generator place fill in "Manifest Document No." i stat. Deborah D Cope 10/21/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE KOCH
Signature: [signature]
Month Day Year: 10 18 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

PAC4900932

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator Retain This Copy

AND CHEMOTHERAPEUTIC WASTE.

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID017423304 | Manifest Document No. | 2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDEIER
1650 W. JEFFERSON AVE. TRENTON MICH. 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: AUTUMN INDUSTRIES
6. US EPA ID Number: OHD986974780

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT DELAWARE AVENUE
PALMERTON PA. 18071
10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC 4900943
B. State Gen. ID: SAME
C. State Trans. ID: PA AH 0267
D. Transporter's Phone (216) 372-5002
E. State Trans. ID: PA
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (215) 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S. (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNANCES), CLASS 9, NA3077, PGIII (K061)	001	DT	44360	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State
a. [ ] S
b. [ ]
c. [ ]
d. [ ]

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO 31. / 24 HOUR EMERGENCY RESPONSE NUMBER 1-313-789-3350
TRUCK # 43301
SCALE TICKET # P60024
P.O. NUMBER HSX5094

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK | Signature: SRComstock/pc | Month Day Year: 10 17 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Mark Gorman | Signature: Mark Gorman | Month Day Year: 10 17 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: | Signature: | Month Day Year:

19. Discrepancy Indication Space
Generator please fill in Manifest Document No. in Item 1. Deborah L. Coyne 10/21/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DF KOCH | Signature: [signature] | Month Day Year: 10 18 91

PAC 4900943

Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

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Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

EH-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D 0 1 7 4 2 3 3 0 4 — Manifest Document No. L 9134 1

2. Page 1 of

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 N. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Doc. No. PAC [redacted]
B. State Generator's ID
C. State Transporter's ID PA- [redacted]
D. Transporter's Phone
E. State Transporter's ID PA- [redacted]
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone

5. Transporter 1 Company Name: AMERICAN INDUSTRIES — 6. US EPA ID Number: 10HD986974780

7. Transporter 2 Company Name — 8. US EPA ID Number

9. Designated Facility Name and Site Address
MOREHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD 0 0 2 3 9 5 8 8 7

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	0 1	DT	41060	P	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

Lab Pack	Physical State	Lab Pack	Physical State
a.	S	c.	
b.		d.	

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 4290
SCALE TICKET #
P.O. NUMBER - HSX5094

24 HOUR EMERGENCY RESPONSE NUMBER
1-313-729-3350

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Month 10 Day 22 Year 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Fred Ivary — Signature: Fred Ivary — Month 10 Day 22 Year 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month — Day — Year

19. Discrepancy Indication Space
NONE

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DP Koch — Signature — Month 10 Day 23 Year 91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR — TRANSPORTER — FACILITY

PAC 4900954

Copy 5 - TSD Facility: Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.
MID017423304 | CL 9135

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name | 6. US EPA ID Number
AUTUMN INDUSTRIES | OHD986974780

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address | 10. US EPA ID Number
NORSHEHAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 | PAD002395887

A. State Manifest Document Number: PAC[illegible]
B. State Generator's ID: [illegible]
C. State Transporter's ID: PA- M R 10 2 6 7 1
D. Transporter's Phone: [illegible]
E. State Transporter's ID: PA-
F. Transporter's Phone: ( )
G. State Facility's ID:
H. Facility's Phone: [illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	001	BT	45860	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State		Lab Pack	Physical State
a.		S	c.		
b.			d.		

K. Handling Codes for Wastes Listed Above

a.	S03	c.	
b.		d.	

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31 24 HOUR EMERGENCY RESPONSE NUMBER 1-313-729-3350
TRUCK # 41201
SCALE TICKET #
P.O. NUMBER - HSX5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month | Day | Year
R. L. Comstock/pc | | 10 | 22 | 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JAMES IVORY | Signature | Month: 10 | Day: 22 | Year: 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space
45860

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: D. KOCH | Signature | Month: 10 | Day: 23 | Year: 91

PAC4900965

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved.
OMB No. 2050-0039
Expires 9-30-91

ER-WM-51 REV. 1/91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. M I D 0 1 7 4 2 3 3 0 4 — Manifest Document No. C E 9136

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WINDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

A. State Manifest Doc. No. PAC[illegible]

B. State Gen. ID [illegible]

5. Transporter 1 Company Name: AUTUMN INDUSTRIES — 6. US EPA ID Number: 10HD986974780

C. State Trans. ID PA [illegible]

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone [illegible]

9. Designated Facility Name and Site Address
NORSHEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071 — 10. US EPA ID Number: P A D 0 0 2 3 9 5 8 8 7

E. State Trans. ID PA [illegible]

F. Transporter's Phone [illegible]

G. State Facility's ID [illegible]

H. Facility's Phone [illegible]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	0 0 1	D T	41380	P	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		S
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above: a. S03 c. b. d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # 39106
SCALE TICKET #
P.O. NUMBER - HSX5094
24 HOUR EMEIGENCY RESPONSE NUMBER
1-313-729-3350

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name	Signature	Month	Day	Year
STEVE R. COMSTOCK	[signature]	10	22	91

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
William Fuxl	[signature]	10	22	91

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space
41100

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[signature]	10	23	91

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR TO TRANSPORTER FILE

PAC4900980

Copy 5 - TSD Facility: Mail to Generator
Copy 3 - Generator Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550
OFFICIAL PENNSYLVANIA MANIFEST FORM

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

ER-WM-51 REV. 1/91

Form approved.
OMB No. 2050-0039
Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MIDO17423304 | Manifest Document No.: CL 9137

2. Page 1 of 1

Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
MCLOUTH STEEL - ATTN: D. WIEDELER
1650 W. JEFFERSON AVENUE TRENTON, MICHIGAN 48183

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name: KID INDUSTRIAL SERVICES | 6. US EPA ID Number: MIDO72790710

7. Transporter 2 Company Name | 8. US EPA ID Number

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO.
EAST PLANT, DELAWARE AVENUE
PALMERTON, PA 18071

10. US EPA ID Number: PAD002395887

A. State Manifest Document Number: PAC [redacted]
B. State Generator's ID: SAME
C. State Transporter's ID: PA [redacted]
D. Transporter's Phone: [redacted]
E. State Transporter's ID: PA- [redacted]
F. Transporter's Phone: [redacted]
G. State Facility's ID: [redacted]
H. Facility's Phone: [redacted]

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE SOLID N.O.S.(EMISSION CONTROL DUST/ SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES),CLASS 9,NA3077, PGIII,(K061)	001	DT	39 500	P	[redacted]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

	Lab Pack	Physical State
a.		S
b.		
c.		
d.		

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO.31
TRUCK # T-19 DTR-3
SCALE TICKET #
P.O. NUMBER - HSI5094

24HR EMERGENCY RESPONSE NUMBER
1-313-729-3350

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | MONTH DAY YEAR

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | MONTH DAY YEAR

19. Discrepancy Indication Space
40000 Gross weight discrepancy resolved by Company's Copy 11/7/91 Weight discrepancy (72,880-HRD, 75,040-MSG. Data on file

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | MONTH DAY YEAR

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

GENERATOR
TSDF
FACILITY

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

PAC 4900991

Copy 5 - TSD Facility: Mail to Generator

Copy 8 - Generator: Retain This Copy

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Waste Management
P. O. Box 8550
Harrisburg, PA 17105-8550

FOR SHIPMENT OF HAZARDOUS, INFECTIOUS AND CHEMOTHERAPEUTIC WASTE.

Form approved. OMB No. 2050-0039 Expires 9-30-91

ER-WM-51 REV. 11/89

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MID 0 1 7 4 2 3 3 0 4 1 | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law but is required by State law.

