FORMER NORTHEAST PIT INTERIM RESPONSE ACTION PLAN (IRAP) – JANUARY 8, 2003

ADDENDUM #1
MAY 14, 2003

ADDENDUM #2
FEBRUARY 5, 2009

Ford/Kingsford Site
Kingsford, Michigan

ARCADIS
Infrastructure, environment, facilities

ARCADIS
126 North Jefferson Street
Suite 400
Milwaukee
Wisconsin 53202
Tel 414.276.7742
Fax 414.276.7603
www.arcadis-us.com

ENVIRONMENT

Mr. Chris Austin
Michigan Department of Environmental Quality
1420 U.S. 2 West
Crystal Falls, MI 49920

Date:
5 February 2009

Contact:
Ric. Studebaker

Phone:
414.277.6225

Email:
Ric.Studebaker@arcadis-us.com

Reference:
WI001125.0008

Subject:
Addendum for the Former Northeast Pit Interim Response Action Plan, Ford/Kingsford Site, Kingsford, Michigan.

Dear Mr. Austin:

ARCADIS (on behalf of Ford Motor Company [Ford] and The Kingsford Products Company [KPC]) has prepared this addendum to the document entitled "*Former Northeast Pit Interim Response Action Plan, Ford/Kingsford Site, Kingsford, Michigan*" dated January 8, 2003. The purpose of this addendum is to address the excavation and removal of the concrete culvert and any contained material located under a section of Balsam Street, owned by the City of Kingsford. Balsam Street runs in a north-south direction and is located directly east of the Northeast Pit (NE Pit) area.

Background

The excavation and removal activities are associated with a concrete culvert that was encountered during the excavation activities in the NE Pit area. During excavation activities in the main NE Pit area, a 3-foot diameter reinforced concrete culvert was encountered, which was subsequently excavated to determine the point of origin. It was determined that the culvert ran from the NE Pit to the east towards the Former Distillation building located across Balsam Street at the Former Plant Site property. During the excavation activities, the section of the culvert spanning from Balsam Street to the NE Pit, as well as the section on the Former Plant Site property, were removed, loaded into trucks and transported off site for disposal.

Due to Balsam Street serving as the main access route to the temporary City Hall at the time of construction at the NE Pit, the portion of the concrete culvert was left in place beneath the roadway. Due to road surfacing delays and a request in 2008 to remove the material, ARCADIS proceeded with excavation activities for the removal of the culvert and associated material.

Site Preparation Activities

Prior to the initiation of the excavation activities, the proper permits and approvals were obtained from the city to begin work. Traffic control measures, such as proper signage and barricades, were implemented on July 17 and 18, 2008 for closure of Balsam Street. Utility clearance and management was also completed through the Michigan MISS DIG system.

Excavation

Excavation activities in Balsam Street were completed on July 17 and 18, 2008. The excavation area is shown on Figure 1. Upon initiation of the field activities, temporary road barriers were set up around the excavation area to prevent public access. The excavation activities were conducted by Bacco Construction, Inc. of Iron Mountain, Michigan with oversight provided by ARCADIS. Due to spacing constraints and the location of power lines, the excavation was completed in two parts. The excavation began on the east side of Balsam Street near the location of the gas line and water main. The activities began with sawcutting through the asphalt layer in the excavation area at a width of approximately 5 feet. An excavator was used to remove the asphalt road surface, backfill material, and the concrete culvert. The concrete culvert on the east side was first encountered approximately 6 feet below ground surface (ft bgs), beneath the gas line. The material inside of the culvert consisted of tar, wood pieces, charcoal fragments, and carbon fragments. Soil material was excavated to a total depth of approximately 9 feet. A total area of approximately 20 feet by 10 feet was excavated on the east side of the road. The concrete culvert and any waste material it contained were removed and transported via front-end loader to designated roll-off boxes. The amount of clean fill mixed in with the culvert and associated material was minimized as much as possible. The clean backfill that was excavated was staged on the north side of the excavation for reuse. No waste or concrete culvert was encountered between the gas line and the center line of the road. This portion of the culvert was likely removed during the installation of the water and sewer lines present within the roadway.

After visual inspection and over-excavation indicated that the waste material and the concrete culvert had been completely removed, the east side of the excavation was backfilled to 2 ft bgs with the excavated fill material and compacted in 2 foot lifts. Compaction testing using the Modified Proctor Test (ASTM D 1557) was completed by Coleman Engineering Company.

The excavation on the west side began at the west edge of Balsam Street and continued back to the east towards the center line of the road. The concrete culvert on the west side was first encountered at approximately 5 ft bgs beneath the shoulder of the road. The culvert was present from approximately the center of the road to approximately 5 feet west of the NE Pit fenced area. The area beyond the NE Pit fence was excavated following the restoration of the road to shorten the timeframe that Balsam Street was closed. An area approximately 10 feet by 10 feet was excavated on the west side of the road. The west side of the culvert was mostly intact and filled with solidified waste material consistent with the material found on the east side. Soil was excavated to a depth of approximately 8 ft bgs and again a visual inspection and over-excavation indicated that the concrete culvert and the associated waste material had been completely removed. The area was then backfilled to 2 ft bgs with excavated fill material, compacted in two foot lifts, and tested similar to the eastern side.