3. Generator's Name and Mailing Address
McLOUTH STEEL - ATTN: D. WINDEIER
1650 WEST JEFFERSON AVE. TRENTON MI 48183

A. State Manifest Document Number PAC 4078141

B. State Gen. ID SAME

4. Generator's Phone (313) 285-1200

5. Transporter 1 Company Name K&D INDUSTRIAL SERVICES INC
6. US EPA ID Number MID 0 7 2 7 9 0 7 1 0

C. State Trans. ID PA-AH 0320

D. Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Trans. ID PA-

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
HORSEHEAD RESOURCE DEVELOPMENT CO
EAST PLANT, DELAWARE AVE.
PALMERTON PA. 18071

10. US EPA ID Number PAD 0 0 2 3 9 5 8 8 7

G. State Facility's ID

H. Facility's Phone (215 826-2111

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, HAZARDOUS WASTE SOLID N.O.S (EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES), CLASS 9, NA3077, PG III, (K061)	001	DT	23840	P	K061
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
Lab Pack / Physical State
a. S
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. S03
b.
c.
d.

15. Special Handling Instructions and Additional Information
EMERGENCY RESPONSE GUIDE NO. 31
24 HOUR EMERGENCY RESPONSE NUMBER 1-313-729-3350
TRUCK #
SCALE TICKET # DTR-3
P.O. # HSX 5094

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: STEVE R. COMSTOCK | Signature: SRComstock/pe | Month Day Year: 11 12 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Don Tatten | Signature: Don Tatten | Month Day Year: 11 12 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space: Generator, please fill in Manifest Document # in Item 1 and please fill in Item B. Debora ... and Copy
24000 11/14/91

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: DE KOCH | Signature | Month Day Year: 11 13 91

PAC 4078141

In case of an emergency or spill immediately call the National Response Center (800) 424-8802 and the PA DER (717) 787-4343

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

Copy 5 - TSD Facility: Mail to Generator

REPLACEMENT COPY 8 - GENERATOR: RETAIN THIS COPY

APPENDIX E

LABORATORY ANALYSIS REPORTS - TECHNA BACKGROUND ASSESSMENT

Fire & Environmental Consulting Laboratories, Inc.

One East Complex 1451 East Lansing Drive, Suite 222 East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-6333

August 12, 1997

Attention: Mr. James Harless

Techna Corporation
44808 Helm Street
Plymouth, MI 48170-6026

Analytical Laboratory Report

FECL #(s): AA49652-AA49660

Project: 000738-09A-001
Samples collected by: UNKNOWN
Date/Time Submitted: 07/30/97 08:00
PO #: Verbal

FECL #: AA49652
Tag: TBG-A
Date/Time Collected: 07/28/97 08:22
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49653
Tag: TBG-B (0-1)
Date/Time Collected: 07/28/97 08:35
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49654
Tag: TBG-B (2-3)
Date/Time Collected: 07/28/97 08:40
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

Analytical Laboratory Report
Techna Corporation
August 12, 1997

FECL #: AA49655
Tag: TBG-C
Date/Time Collected: 07/28/97 08:55
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49656
Tag: TBG-D (1-2)
Date/Time Collected: 07/28/97 09:07
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49657
Tag: TBG-D (3-4)
Date/Time Collected: 07/28/97 09:17
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49658
Tag: TTest Pile A
Date/Time Collected: 07/28/97 07:06
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49659
Tag: TTest Pile B
Date/Time Collected: 07/28/97 07:10
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

FECL #: AA49660
Tag: TBG-H
Date/Time Collected: 07/28/97 07:18
Matrix: Soil
Container(s): 2-Glass
Preservation: Refrigeration/None

Analytical Laboratory Report
Techna Corporation
August 12, 1997

FECL #: AA49652
Tag: TBG-A
Date/Time Collected: 07/28/97 08:22
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	94.4	%	1	160.3	I M	08/08/97
Metals						
Cadmium	0.82	mg/kg	0.05	6020	P R	08/06/97
Chromium	561	mg/kg	1.0	6020	P R	08/06/97
Lead	41.3	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49653
Tag: TBG-B (0-1)
Date/Time Collected: 07/28/97 08:35
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	91.7	%	1	160.3	I M	08/08/97
Metals						
Cadmium	1.83	mg/kg	0.05	6020	P R	08/06/97
Chromium	200	mg/kg	1.0	6020	P R	08/06/97
Lead	191	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49654
Tag: TBG-B (2-3)
Date/Time Collected: 07/28/97 08:40
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	93.3	%	1	160.3	I M	08/08/97

FECL #: AA49654 (Continued)
Tag: TBG-B (2-3)
Date/Time Collected: 07/28/97 08:40
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Cadmium	1.38	mg/kg	0.05	6020	P R	08/06/97
Chromium	197	mg/kg	1.0	6020	P R	08/06/97
Lead	96.6	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49655
Tag: TBG-C
Date/Time Collected: 07/28/97 08:55
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	90.0	%	1	160.3	I M	08/08/97
Metals						
Cadmium	5.00	mg/kg	0.05	6020	P R	08/06/97
Chromium	429	mg/kg	1.0	6020	P R	08/06/97
Lead	406	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49656
Tag: TBG-D (1-2)
Date/Time Collected: 07/28/97 09:07
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	91.2	%	1	160.3	I M	08/08/97
Metals						
Cadmium	1.42	mg/kg	0.05	6020	P R	08/06/97
Chromium	488	mg/kg	1.0	6020	P R	08/06/97
Lead	273	mg/kg	1.0	6020	P R	08/06/97

FECL

Analytical Laboratory Report
Techna Corporation
August 12, 1997

FECL #: AA49657
Tag: TBG-D (3-4)
Date/Time Collected: 07/28/97 09:17
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	87.3	%	1	160.3	I M	08/08/97
Metals						
Cadmium	1.58	mg/kg	0.05	6020	P R	08/06/97
Chromium	39.1	mg/kg	1.0	6020	P R	08/06/97
Lead	73.1	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49658
Tag: TTest Pile A
Date/Time Collected: 07/28/97 07:06
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	97.8	%	1	160.3	I M	08/08/97
Metals						
Arsenic	6.93	mg/kg	0.50	6020	P R	08/09/97
Barium	69.7	mg/kg	1.0	6020	P R	08/09/97
Cadmium	0.30	mg/kg	0.05	6020	P R	08/09/97
Chromium	31.9	mg/kg	1.0	6020	P R	08/09/97
Copper	63.0	mg/kg	1.0	6020	P R	08/09/97
Lead	24.5	mg/kg	1.0	6020	P R	08/09/97
Mercury	Not detected	mg/kg	0.10	7471	E B	08/11/97
Selenium	Not detected	mg/kg	0.50	6020	P R	08/09/97
Silver	0.33	mg/kg	0.20	6020	P R	08/09/97
Zinc	90.7	mg/kg	1.0	6020	P R	08/09/97
Arsenic	0.011	mg/L	0.001	200.8	P R	08/09/97
Barium	1.45	mg/L	0.01	200.8	P R	08/09/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/09/97
Chromium	0.01	mg/L	0.01	200.8	P R	08/09/97
Copper	0.06	mg/L	0.01	200.8	P R	08/09/97

Analytical Laboratory Report
Techna Corporation
August 12, 1997

FECL #: AA49658 (Continued)
Tag: TTest Pile A
Date/Time Collected: 07/28/97 07:06
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals (Continued)						
Lead	Not detected	mg/L	0.003	200.8	P R	08/09/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/11/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/09/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/09/97
Zinc	0.76	mg/L	0.01	200.8	P R	08/09/97
TCLP Extraction						
% Solids	100			1311	I M	08/06/97
Sample used g	100			1311	I M	08/06/97
Final Volume ml	2,000			1311	I M	08/06/97
Final Extract pH	6.61			1311	I M	08/06/97

FECL #: AA49659
Tag: TTest Pile B
Date/Time Collected: 07/28/97 07:10
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	96.6	%	1	160.3	I M	08/08/97
Metals						
Arsenic	5.38	mg/kg	0.50	6020	P R	08/09/97
Barium	37.7	mg/kg	1.0	6020	P R	08/09/97
Cadmium	0.58	mg/kg	0.05	6020	P R	08/09/97
Chromium	189	mg/kg	1.0	6020	P R	08/09/97
Copper	43.5	mg/kg	1.0	6020	P R	08/09/97
Lead	62.5	mg/kg	1.0	6020	P R	08/09/97
Mercury	Not detected	mg/kg	0.10	7471	E B	08/11/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/11/97
Selenium	Not detected	mg/kg	0.50	6020	P R	08/09/97
Silver	0.83	mg/kg	0.20	6020	P R	08/09/97

Analytical Laboratory Report
Techna Corporation
August 12, 1997

FECL #: AA49659 (Continued)
Tag: TTest Pile B
Date/Time Collected: 07/28/97 07:10
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals (Continued)						
Zinc	877	mg/kg	1.0	6020	P R	08/09/97
Arsenic	0.008	mg/L	0.001	200.8	P R	08/09/97
Barium	1.24	mg/L	0.01	200.8	P R	08/09/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/09/97
Chromium	0.02	mg/L	0.01	200.8	P R	08/09/97
Copper	Not detected	mg/L	0.01	200.8	P R	08/09/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/09/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/09/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/09/97
Zinc	4.82	mg/L	0.01	200.8	P R	08/09/97
TCLP Extraction						
% Solids	100			1311	I M	08/06/97
Sample used g	100			1311	I M	08/06/97
Final Volume ml	2,000			1311	I M	08/06/97
Final Extract pH	6.30			1311	I M	08/06/97

FECL #: AA49660
Tag: TBG-H
Date/Time Collected: 07/28/97 07:18
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	93.1	%	1	160.3	I M	08/08/97
Metals						
Cadmium	Not detected	mg/kg	0.05	6020	P R	08/06/97
Chromium	906	mg/kg	1.0	6020	P R	08/06/97
Lead	2.2	mg/kg	1.0	6020	P R	08/06/97

Analytical Laboratory Report
Techna Corporation
August 12, 1997

Note: Methods may be modified for improved performance.
Results reported on a dry weight basis, where applicable.
Results relate only to items tested.
Report shall not be reproduced except in full, without the written approval of FECL.

Violetta F. Murshak

Violetta F. Murshak
Laboratory Director

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170-6026

Telephone Numbers:
(313) 454-1100
(313) 454-1233 (FAX)

CHAIN OF CUSTODY

Send report to:	Project:	Lab:	Due Date:
JAMES HARLESS TECHNA CORP	00738-09A 001	FELL	

Sample ID	Date	Time	Grab(G)/ Composite(C)	# Containers	Matrix*	Preservative**	Parameters: CADMIUM CHROMIUM AND LEAD	MI 10 METALS	SPLP MI 10 METALS		TCLP MI 10 METALS			
BG-A	7/28/97	8:22	G	2	S	6	X							49652
BG-B(0-1)		8:35		2			X							49653
BG-B(2-3)		8:40		1			X							49654
BG-C		8:55		2			X							49655
BG-D(1-2)		9:07					X							49656
BG-D(3-4)		9:17					X							49657
TEST PILE-A		7:06						X	X	SPM	X			49658
TEST PILE-B		7:10						X	X	SPM	X			49659
~~TRIP BLANK~~		~~5:30~~		2	W	4								
BG-H	7/28/97	7:18	G	2	S	6	X							49660

Collected by:	Date: 7/28/97	Time: 9:30			
Relinquished by:	Date: 7/28/97	Time: 16:00	Received by: Techna Storage	Date: 7/28/97	Time: 18:00
Relinquished by:	Date: 7/29/97	Time: 1650	Received by: Isaak Mmuth	Date: 7/29/97	Time: 1650
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab:	Date: 7-30-97	Time: 0800
Relinquished by Lab:	Date:	Time:	Received by:	Date:	Time:

Remarks: ALT 451, PART 201 LIMITS; QA/QC; and FAX RESULTS
NOTE: PLEASE RUN SPLP SAMPLES

(6) Indicate Preservative Used: 2°C

*Matrix: S=Solid L=Liquid W=Water GW=Groundwater SL=Sludge WW=Wastewater O=Other

**Preservatives: (1) H_2SO_4 to pH <2 (2) 10N NaOH to pH ≥12 (3) HNO_3 to pH <2 (4) 1:1 HCl (5) Zinc Acetate (6) See Remarks

COCform.ic

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170-6026

Telephone Numbers:
(313) 454-1100
(313) 454-1233 (FAX)

CHAIN OF CUSTODY

Send report to:	Project:	Lab:	Due Date:
JAMES HARLESS TECHNA CORP	00738-09A 001	FELL	8/4/97

Sample ID	Date	Time	Grab(G)/ Composite(C)	# Containers	Matrix*	Preservative**	Parameters: CHROMIUM AND LEAD	AZ 10 METALS	SPLP: MI 10 METALS		TCLP MI 10 METALS					
TBG-A	7/28/97	8:22	G	2	S	6	X									
TBG-B(0-1)		8:35		2			X									
TBG-B(2-3)		8:40		1			X									
TBG-C		8:55		2			X									
TBG-D(1-2)		9:07					X									
TBG-D(3-4)		9:17					X									
TEST PILE-A		7:06						X	X	SPLP	X					
TEST PILE-B		7:10						X	X	SPLP	X					
~~TRIP BLANK~~	~~7/28/97~~	~~5:30~~	~~G~~	~~2~~	~~W~~	~~HCl~~										
TBG-H	7/29/97	7:18	G	2	S	6	X									

Collected by:	Date: 7/28/97	Time: 9:30			
Relinquished by:	Date: 7/28/97	Time: 18:00	Received by: Techna Storage	Date: 7/28/97	Time: 18:00
Relinquished by:	Date: 7/29/97	Time: 1650	Received by: Federal Express	Date: 7/29/97	Time: 1650
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by Lab:	Date:	Time:
Relinquished by Lab:	Date:	Time:	Received by:	Date:	Time:

Remarks: ALT 451, PART 201 LIMITS; QA/QC; and FAX RESULTS
NOTE: PLEASE RUN SPLP SAMPLES

(6) Indicate Preservative Used: 2°C

*Matrix: S=Solid L=Liquid W=Water GW=Groundwater SL=Sludge WW= Wastewater O=Other
**Preservatives: (1) H_2SO_4 to pH<2 (2) 10N NaOH to pH ≥12 (3) HNO_3 to pH <2 (4) 1:1 HCl (5) Zinc Acetate (6) See Remarks

COC/o

Fire & Environmental Consulting Laboratories, Inc.

One East Complex 1451 East Lansing Drive, Suite 222 East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-6333

August 06, 1997

Attention: Mr. James Harless

Techna Corporation
44808 Helm Street
Plymouth, MI 48170-6026

Analytical Laboratory Report

FECL #(s): AA49566-AA49575

Project: 00738-09A-003
Samples collected by: UNKNOWN
Date/Time Submitted: 07/29/97 08:00
PO #: Verbal

FECL #: AA49566
Tag: TTrip Blank
Date/Time Collected: 07/24/97 17:15
Matrix: Liquid
Container(s): 2-40 mL VOA
Preservation: Refrigeration/HCl

FECL #: AA49567
Tag: TB11-A
Date/Time Collected: 07/25/97 17:45
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49568
Tag: TB11-B
Date/Time Collected: 07/25/97 07:50
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

Analytical Laboratory Report
Techna Corporation
August 06, 1997

FECL #: AA49569
Tag: TB11-C
Date/Time Collected: 07/25/97 08:00
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49570
Tag: TB11-D
Date/Time Collected: 07/25/97 08:10
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49571
Tag: TDup
Date/Time Collected: 07/25/97
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49572
Tag: TBG-G
Date/Time Collected: 07/25/97 15:18
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49573
Tag: TBG-F
Date/Time Collected: 07/25/97 15:30
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

FECL #: AA49574
Tag: TBG-E (1-2)
Date/Time Collected: 07/25/97 16:15
Matrix: Soil
Container(s): 2-4 oz Glass
Preservation: Refrigeration/None

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170-6026

Telephone Numbers:
(313) 454-1100
(313) 454-1233 (FAX)

CHAIN OF CUSTODY

Send report to:	Project:	Lab:	Due Date:
JAMES HARLESS TECHNA CORP	00738-09A-003	FECL	AUG 4, 1997