Following completion of the roadway restoration, on July 21, 2008, Bacco Construction began excavating west of the NE Pit perimeter fence on the west side of Balsam Street. An area approximately 5 feet by 8 feet was excavated to remove the end of the culvert and the associated waste material. The concrete culvert was removed and placed into designated roll-off boxes. The area was backfilled to the surface.

Site Restoration

Upon completion of the excavation and backfilling in Balsam Street, sand was placed in the excavation to bring the fill material to approximately 8 inches bgs. The sand was then compacted and watered. Gravel was placed on top of the sand and spread to prepare the base for asphalt. The gravel was compacted, watered, and graded. Upon completion of grading the roadway was swept to remove any remaining soil from the area. Two layers of asphalt were placed over the excavated area for a total thickness of approximately 4 inches. Road barriers and barricades along with signage were removed and Balsam Street was re-opened for public access on July 18, 2008.

Waste Handling and Disposal

During excavation activities, waste material and portions of the concrete culvert were placed into designated 20 yard roll-off boxes on the NE Pit property via a front-end loader. A total of 7 roll-off boxes, approximately 70 yards of material, were appropriately secured, covered, and staged on site pending appropriate waste profiling and subsequent disposal. Following completion of profiling, the material was transported to Veolia Hickory Meadows Landfill, LLC in Hilbert, Wisconsin for disposal. A copy of the waste documentation is attached.

Closing

The excavation and removal of the section of concrete culvert beneath Balsam Street has been completed. These activities were completed as a supplement to the NE Pit interim action, and this Addendum is incorporated into the Interim Response Action Plan (January 8, 2003) and will also be incorporated into the overall site-wide Remedial Action Plan.

If you have any questions, please contact the undersigned.

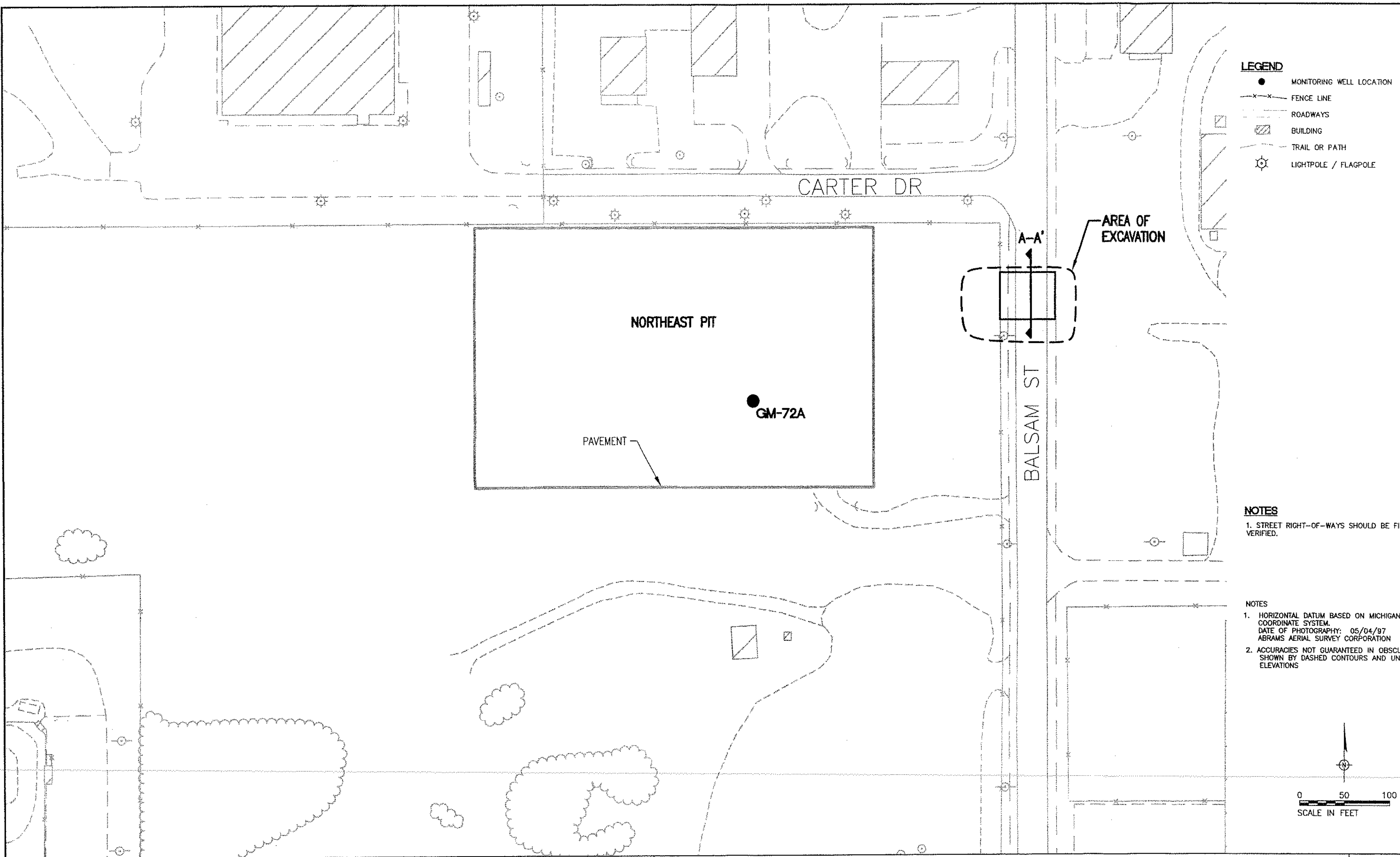
Sincerely,

ARCADIS

Richard L. Studebaker Jr., PE
Principal Engineer/Project Manager

Copies:
David Miller
Daniel Musgrove

Attachments



LEGEND

●	MONITORING WELL LOCATION
—x—x—	FENCE LINE
- - -	ROADWAYS
▨	BUILDING
- - -	TRAIL OR PATH
☼	LIGHTPOLE / FLAGPOLE

NOTES

1. STREET RIGHT-OF-WAYS SHOULD BE FIELD VERIFIED.

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

User Name : cmckeough
Acad Version : R17.0s (LMS Tech)
Current Plotstyle : ByColor
Date\Time : Wed, 26 Nov 2008 - 9:16am
Page Setup: 5100-11X17
Pen Table: BLACKGRAY.ctb
Layout Tab: Layout1
Path\Name : G:\Aproject\FORD\WI0637\CJ2008\CADD\NE PIT\REST COV-BALSAM-R1.dwg

Area Manager

Project Director
R. STUDEBAKER

Task Manager

Technical Review

ARCADIS

126 North Jefferson Street, Suite 400
Milwaukee, Wisconsin 53202
Tel: 414-276-7742 Fax: 414-276-7603
www.arcadis-us.com

LOCATION OF EXCAVATION AREAS

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

Project Number
WI001095

Drawing Date
2/05/08

Figure
1

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553 13 September 2008 6:50 am
Ticket: 248107 13 September 2008 7:12 am
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR 00 Gross Weight 59,200.00 lb
GREAT AMERICAN DISPOSAL COStored Tare Weight 34,860.00 lb
20 YD ORO Net Weight 24,340.00 lb 12.17 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit		Description	Rate	Tax	Total
12.17	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver Chad
HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11854

SPECIAL WASTE MANIFEST DISPOSAL TICKET 248107

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Rachel R. Saini on behalf of Ford Motor Company 9/13/08 Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 9/13/08 Date

DRIVER'S SIGNATURE: 9/13/08 Date TRUCK NO. 103 12.17 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553 10 September 2008 10:17 am
Ticket: 247766 10 September 2008 10:34 am
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR 00 Gross Weight 58,400.00 lb
GREAT AMERICAN DISPOSAL COStored Tare Weight 33,380.00 lb
20 YD ORO Net Weight 25,020.00 lb 12.51 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit		Description	Rate	Tax	Total
12.51	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver
HAVE A GREAT DAY!!
LICENSE NUMBER: 61-11854

247766

SPECIAL WASTE MANIFEST DISPOSAL TICKET

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services
TRANSPORTER: Great American Disposal
GENERATOR: Ford Motor Company
GENERATOR'S SIGNATURE: Ruel R. Saw on behalf of Ford Motor Company / / Date
WASTE DESCRIPTION: Remediation Waste
PROFILE #: HML08-144
ACCEPTED BY: 9.10.08 Date
DRIVER'S SIGNATURE: 9.10.08 Date TRUCK NO. 103 12.51 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553

9 September 2008 10:43 am
9 September 2008 11:06 am

Ticket: 247657
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR
GREAT AMERICAN DISPOSAL CO
20 YD ORO

00 Gross Weight 58,500.00 lb
Stored Tare Weight 33,260.00 lb
Net Weight 25,240.00 lb 12.62 TN
OUT OF STATE 100

Contract: HML08-144
Reference:

FORD MOTOR CO / REMEDIATION WASTE

QuantityUnit		Description	Rate	Tax	Total
12.62	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver

HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11864

247657

SPECIAL WASTE MANIFEST DISPOSAL TICKET

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Ruel R. Sam on behalf of Ford Motor Company / / Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 9.9.08 Date

DRIVER'S SIGNATURE: 9.9.08 Date TRUCK NO. 103 12.62 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553

Ticket: 247330
5 September 2008 8:59 am
5 September 2008 9:16 am

000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR
GREAT AMERICAN DISPOSAL CO
20 YD ORO