	Sample ID	Date	Time	Grab(G)/ Composite(C)	# Containers	Matrix*	Preservative**	Parameters: VOCs	PAHs	LEAD CADMIUM CHROMIUM							
	TRIP BLANK	7/24/97	17:15	G	2	W	4 & 2°C	X									
	TB11-A	7/25/97	7:45			S	2°C	X	X								
*	TB11-B		7:50					X	X								
*	TB11-C		8:00					X	X								
*	TB11-D		8:10					X	X								
	TDUP							X	X								
	TBG-G		15:30 18 spm							X							
	TBG-F		15:30							X							
	TBG-E (1-2)		16:15							X							
	TBG-E (3-4)		16:25		1					X							

Collected by:	Date: 7/25/97	Time: 8:10		
Relinquished by:	Date: 7/25/97	Time: 19:00	Received by: Teshon Stevens	Date: 7/25/97 Time: 19:00
Relinquished by:	Date: 7/28/97	Time: 5:38	Received by: Isaah Marshall	Date: 7/28/97 Time: 5:38
Relinquished by:	Date:	Time:	Received by:	Date: Time:
Relinquished by:	Date:	Time:	Received by:	Date: Time:
Relinquished by:	Date:	Time:	Received by:	Date: Time:
Relinquished by Lab:	Date:	Time:	Received by Lab:	Date: Time:
Remarks: ~~ACT 451 LIMITS, PA SOM~~ ACT 451, PART 201 LIMITS QA/QC; FAX RESULTS			Received by:	Date: Time:

(6) Indicate Preservative Used: 4°C & HCl for TRIP BLANK

* NOTE! SAMPLES B11-B, B11-C AND B11-D in saturated zone

*Matrix: S=Solid L=Liquid W=Water GW=Groundwater SL=Sludge WW= Wastewater O=Other

**Preservatives: (1) H_2SO_4 to pH <2 (2) 10N NaOH to pH ≥ 12 (3) HNO_3 to pH <2 (4) 1:1 HCl (5) Zinc Acetate (6) See Remarks

COCform.tem

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FECL #: AA49575
Tag: TBG-E (3-4)
Date/Time Collected: 07/25/97 16:25
Matrix: Soil
Container(s): 1-4 oz Glass
Preservation: Refrigeration/None

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FECL #: AA49566
Tag: TTrip Blank
Date/Time Collected: 07/24/97 17:15
Matrix: Liquid

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics						
Volatile Organics						
Benzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Bromodichloromethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Bromoform	Not detected	mg/L	0.001	8260	VFM	07/31/97
Bromomethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Carbon tetrachloride	Not detected	mg/L	0.001	8260	VFM	07/31/97
Chlorobenzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Chloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
2-Chloroethylvinyl ether	Not detected	mg/L	0.001	8260	VFM	07/31/97
Chloroform	Not detected	mg/L	0.001	8260	VFM	07/31/97
Chloromethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Dibromochloromethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,2-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,3-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,4-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,1-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,2-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,1-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	07/31/97
cis-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	07/31/97
trans-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,2-Dichloropropane	Not detected	mg/L	0.001	8260	VFM	07/31/97
cis-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	07/31/97
trans-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Ethylbenzene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Methylene Chloride	Not detected	mg/L	0.001	8260	VFM	07/31/97
Styrene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,1,2,2-Tetrachloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Tetrachloroethene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Toluene	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,1,1-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
1,1,2-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Trichloroethene	Not detected	mg/L	0.001	8260	VFM	07/31/97
Trichlorofluoromethane	Not detected	mg/L	0.001	8260	VFM	07/31/97
Vinyl Chloride	Not detected	mg/L	0.001	8260	VFM	07/31/97
p,m-Xylene	Not detected	mg/L	0.001	8260	VFM	07/31/97
o-Xylene	Not detected	mg/L	0.001	8260	VFM	07/31/97

FECL #: AA49566 (Continued)
Tag: TTrip Blank
Date/Time Collected: 07/24/97 17:15
Matrix: Liquid

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics (Continued)						
Acetone	Not detected	mg/L	0.05	8260	VFM	07/31/97
2-Butanone	Not detected	mg/L	0.05	8260	VFM	07/31/97
Carbon disulfide	Not detected	mg/L	0.05	8260	VFM	07/31/97
2-Hexanone	Not detected	mg/L	0.05	8260	VFM	07/31/97
4-Methyl-2-pentanone	Not detected	mg/L	0.05	8260	VFM	07/31/97

FECL #: AA49567
Tag: TB11-A
Date/Time Collected: 07/25/97 17:45
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	89.1	%	1	160.3	JH	08/01/97
Organics						
PNA Extraction	Completed				JKB	07/31/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromodichloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromoform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
sec-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
tert-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Carbon tetrachloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97

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FECL #: AA49567 (Continued)
Tag: TB11-A
Date/Time Collected: 07/25/97 17:45
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
2-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
4-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromoethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,4-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dichlorodifluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
cis-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
trans-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
2,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Ethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Hexachlorobutadiene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Isopropylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
p-Isopropyltoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Methylene chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Naphthalene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Propylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Styrene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Tetrachloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Toluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,2-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97

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FECL #: AA49567 (Continued)
Tag: TB11-A
Date/Time Collected: 07/25/97 17:45
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
Trichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Trichlorofluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Vinyl chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
o-Xylene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
p,m-Xylene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
cis-1,3-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Polynuclear Aromatics						
Acenaphthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Acenaphthylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(b)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(k)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(ghi)perylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Chrysene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Dibenzo(ah)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluorene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Naphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Phenanthrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
2-Methylnaphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97

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FECL #: AA49568
Tag: TB11-B
Date/Time Collected: 07/25/97 07:50
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	81.9	%	1	160.3	JH	08/01/97
Organics						
PNA Extraction	Completed				JKB	07/31/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Bromobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Bromochloromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Bromodichloromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Bromoform	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Bromomethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
n-Butylbenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
sec-Butylbenzene	0.6	mg/kg	* 0.1	8260	VFM	08/02/97
tert-Butylbenzene	0.2	mg/kg	* 0.1	8260	VFM	08/02/97
Carbon tetrachloride	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Chlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Chloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Chloroform	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Chloromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
2-Chlorotoluene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
4-Chlorotoluene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Dibromochloromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2-Dibromoethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Dibromomethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2-Dichlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,3-Dichlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,4-Dichlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Dichlorodifluoromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1-Dichloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2-Dichloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1-Dichloroethene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
cis-1,2-Dichloroethene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
trans-1,2-Dichloroethene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2-Dichloropropane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97

* Higher detection limits due to matrix interference and/or high target concentrations.

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FECL #: AA49568 (Continued)
Tag: TB11-B
Date/Time Collected: 07/25/97 07:50
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
1,3-Dichloropropane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
2,2-Dichloropropane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1-Dichloropropene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Ethylbenzene	0.3	mg/kg	* 0.1	8260	VFM	08/02/97
Hexachlorobutadiene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Isopropylbenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
p-Isopropyltoluene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Methylene chloride	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Naphthalene	0.1	mg/kg	* 0.1	8260	VFM	08/02/97
n-Propylbenzene	1.3	mg/kg	* 0.1	8260	VFM	08/02/97
Styrene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Tetrachloroethene	0.2	mg/kg	* 0.1	8260	VFM	08/02/97
Toluene	0.2	mg/kg	* 0.1	8260	VFM	08/02/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1,1-Trichloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,1,2-Trichloroethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Trichloroethene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Trichlorofluoromethane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2,3-Trichloropropane	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
1,2,4-Trimethylbenzene	1.7	mg/kg	* 0.1	8260	VFM	08/02/97
1,3,5-Trimethylbenzene	1.3	mg/kg	* 0.1	8260	VFM	08/02/97
Vinyl chloride	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
o-Xylene	0.4	mg/kg	* 0.1	8260	VFM	08/02/97
p,m-Xylene	1.0	mg/kg	* 0.1	8260	VFM	08/02/97
cis-1,3-Dichloropropene	Not detected	mg/kg	* 0.1	8260	VFM	08/02/97
Polynuclear Aromatics						
Acenaphthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Acenaphthylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)anthracene	0.59	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)pyrene	0.47	mg/kg	0.33	8270	JB	08/01/97

* Higher detection limits due to matrix interference and/or high target concentrations.

FECL #: AA49568 (Continued)
Tag: TB11-B
Date/Time Collected: 07/25/97 07:50
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Polynuclear Aromatics (Continued)						
Benzo(b)fluoranthene	0.42	mg/kg	0.33	8270	JB	08/01/97
Benzo(k)fluoranthene	0.42	mg/kg	0.33	8270	JB	08/01/97
Benzo(ghi)perylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Chrysene	0.92	mg/kg	0.33	8270	JB	08/01/97
Dibenzo(ah)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluoranthene	0.83	mg/kg	0.33	8270	JB	08/01/97
Fluorene	0.55	mg/kg	0.33	8270	JB	08/01/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Naphthalene	0.99	mg/kg	0.33	8270	JB	08/01/97
Phenanthrene	1.67	mg/kg	0.33	8270	JB	08/01/97
Pyrene	1.56	mg/kg	0.33	8270	JB	08/01/97
2-Methylnaphthalene	2.92	mg/kg	0.33	8270	JB	08/01/97

FECL #: AA49569
Tag: TB11-C
Date/Time Collected: 07/25/97 08:00
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	68.3	%	1	160.3	JH	08/01/97
Organics						
PNA Extraction	Completed				JKB	07/31/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Bromobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Bromochloromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Bromodichloromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Bromoform	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Bromomethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
n-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97

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FECL #: AA49569 (Continued)
Tag: TB11-C
Date/Time Collected: 07/25/97 08:00
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
sec-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
tert-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Carbon tetrachloride	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Chlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Chloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Chloroform	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Chloromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
2-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
4-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Dibromochloromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2-Dibromoethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Dibromomethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,3-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,4-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Dichlorodifluoromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
cis-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
trans-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,3-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
2,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Ethylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Hexachlorobutadiene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Isopropylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
p-Isopropyltoluene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Methylene chloride	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Naphthalene	0.03	mg/kg	0.01	8260	VFM	08/02/97
n-Propylbenzene	0.02	mg/kg	0.01	8260	VFM	08/02/97
Styrene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97

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FECL #: AA49569 (Continued)
Tag: TB11-C
Date/Time Collected: 07/25/97 08:00
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Tetrachloroethene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Toluene	0.04	mg/kg	0.01	8260	VFM	08/02/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1,1-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,1,2-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Trichloroethene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Trichlorofluoromethane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2,3-Trichloropropane	Not detected	mg/kg	0.01	8260	VFM	08/02/97
1,2,4-Trimethylbenzene	0.06	mg/kg	0.01	8260	VFM	08/02/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Vinyl chloride	Not detected	mg/kg	0.01	8260	VFM	08/02/97
o-Xylene	0.01	mg/kg	0.01	8260	VFM	08/02/97
p,m-Xylene	0.03	mg/kg	0.01	8260	VFM	08/02/97
cis-1,3-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	08/02/97
Polynuclear Aromatics						
Acenaphthene	0.71	mg/kg	0.33	8270	JB	08/01/97
Acenaphthylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Anthracene	0.34	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)anthracene	0.53	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(b)fluoranthene	0.39	mg/kg	0.33	8270	JB	08/01/97
Benzo(k)fluoranthene	0.39	mg/kg	0.33	8270	JB	08/01/97
Benzo(ghi)perylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Chrysene	0.83	mg/kg	0.33	8270	JB	08/01/97
Dibenzo(ah)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluoranthene	2.11	mg/kg	0.33	8270	JB	08/01/97
Fluorene	0.84	mg/kg	0.33	8270	JB	08/01/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Naphthalene	1.68	mg/kg	0.33	8270	JB	08/01/97
Phenanthrene	3.07	mg/kg	0.33	8270	JB	08/01/97
Pyrene	1.99	mg/kg	0.33	8270	JB	08/01/97
2-Methylnaphthalene	1.80	mg/kg	0.33	8270	JB	08/01/97

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FECL #: AA49570
Tag: TB11-D
Date/Time Collected: 07/25/97 08:10
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	80.5	%	1	160.3	JH	08/01/97
Organics						
PNA Extraction	Completed				JKB	07/31/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromodichloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromoform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
sec-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
tert-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Carbon tetrachloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
2-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
4-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromoethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,4-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dichlorodifluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
cis-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
trans-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97

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FECL #: AA49570 (Continued)
Tag: TB11-D
Date/Time Collected: 07/25/97 08:10
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
1,3-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
2,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Ethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Hexachlorobutadiene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Isopropylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
p-Isopropyltoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Methylene chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Naphthalene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Propylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Styrene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Tetrachloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Toluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,2-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Trichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Trichlorofluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trimethylbenzene	0.01	mg/kg	0.01	8260	VFM	07/31/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Vinyl chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
o-Xylene	0.03	mg/kg	0.01	8260	VFM	07/31/97
p,m-Xylene	0.04	mg/kg	0.01	8260	VFM	07/31/97
cis-1,3-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Polynuclear Aromatics						
Acenaphthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Acenaphthylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97

FECL #: AA49570 (Continued)
Tag: TB11-D
Date/Time Collected: 07/25/97 08:10
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Polynuclear Aromatics (Continued)						
Benzo(b)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(k)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(ghi)perylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Chrysene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Dibenzo(ah)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluorene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Naphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Phenanthrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
2-Methylnaphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97

FECL #: AA49571
Tag: TDup
Date/Time Collected: 07/25/97
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	89.6	%	1	160.3	JH	08/01/97
Organics						
PNA Extraction	Completed				JKB	07/31/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromodichloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromoform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Bromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97

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FECL #: AA49571 (Continued)
Tag: TDup
Date/Time Collected: 07/25/97
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
sec-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
tert-Butylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Carbon tetrachloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloroform	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Chloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
2-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
4-Chlorotoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromochloromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dibromoethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dibromomethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,4-Dichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Dichlorodifluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
cis-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
trans-1,2-Dichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
2,2-Dichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Ethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Hexachlorobutadiene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Isopropylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
p-Isopropyltoluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Methylene chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Naphthalene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
n-Propylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Styrene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97

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FECL #: AA49571 (Continued)
Tag: TDup
Date/Time Collected: 07/25/97
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Tetrachloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Toluene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,1-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,1,2-Trichloroethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Trichloroethene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Trichlorofluoromethane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,3-Trichloropropane	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,2,4-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Vinyl chloride	Not detected	mg/kg	0.01	8260	VFM	07/31/97
o-Xylene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
p,m-Xylene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
cis-1,3-Dichloropropene	Not detected	mg/kg	0.01	8260	VFM	07/31/97
Polynuclear Aromatics						
Acenaphthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Acenaphthylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(a)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(b)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(k)fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Benzo(ghi)perylene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Chrysene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Dibenzo(ah)anthracene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluoranthene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Fluorene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Naphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Phenanthrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
Pyrene	Not detected	mg/kg	0.33	8270	JB	08/01/97
2-Methylnaphthalene	Not detected	mg/kg	0.33	8270	JB	08/01/97

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FECL #: AA49572
Tag: TBG-G
Date/Time Collected: 07/25/97 15:18
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	95.2	%	1	160.3	JH	08/01/97
Metals						
Cadmium	2.38	mg/kg	0.05	6020	P R	08/06/97
Chromium	145	mg/kg	1.0	6020	P R	08/06/97
Lead	185	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49573
Tag: TBG-F
Date/Time Collected: 07/25/97 15:30
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	90.0	%	1	160.3	JH	08/01/97
Metals						
Cadmium	2.05	mg/kg	0.05	6020	P R	08/06/97
Chromium	302	mg/kg	1.0	6020	P R	08/06/97
Lead	399	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49574
Tag: TBG-E (1-2)
Date/Time Collected: 07/25/97 16:15
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	85.0	%	1	160.3	JH	08/01/97

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FECL #: AA49574 (Continued)
Tag: TBG-E (1-2)
Date/Time Collected: 07/25/97 16:15
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Cadmium	7.19	mg/kg	0.05	6020	P R	08/06/97
Chromium	3,770	mg/kg	1.0	6020	P R	08/06/97
Lead	612	mg/kg	1.0	6020	P R	08/06/97

FECL #: AA49575
Tag: TBG-E (3-4)
Date/Time Collected: 07/25/97 16:25
Matrix: Soil

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	94.3	%	1	160.3	JH	08/01/97
Metals						
Cadmium	9.18	mg/kg	0.05	6020	P R	08/06/97
Chromium	208	mg/kg	1.0	6020	P R	08/06/97
Lead	1,110	mg/kg	1.0	6020	P R	08/06/97

Note: Methods may be modified for improved performance.
Results reported on a dry weight basis, where applicable.
Results relate only to items tested.
Report shall not be reproduced except in full, without the written approval of FECL.