00 Gross Weight 58,460.00 lb
Stored Tare Weight 34,860.00 lb
Net Weight 23,600.00 lb 11.80 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

Quantity	Unit	Description	Rate	Tax	Total
11.80	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver

HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11854

247330

SPECIAL WASTE MANIFEST DISPOSAL TICKET

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Brett R. Saari on behalf of Ford Motor Company / / Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 9/5/08 Date

DRIVER'S SIGNATURE: 9/5/08 Date TRUCK NO. 103 11.80 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

```
                 VEOLIA HICKORY MEADOWS LANDFILL                 B5
                     W3105 SCHNEIDER ROAD
                       HILBERT, WI 54129
                         920-853-8553           4 September 2008    1:20 pm
Ticket:     247261                              4 September 2008    1:37 pm
 000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle:  103GR                       00 Gross Weight  58,360.00 lb
          GREAT AMERICAN DISPOSAL COStored Tare Weight  34,040.00 lb
          20 YD ORO                       Net Weight  24,320.00 lb 12.16 TN
                                                OUT OF STATE      100

Contract: HML08-144                         FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit   Description                              Rate      Tax    Total
12.16    TN     37A Remediated Waste / Soil


                                                  Net Amount:

 Weighmaster:   JOAN M QUANDT        Driver
                             HAVE A GREAT DAY!!
                         LICENSE NUMBER:  81-11854
```

SPECIAL WASTE MANIFEST DISPOSAL TICKET

247261

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Rick R. Saw on behalf of Ford Motor Company Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 9-4-08 Date

DRIVER'S SIGNATURE: 9.4.08 Date TRUCK NO. 103 12.16 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553 3 September 2008 1:01 pm
Ticket: 247106 3 September 2008 1:22 pm
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR 00 Gross Weight 58,100.00 lb
GREAT AMERICAN DISPOSAL COStored Tare Weight 35,200.00 lb
20 YD ORO Net Weight 22,900.00 lb 11.45 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit		Description	Rate	Tax	Total
11.45	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver
HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11854

SPECIAL WASTE MANIFEST DISPOSAL TICKET 247106

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services
TRANSPORTER: Great American Disposal
GENERATOR: Ford Motor Company
GENERATOR'S SIGNATURE: Ronald R. Saw on behalf of Ford Motor Company / / Date
WASTE DESCRIPTION: Remediation Waste
PROFILE #: HML08-144
ACCEPTED BY: 9.3.08 Date
DRIVER'S SIGNATURE: 9/3/08 Date TRUCK NO. 103 11.45 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553 2 September 2008 8:22 am

Ticket: 246869 2 September 2008 8:42 am
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR 00 Gross Weight 58,460.00 lb
GREAT AMERICAN DISPOSAL COStored Tare Weight 34,700.00 lb
20 YD ORO Net Weight 23,760.00 lb 11.88 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit		Description	Rate	Tax	Total
11.88	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver
HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11864

SPECIAL WASTE MANIFEST DISPOSAL TICKET 246869

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Rachl R. Sun on behalf of Ford Motor Company / / Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 9 2 08 Date

DRIVER'S SIGNATURE: 9/2/08 Date TRUCK NO. 103 11.88 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553

B5

29 August 2008 9:47 am
29 August 2008 10:02 am

Ticket: 246732
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR
GREAT AMERICAN DISPOSAL CO
20 YD ORO

00 Gross Weight 58,460.00 lb
Stored Tare Weight 34,200.00 lb
Net Weight 24,260.00 lb 12.13 TN
OUT OF STATE 100

Contract: HML08-144 FORD MOTOR CO / REMEDIATION WASTE
Reference:

QuantityUnit		Description	Rate	Tax	Total
12.13	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver

HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11854

SPECIAL WASTE MANIFEST DISPOSAL TICKET

246732

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC.
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Paul R. [illegible] on behalf of Ford Motor Company / / Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: 8/29/08 Date

DRIVER'S SIGNATURE: 8/29/08 Date TRUCK NO. 103 12.13 TONS/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

VEOLIA HICKORY MEADOWS LANDFILL B5
W3105 SCHNEIDER ROAD
HILBERT, WI 54129
920-853-8553

Ticket: 246677
28 August 2008 3:06 pm
28 August 2008 3:22 pm
000333 - 0013 FORD MOTOR COMPANY c/o VEOLIA ES INDUST

Vehicle: 103GR
GREAT AMERICAN DISPOSAL CO
20 YD ORO

00 Gross Weight 57,800.00 lb
Tare Weight 35,240.00 lb
Net Weight 22,560.00 lb 11.28 TN
OUT OF STATE 100

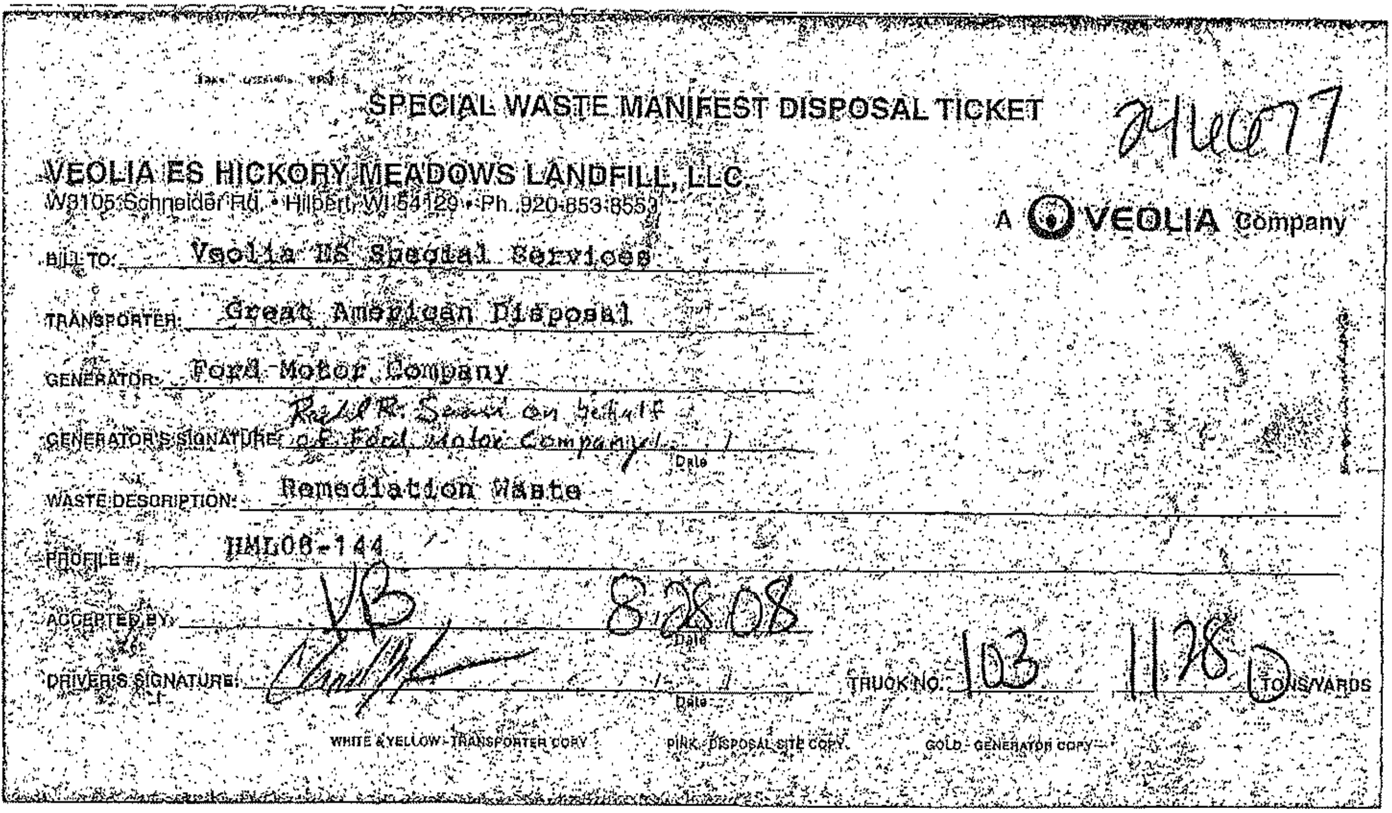
Contract: HML08-144
Reference:
FORD MOTOR CO / REMEDIATION WASTE

QuantityUnit		Description	Rate	Tax	Total
11.28	TN	37A Remediated Waste / Soil			

Net Amount:

Weighmaster: JOAN M QUANDT Driver Chad

HAVE A GREAT DAY!!
LICENSE NUMBER: 81-11854



SPECIAL WASTE MANIFEST DISPOSAL TICKET

246677

VEOLIA ES HICKORY MEADOWS LANDFILL, LLC
W3105 Schneider Rd. • Hilbert, WI 54129 • Ph. 920-853-8553

A VEOLIA Company

BILL TO: Veolia ES Special Services

TRANSPORTER: Great American Disposal

GENERATOR: Ford Motor Company

GENERATOR'S SIGNATURE: Ralph R. Semin on behalf of Ford Motor Company Date

WASTE DESCRIPTION: Remediation Waste

PROFILE #: HML08-144

ACCEPTED BY: VB Date 8.28.08

DRIVER'S SIGNATURE: Chad Date

TRUCK NO. 103 11.28 [✓ TONS]/YARDS

WHITE & YELLOW - TRANSPORTER COPY PINK - DISPOSAL SITE COPY GOLD - GENERATOR COPY

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS G&M, Inc.
126 North Jefferson Street
Suite 400
Milwaukee
Wisconsin 53202
Tel 414 276 7742
Fax 414 276 7603
www.arcadis-us.com

ENVIRONMENT

Mr. Chris Austin
Michigan Department of Environmental Quality
1420 U.S. 2 West
Crystal Falls, MI 49920

Date:
14 May 2003

Contact:
Ric Studebaker

Phone:
414 277 6225

Email:
rstudebaker@arcadis-us.com

Our ref:
WI000975.0032.0001

Subject:
Addendum for the Former Northeast Pit Interim Response Action Plan, Ford/Kingsford Site, Kingsford, Michigan.