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(313) 454-1233 (FAX)

CHAIN OF CUSTODY

Send report to:	Project:	Lab:	Due Date:
JAMES HARLESS TECHNA CORP	007380-09A-003	FECL	AUG 4, 1997

	Sample ID	Date	Time	Grab(G)/ Composite(C)	# Containers	Matrix*	Preservative**	Parameters: VOCs	PAHs	LEAD CADMIUM, CHROMIUM						
	TRIP BLANK	7/24/97	17:15	G	2	W	4 & 2°C	X					49566			
	B11-A	7/25/97	7:45			S	2°C	X	X				49567			
*	B11-B		7:50					X	X				49568			
*	B11-C		8:00					X	X				49569			
*	B11-D		8:10					X	X				49570			
	DUP							X	X				49571			
	BG-G		15:30 (10 spm)							X			49572			
	BG-F		15:30							X			49573			
	BG-E (1-2)		16:15							X			49574			
	BG-E (3-4)		16:25		1					X			49575			

Collected by:	Date: 7/25/97	Time: 8:10		
Relinquished by:	Date: 7/25/97	Time: 19:00	Received by: Joshua Stamps	Date: 7/25/97 Time: 19:00
Relinquished by:	Date: 7/28/97	Time: 5:38p	Received by: Isaak Marshall	Date: 7/28/97 Time: 5:38p
Relinquished by:	Date:	Time:	Received by:	Date: Time:
Relinquished by:	Date:	Time:	Received by:	Date: Time:
Relinquished by:	Date:	Time:	Received by Lab:	Date: 7-29-97 Time: 0800
Relinquished by Lab:	Date:	Time:	Received by:	Date: Time:

Remarks: ~~ACT 451 LIMITS, PA 60m~~ ACT 451, PART 201 LIMITS QA/QC; FAX RESULTS

(6) Indicate Preservative Used: 4°C & HCl for TRIP BLANK

* NOTE: SAMPLES B11-B, B11-C, AND B11-D in saturated zone

*Matrix: S=Solid L=Liquid W=Water GW=Groundwater SL=Sludge WW=Wastewater O=Other

**Preservatives: (1) H_2SO_4 to pH <2 (2) 10N NaOH to pH ≥ 12 (3) HNO_3 to pH <2 (4) 1:1 HCl (5) Zinc Acetate (6) See Remarks

COCform.tem

APPENDIX F

SUPPLEMENTAL GUIDANCE TO RAGS:

CALCULATING THE CONCENTRATION TERM

PB92-963373

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response Washington, D.C. 20460 | Publication 9285.7-08I May 1992

EPA

Supplemental Guidance to RAGS: Calculating the Concentration Term

Office of Emergency and Remedial Response
Hazardous Site Evaluation Division, OS-230

Intermittent Bulletin
Volume 1 Number 1

The overarching mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is to protect human health and the environment from current and potential threats posed by uncontrolled releases of hazardous substances. To help meet this mandate, the U.S. Environmental Protection Agency's (EPA's) Office of Emergency and Remedial Response has developed a human health risk assessment process as part of its remedial response program. This process is described in *Risk Assessment Guidance for Superfund: Volume I — Human Health Evaluation Manual* (RAGS/HHEM). Part A of RAGS/HHEM addresses the baseline risk assessment, and describes a general approach for estimating exposure to individuals from hazardous substance releases at Superfund sites.

This bulletin explains the concentration term in the exposure/intake equation to remedial project managers (RPMs), risk assessors, statisticians, and other personnel. This bulletin presents the general intake equation as presented in RAGS/HHEM Part A, discusses basic concepts concerning the concentration term, describes generally how to calculate the concentration term, presents examples to illustrate several important points, and, lastly, identifies where to get additional help.

THE CONCENTRATION TERM

How is the concentration term used?

RAGS/HHEM Part A presents the Superfund risk assessment process in four "steps": (1) data collection and evaluation; (2) exposure assessment; (3) toxicity assessment; and (4) risk characterization. The concentration term is calculated for use in the exposure assessment step. **Highlight 1** presents the general equation Superfund uses for calculating exposure, and illustrates that the concentration term (C) is one of several parameters needed to estimate contaminant intake for an individual.

For Superfund assessments, the concentration term (C) in the intake equation is an estimate of the arithmetic average concentration for a contaminant based on a set of site sampling results. Because of the uncertainty associated with estimating the true average concentration at a site, the 95 percent upper confidence limit (UCL) of the arithmetic mean should be used for this variable. The 95 percent UCL provides reasonable confidence that the true site average will not be underestimated.

Why use an average value for the concentration term?

An estimate of average concentration is used because:

Highlight 1
GENERAL EQUATION FOR ESTIMATING EXPOSURE TO A SITE CONTAMINANT

$$I = C \times \frac{CR \times EFD}{BW} \times \frac{1}{AT}$$

where:

I = intake (i.e., the quantitative measure of exposure in RAGS/HHEM)
C = contaminant concentration
CR = contact (intake) rate
EFD = exposure frequency and duration
BW = body weight
AT = averaging time

(1) carcinogenic and chronic noncarcinogenic toxicity criteria[1] are based on lifetime average exposures; and

(2) average concentration is most representative of the concentration that would be contacted at a site over time.

For example, if you assume that an exposed individual moves randomly across an exposure area, then the spatially averaged soil concentration can be used to estimate the true average concentration contacted over time. In this example, the average concentration contacted over time would equal the spatially averaged concentration over the exposure area. While an individual may not actually exhibit a truly random pattern of movement across an exposure area, the assumption of equal time spent in different parts of the area is a simple but reasonable approach.

When should an average concentration be used?

The two types of exposure estimates now being required for Superfund risk assessments, a reasonable maximum exposure (RME) and an average, should both use an average concentration. To be protective, the overall estimate of intake (see Highlight 1) used as a basis for action at Superfund sites should be an estimate in the high end of the intake/dose distribution. One high-end option is the RME used in the Superfund program. The RME, which is defined as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site, is intended to account for both uncertainty in the contaminant concentration and variability in exposure parameters (e.g., exposure frequency, averaging time). For comparative purposes, Agency guidance (U.S. EPA, *Guidance on Risk Characterization for Risk Managers and Risk Assessors*, February 26, 1992) states that an average estimate of exposure also should be presented in risk assessments. For decision-making purposes in the Superfund program, however, RME is used to estimate risk.[2]

Why use an estimate of the arithmetic mean rather than the geometric mean?

The choice of the arithmetic mean concentration as the appropriate measure for estimating exposure derives from the need to estimate an individual's long-term average exposure. Most Agency health criteria are based on the long-term average daily dose, which is simply the sum of all daily doses divided by the total number of days in the averaging period. This is the definition of an arithmetic mean. The

[1] When acute toxicity is of most concern, a long-term average concentration generally should not be used for risk assessment purposes, as the focus should be to estimate short-term, peak concentrations.