Dear Mr. Austin:

As discussed during our previous telephone conversations, and our meetings on March 12 and April 1, 2003, ARCADIS (on behalf of Ford Motor Company [Ford] and The Kingsford Products Company [KPC]) has prepared this addendum to the document entitled "*Former Northeast Pit Interim Response Action Plan, Ford/Kingsford Site, Kingsford, Michigan*" dated January 8, 2003. The purpose of this addendum is to address the Michigan Department of Environmental Quality (MDEQ) correspondence dated March 14, 2003, and to facilitate approval of the proposed interim response action for the Northeast Pit (NE Pit). Ford/KPC are prepared to immediately proceed with implementation of the proposed action, following receipt of Interim Response Action Plan (IRAP) approval from the MDEQ.

As mentioned in the March 14, 2003 MDEQ correspondence, revisions to the Part 201 Rules went into effect on December 21, 2002. Tables 4, 5, 6, 9, and 10 of the NE Pit IRAP have been updated to reflect any changes to the applicable criteria that resulted from the Part 201 Rule revisions. Copies of the revised tables containing the updated applicable criteria are provided as an attachment to this addendum. Although some of the criteria values have changed, these changes do not affect the NE Pit interim response action. The Part 201 Rule revisions made no changes to the groundwater, surface soil, and subsurface soil constituents of concern. Several constituents present in the waste material now have concentrations above newly established groundwater/ surface water interface criteria (1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, diethylphthalate, and acetaldehyde). However, these same constituents were already appropriately addressed by the NE Pit IRAP due to the presence of concentrations above other applicable criteria. No new constituents were identified as having concentrations above the revised criteria.

The interim response action for the NE Pit is only intended to address the former NE Pit itself (as defined in the IRAP document), with the specific intentions of 1) consolidating the waste material requiring action under a low-permeability surface cover, thereby minimizing or eliminating any potential infiltration of precipitation that could cause a continuing release of constituents to groundwater; and 2) establishing an appropriate barrier to direct contact with waste materials remaining in the NE Pit, and preventing the migration of wood tar to the surface. With the exception of the waste consolidation activities, the interim action proposed for this area does not address any environmental media beyond the boundaries of the NE Pit.

In accordance with the definition of an interim response action, implementation of the NE Pit IRAP is intended to appropriately address environmental issues in a certain area to provide immediate benefits, while site-wide or overall plans are being evaluated and developed. The interim response action will be an integral component of the final site-wide remedy.

Specifically in accordance with Rule 526(5)(d), the interim response activities for the NE Pit will be incorporated into the final overall site-wide remedy by addressing the issues of potential infiltration of precipitation through the waste materials, direct contact, and wood tar migration as outlined above. The implementation of this interim response action will not conflict with any potential future remedial activities that may be undertaken to address environmental media outside the boundaries of the NE Pit.

In an effort to utilize as much of the 2003 construction season as possible, ARCADIS is requesting MDEQ comment/approval for the NE Pit IRAP by June 13, 2003, as outlined in the revised project schedule presented on the attached Figure 14. MDEQ approval within this timeframe will still allow significant construction activities to proceed this season.

We trust this information will meet your needs. If you have any questions, or require any further information, please contact the undersigned.

Sincerely,

ARCADIS G&M, Inc.