[2] For additional information on RME, see RAGS/HHEM Part A and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 55 *Federal Register* 8710, March 8, 1990.

arithmetic mean is appropriate regardless of the pattern of daily exposures over time or the type of statistical distribution that might best describe the sampling data. The geometric mean of a set of sampling results, however, bears no logical connection to the cumulative intake that would result from long-term contact with site contaminants, and it may differ appreciably from — and be much lower than — the arithmetic mean. Although the geometric mean is a convenient parameter for describing central tendencies of lognormal distributions, it is not an appropriate basis for estimating the concentration term used in Superfund exposure assessments. The following simple example may help clarify the difference between the arithmetic and geometric mean when used for an exposure assessment:

> Assume the daily exposure for a trespasser subject to random exposure at a site is 1.0, 0.01, 1.0, 0.01, 1.0, 0.01, 1.0, and 0.01 units/day over an 8-day period. Given these values, the cumulative exposure is simply their summation, or 4.04 units. Dividing this by 8 days of exposure results in an arithmetic mean of 0.505 units/day. This is the value we would want to use in a risk assessment for this individual, not the geometric mean of 0.1 units/day. Viewed another way, multiplication of the geometric mean by the number of days equals 0.8 units, considerably lower than the known cumulative exposure of 4.04 units.

UCL AS AN ESTIMATE OF THE AVERAGE CONCENTRATION

What is a 95 percent UCL?

The 95 percent UCL of a mean is defined as a value that, when calculated repeatedly for randomly drawn subsets of site data, equals or exceeds the true mean 95 percent of the time. Although the 95 percent UCL of the mean provides a conservative estimate of the average (or mean) concentration, it should not be confused with a 95th percentile of site concentration data (as shown in Highlight 2).

Why use the UCL as the average concentration?

Statistical confidence limits are the classical tool for addressing uncertainties of a distribution average. The 95 percent UCL of the arithmetic mean concentration is used as the average concentration because it is not possible to know the true mean. The 95 percent UCL therefore accounts for uncertainties due to limited sampling data at Superfund sites. As sampling data become less limited at a site, uncertainties decrease, the UCL moves closer to the true mean, and exposure evaluations using either the mean or the UCL produce similar results. This concept is illustrated in Highlight 2.

Should a value other than the 95 percent UCL be used for the concentration?

A value other than the 95 percent UCL can be used provided the risk assessor can document that high coverage of the true population mean occurs (i.e., the value equals or exceeds the true population mean with high probability). For exposure areas with limited amounts of data or extreme variability in measured or modeled data, the UCL can be greater than the highest measured or modeled concentration. In these cases, if additional data cannot practicably be obtained, the highest measured or modeled value could be used as the concentration term. Note, however, that the true mean still may be higher than this maximum value (i.e., the 95 percent UCL indicates a higher mean is possible), especially if the most contaminated portion of the site has not been sampled.

CALCULATING THE UCL

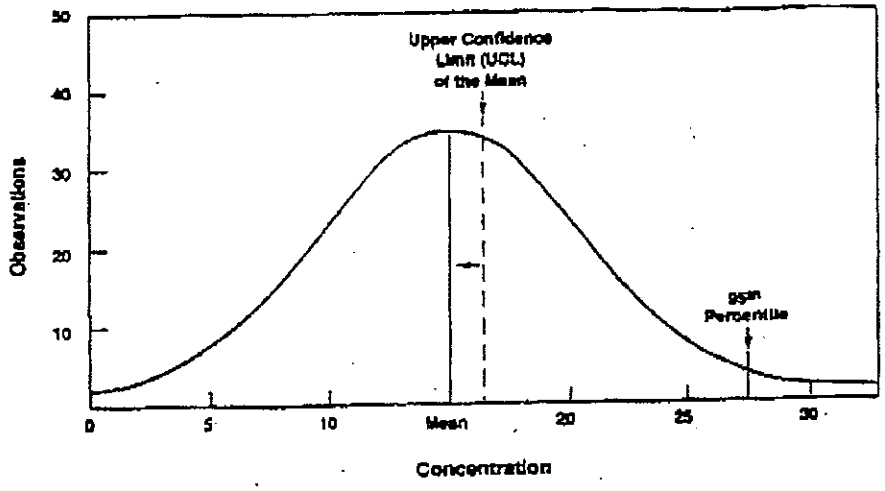
How many samples are necessary to calculate the 95 percent UCL?

Sampling data from Superfund sites have shown that data sets with fewer than 10 samples per exposure area provide poor estimates of the mean concentration (i.e., there is a large difference between the sample mean and the 95 percent UCL), while data sets with 10 to 20 samples per exposure area provide somewhat better estimates of the mean, and data sets with 20 to 30 samples provide fairly consistent estimates of the mean (i.e., the 95 percent UCL is close to the sample mean). Remember that, in general, the UCL approaches the true mean as more samples are included in the calculation.

Should the data be transformed?

EPA's experience shows that most large or "complete" environmental contaminant data sets

Highlight 2
COMPARISON OF UCL AND 95th PERCENTILE



As sample size increases, the UCL of the mean moves closer to the true mean, while the 95th percentile of the distribution remains at the upper end of the distribution.

from soil sampling are lognormally distributed rather than normally distributed (see Highlights 3 and 4 for illustrations of lognormal and normal distributions). In most cases, it is reasonable to assume that Superfund soil sampling data are lognormally distributed. Because transformation is a necessary step in calculating the UCL of the arithmetic mean for a lognormal distribution, the data should be transformed by using the natural logarithm function (i.e., calculate ln(x), where x is the value from the data set). However, in cases where there is a question about the distribution of the data set, a statistical test should be used to identify the best distributional assumption for the data set. The W-test (Gilbert 1987) is one statistical method that can be used to determine if a data set is consistent with a normal or lognormal distribution. In all cases, it is valuable to plot the data to better understand the contaminant distribution at the site.

How do you calculate the UCL for a lognormal distribution?

To calculate the 95 percent UCL of the arithmetic mean for a lognormally distributed data set, first transform the data using the natural logarithm function as discussed previously (i.e., calculate ln(x)). After transforming the data, determine the 95 percent UCL for the data set by completing the following four steps:

(1) Calculate the arithmetic mean of the transformed data (which is also the log of the geometric mean);

(2) Calculate the standard deviation of the transformed data;

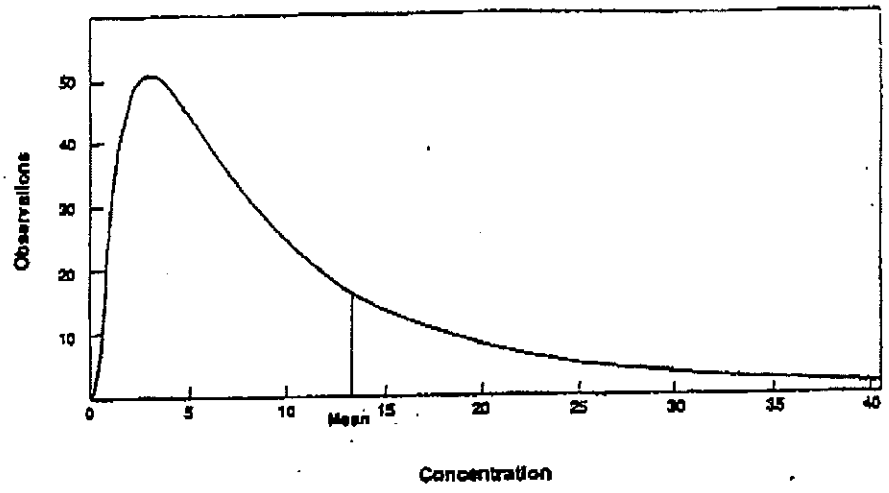
(3) Determine the H-statistic (e.g., see Gilbert 1987); and

(4) Calculate the UCL using the equation shown in Highlight 5.

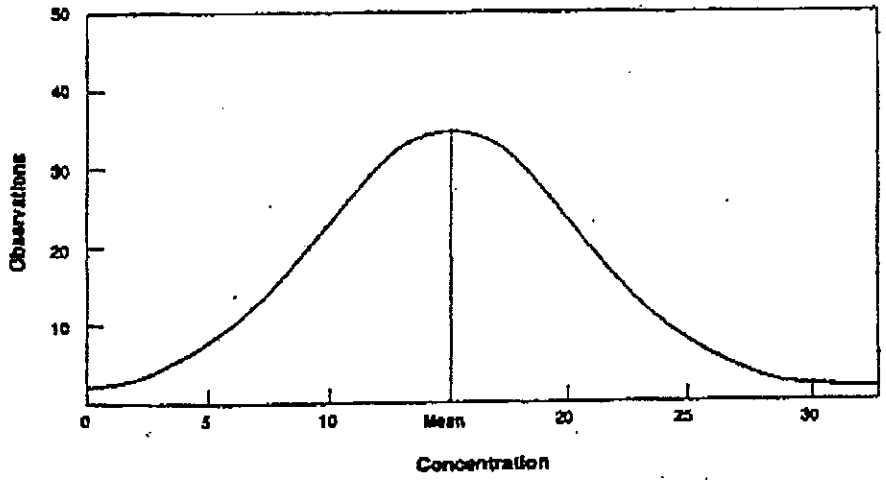
How do you calculate the UCL for a normal distribution?

If a statistical test supports the assumption that the data set is normally distributed, calculate the 95 percent UCL by completing the following four steps:

Highlight 3
EXAMPLE OF A LOGNORMAL DISTRIBUTION



Highlight 4
EXAMPLE OF A NORMAL DISTRIBUTION



Highlight 5
CALCULATING THE UCL OF THE ARITHMETIC MEAN FOR A LOGNORMAL DISTRIBUTION

$$UCL = e^{(\bar{x} + 0.5s^2 + sH/\sqrt{n-1})}$$

where:

UCL	=	upper confidence limit
e	=	constant (base of the natural log, equal to 2.718)
$\bar{x}$	=	mean of the transformed data
s	=	standard deviation of the transformed data
H	=	H-statistic (e.g., from table published in Gilbert 1987)
n	=	number of samples

Highlight 6
CALCULATING THE UCL OF THE ARITHMETIC MEAN FOR A NORMAL DISTRIBUTION

$$UCL = \bar{x} + t(s/\sqrt{n})$$

where:

UCL	=	upper confidence limit
$\bar{x}$	=	mean of the untransformed data
s	=	standard deviation of the untransformed data
t	=	Student-t statistic (e.g., from table published in Gilbert 1987)
n	=	number of samples

(1) Calculate the arithmetic mean of the untransformed data;

(2) Calculate the standard deviation of the untransformed data;

(3) Determine the one-tailed t-statistic (e.g., see Gilbert 1987); and

(4) Calculate the UCL using the equation presented in Highlight 6.

Use caution when applying normal distribution calculations if there is a possibility that heavily contaminated portions of the site have not been adequately sampled. In such cases, a UCL from normal distribution calculations could fall below the true mean, even if a limited data set at a site appears normally distributed.

EXAMPLES

The examples shown in Highlights 7 and 8 address the exposure scenario where an individual at a Superfund site has equal opportunity to contact soil in any sector of the contaminated area over time. Even though the examples address only soil exposures, the UCL approach is applicable to all exposure pathways. Guidance and examples for other exposure pathways will be presented in forthcoming bulletins. *

Highlight 7 presents a simple data set and provides a stepwise demonstration of transforming the data — assuming a lognormal distribution — and calculating the UCL. Highlight 8 uses the same data set to show the difference *between the* UCLs that would result from assuming normal and lognormal distribution of the data. These

Highlight 7
EXAMPLE OF DATA TRANSFORMATION AND CALCULATION OF UCL

This example shows the calculation of a 95 percent UCL of the arithmetic mean concentration for chromium in soil at a Superfund site. This example is applicable only to a scenario in which a spatially random exposure pattern is assumed. The concentrations of chromium obtained from random sampling in soil at this site (in mg/kg) are 10, 13, 20, 36, 41, 59, 67, 110, 110, 136, 140, 160, 200, 230, and 1300. Using these data, the following steps are taken to calculate a concentration term for the intake equation:

(1) Plot the data and inspect the graph. (You may need the help of a statistician for this part [as well as other parts] of the calculation of the UCL.) The plot (not shown, but similar to **Highlight 3**) shows a skew to the right, consistent with a lognormal distribution.

(2) Transform the data by taking the natural log of the values (i.e., determine ln(x)). For this data set, the transformed values are: 2.30, 2.56, 3.00, 3.58, 3.71, 4.08, 4.20, 4.70, 4.70, 4.91, 4.94, 5.08, 5.30, 5.44, and 7.17.

(3) Apply the UCL equation in **Highlight 5**, where:

$\bar{x} = 4.38$
$s = 1.25$
$H = 3.163$ (based on 95 percent)
$n = 15$

The resulting 95 percent UCL of the arithmetic mean is thus found to equal $e^{(6.218)}$, or 502 mg/kg.

Highlight 8
COMPARING UCLS OF THE ARITHMETIC MEAN ASSUMING DIFFERENT DISTRIBUTIONS

In this example, the data presented in **Highlight 7** are used to demonstrate the difference in the UCL that is seen if the normal distribution approach were inappropriately applied to this data set (i.e., if, in this example, a normal distribution is assumed).

ASSUMED DISTRIBUTION:	Normal	Lognormal
TEST STATISTIC:	Student-t	H-statistic
95 PERCENT UCL (mg/kg):	325	502

Table A12 Values of $H_{1-\alpha} = H_{0.95}$ for Computing a One-Sided Upper 95% Confidence Limit on a Lognormal Mean

	n									
s_y	3	5	7	10	12	15	21	31	51	101
0.10	2.750	2.035	1.886	1.802	1.775	1.749	1.722	1.701	1.684	1.670
0.20	3.295	2.198	1.992	1.881	1.843	1.809	1.771	1.742	1.718	1.697
0.30	4.109	2.402	2.125	1.977	1.927	1.882	1.833	1.793	1.761	1.733
0.40	5.220	2.651	2.282	2.089	2.026	1.968	1.905	1.856	1.813	1.777
0.50	6.495	2.947	2.465	2.220	2.141	2.068	1.989	1.928	1.876	1.830
0.60	7.807	3.287	2.673	2.368	2.271	2.181	2.085	2.010	1.946	1.891
0.70	9.120	3.662	2.904	2.532	2.414	2.306	2.191	2.102	2.025	1.960
0.80	10.43	4.062	3.155	2.710	2.570	2.443	2.307	2.202	2.112	2.035
0.90	11.74	4.478	3.420	2.902	2.738	2.589	2.432	2.310	2.206	2.117
1.00	13.05	4.905	3.698	3.103	2.915	2.744	2.564	2.423	2.306	2.205
1.25	16.33	6.001	4.426	3.639	3.389	3.163	2.923	2.737	2.580	2.447
1.50	19.60	7.120	5.184	4.207	3.896	3.612	3.311	3.077	2.881	2.713
1.75	22.87	8.250	5.960	4.795	4.422	4.081	3.719	3.437	3.200	2.997
2.00	26.14	9.387	6.747	5.396	4.962	4.564	4.141	3.812	3.533	3.295
2.50	32.69	11.67	8.339	6.621	6.067	5.557	5.013	4.588	4.228	3.920
3.00	39.23	13.97	9.945	7.864	7.191	6.570	5.907	5.388	4.947	4.569
3.50	45.77	16.27	11.56	9.118	8.326	7.596	6.815	6.201	5.681	5.233
4.00	52.31	18.58	13.18	10.38	9.469	8.630	7.731	7.024	6.424	5.908
4.50	58.85	20.88	14.80	11.64	10.62	9.669	8.652	7.854	7.174	6.590
5.00	65.39	23.19	16.43	12.91	11.77	10.71	9.579	8.688	7.929	7.277
6.00	78.47	27.81	19.68	15.45	14.08	12.81	11.44	10.36	9.449	8.661
7.00	91.55	32.43	22.94	18.00	16.39	14.90	13.31	12.05	10.98	10.05
8.00	104.6	37.06	26.20	20.55	18.71	17.01	15.18	13.74	12.51	11.45
9.00	117.7	41.68	29.46	23.10	21.03	19.11	17.05	15.43	14.05	12.85
10.00	130.8	46.31	32.73	25.66	23.35	21.22	18.93	17.13	15.59	14.26

Source: After Land, 1975.

This table is used in Section 13.2.

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