R.L. Studebaker II

Richard L. Studebaker, Jr., PE
Senior Engineer/Project Manager

Copies:
David Miller
Daniel Musgrove

Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring	Surface soil	Surface soil	Surface soil	Surface soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	0.5'	0.5'	0.5'	0.5'	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	05/04/88	05/04/88	05/04/88	05/04/88	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	S-1	S-1 RE	S-2	S-4	SSNE-1	SSNE-2	SSNE-4	SSNE-5
VOC								
2-Butanone (MEK)	170	NA	160	33 J	<2,600	<2,600	<2,700	<2,600
4-Methyl-2-pentanone (MIBK)	<10	NA	5 J	<1,000	<2,600 J	<2,600 J	<2,700 J	<2,600 J
Acetone	<39	NA	<48	11 J	<5,300	<5,200	<5,400	<5,200
Chloroform	13	NA	12	<500	<53	<52	<54	<52
Methylene chloride	96 B	NA	110 B	<500	<260	<260	<270	<260
Toluene	4 J	NA	6	<500	<100	<100	<110	<100
Xylenes (total)	<5	NA	5	<500	<160	<160	<160	<160
SVOC								
2,4-Dimethylphenol	NA	<340	<340	3,500	<340	<340	<350	<340
2-Methylnaphthalene	NA	<340	<340	760 J	<340	<340	<350	<340
2-Methylphenol	NA	<340	<340	1,600	<340	<340	<350	<340
bis(2-Ethylhexyl)phthalate	NA	62 J	66 J	<1,400	<340	<340	<350	<340
Naphthalene	NA	<340	<340	1,900	<340	<340	<350	<340
Pentachlorophenol	NA	<1,600	27 J	<6,700	<1,800	<1,800	<1,800	<1,800
Metals								
Aluminum	2,680,000	NA	2,810,000	4,430,000	NA	NA	NA	NA
Antimony	<2,900 N	NA	<2,900 N	4,500 BN	NA	NA	NA	NA
Arsenic	3,300 N+	NA	3,200 NS	2,400 N+	NA	NA	NA	NA
Barium	25,400 B	NA	17,400 B	33,100 B	NA	NA	NA	NA
Beryllium	110 B	NA	100 B	110 B	NA	NA	NA	NA
Calcium	910,000 B	NA	1,130,000	1,420,000	NA	NA	NA	NA

Footnotes on Page 7.

Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring	Surface soil	Surface soil	Surface soil	Surface soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	0.5'	0.5'	0.5'	0.5'	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	05/04/88	05/04/88	05/04/88	05/04/88	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	S-1	S-1 RE	S-2	S-4	SSNE-1	SSNE-2	SSNE-4	SSNE-5
Metals (continued)								
Chromium	8,400	NA	7,000	10,100	NA	NA	NA	NA
Cobalt	3,700 B	NA	2,200 B	3,300 B	NA	NA	NA	NA
Copper	23,500 *	NA	11,100 *	23,500 *	NA	NA	NA	NA
Iron	5,170,000	NA	4,630,000	5,540,000	NA	NA	NA	NA
Lead	2,000 +	NA	3,000 S	6,300 S	NA	NA	NA	NA
Magnesium	1,880,000	NA	1,210,000	1,750,000	NA	NA	NA	NA
Manganese	188,000 *	NA	108,000 *	112,000 *	NA	NA	NA	NA
Nickel	7,500 B	NA	6,200 B	3,700	NA	NA	NA	NA
Potassium	315,000 B	NA	232,000 B	1,140,000	NA	NA	NA	NA
Selenium	<450 W	NA	<450 W	470 BW	NA	NA	NA	NA
Silver	<860 N	NA	<850 N	1,200 BN	NA	NA	NA	NA
Sodium	55,000 B	NA	47,000 B	92,000 B	NA	NA	NA	NA
Vanadium	12,200	NA	7,500 B	12,900	NA	NA	NA	NA
Zinc	44,700 *E	NA	23,200 *E	18,900 *E	NA	NA	NA	NA
Alcohols								
1-Propanol	NA	NA	NA	NA	<1,000	<1,000	<1,100	<1,000
PEST/PCB								
Aroclor 1242	<160	NA	**1,200 D**	**2,300 D**	<34	<34	<35 J	<34

Footnotes on Page 7.

Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	SSNE-6	SSNE-7	SSNE-8	SSNE-98	SSNE-9	SSNE-10	SSNE-11	SSNE-12
VOC								
2-Butanone (MEK)	<2,600	<2,600	<2,600	<2,600	<2,700	<2,600	<2,600	<2,600
4-Methyl-2-pentanone (MIBK)	<2,600 J	<2,600 J	<2,600 J	<2,600 J	<2,700 J	<2,600 J	<2,600 J	<2,600 J
Acetone	<5,300	<5,300	<5,300	<5,300	<5,400	<5,200	<5,300	<5,300
Chloroform	<53	<53	<53	<53	<54	<52	<53	<53
Methylene chloride	<260	<260	<260	<260	<270	<260	<260	<260
Toluene	<110	<100	<110	<110	<110	<100	<100	<110
Xylenes (total)	<160	<160	<160	<160	<160	<150	<160	<160
SVOC								
2,4-Dimethylphenol	<350	<350	<350	<350	<360	<340	<340	<350
2-Methylnaphthalene	<350	<350	<350	<350	<360	<340	<340	<350
2-Methylphenol	<350	<350	<350	<350	<360	<340	<340	<350
bis(2-Ethylhexyl)phthalate	<350	<350	<350	<350	<360	<340	<340	<350
Naphthalene	<350	<350	<350	<350	<360	<340	<340	<350
Pentachlorophenol	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA

Footnotes on Page 7.

Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	SSNE-6	SSNE-7	SSNE-8	SSNE-98	SSNE-9	SSNE-10	SSNE-11	SSNE-12
Metals (continued)								
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Alcohols								
1-Propanol	<1,100	<1,000	<1,100	<1,100	<1,100	550 J	<1,000	<1,100
PEST/PCB								
Aroclor 1242	<35 J	<34 J	<35 J	<35	<36	<34	<35 J	<35

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Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring	Criteria				
Depth Sample Date Sample I.D.	Industrial Direct Contact	Residential Drinking Water Protection	Industrial Indoor Inhalation	Industrial Ambient Air Particulate Inhalation	Groundwater Surface Water Interface Protection
VOC					
2-Butanone (MEK)	27,000,000 (I) C,DD	260,000 (I)	27,000,000 (I) C	29,000,000,000 (I)	44,000 (I)
4-Methyl-2-pentanone (MIBK)	2,700,000 (I) C	36,000 (I)	2,700,000 (I) C	60,000,000,000 (I)	(I) ID
Acetone	73,000,000 (I)	15,000 (I)	110,000,000 (I) C	170,000,000,000 (I)	34,000 (I)
Chloroform	1,500,000 C	2,000 W	38,000	1,600,000,000	3,400 X
Methylene chloride	2,300,000 C	100	240,000	8,300,000,000	19,000 X
Toluene	250,000 (I) C	16,000 (I)	250,000 (I) C	12,000,000,000 (I)	2,800 (I)
Xylenes (total)	150,000 (I) C	5,600 (I)	150,000 (I) C J	130,000,000,000 (I)	700 (I)
SVOC					
2,4-Dimethylphenol	36,000,000	7,400	NLV	2,100,000,000	7,600
2-Methylnaphthalene	26,000,000	57,000	ID	ID	ID
2-Methylphenol	36,000,000 J	7,400 J	NLV	2,900,000,000 J	1,400 J
bis(2-Ethylhexyl)phthalate	10,000,000 C	NLL	NLV	890,000,000	NLL
Naphthalene	52,000,000	35,000	470,000	88,000,000	870
Pentachlorophenol	320,000	22	NLV	130,000,000	G,X
Metals					
Aluminum	370,000,000 (B) DD	1,000 (B)	(B) NLV	(B) ID	(B) NA
Antimony	670,000	500 M	NLV	5,900,000	94,000
Arsenic	37,000	23,000	NLV	910,000	70,000 X
Barium	130,000,000 (B)	1,300,000 (B)	(B) NLV	150,000,000 (B)	(B) G,X
Beryllium	1,600,000	51,000	NLV	590,000	G
Calcium	NA	NA	NA	NA	NA

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Table 4. Summary of Consistuents Detected in Surface Soil Samples, Former NE Pit IRAP, Ford/Kingsford, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Criteria				
	Industrial Direct Contact	Residential Drinking Water Protection	Industrial Indoor Inhalation	Industrial Ambient Air Particulate Inhalation	Groundwater Surface Water Interface Protection
Metals (continued)					
Chromium	9,200,000 (hexavalent)	30,000 (hexavalent)	(hexavalent) NLV	240,000 (hexavalent)	3,300 (hexavalent)
Cobalt	9,000,000	800	NLV	5,900,000	2,000
Copper	73,000,000 (B)	5,800,000 (B)	(B) NLV	59,000,000 (B)	(B) G
Iron	580,000,000 (B)	6,000 (B)	(B) NLV	(B) ID	(B) NA
Lead	900,000 (B) DD	700,000 (B)	(B) NLV	44,000,000 (B)	(B) G,M,X
Magnesium	1,000,000,000 (B) D	8,000,000 (B)	(B) NLV	2,900,000,000 (B)	(B) NA
Manganese	90,000,000 (B)	1,000 (B)	(B) NLV	1,500,000 (B)	(B) G,X
Nickel	150,000,000 (B)	100,000 (B)	(B) NLV	16,000,000 (B)	(B) G
Potassium	NA	NA	NA	NA	NA
Selenium	9,600,000 (B)	4,000 (B)	(B) NLV	59,000,000 (B)	400 (B)
Silver	9,000,000 (B)	4,500 (B)	(B) NLV	2,900,000 (B)	500 (B) M
Sodium	1,000,000,000 D	2,500,000	NLV	ID	NA
Vanadium	5,500,000 DD	72,000	NLV	ID	190,000
Zinc	630,000,000 (B)	2,400,000 (B)	(B) NLV	(B) ID	(B) G
Alcohols					
1-Propanol	74,000,000 (I) DD	28,000 (I)	(I) NLV	21,000,000,000 (I)	(I) NA
PEST/PCB					
Aroclor 1242	1,000 (J,T) T	(J,T) NLL	16,000,000 (J,T)	6,500,000 (J,T)	(J,T) NLL

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Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

All results are in micrograms per kilogram (µg/kg).

Bold	Value above the Industrial Direct Contact Criteria (Operational Memorandum #18, December 21, 2002).
Italics	Value above the Industrial Indoor Inhalation Criteria (Operational Memorandum #18, December 21, 2002).
▨	Value above the Residential Drinking Water Protection Criteria (Operational Memorandum #18, December 21, 2002).
☐	Value above the Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, December 21, 2002).
underline	Value above the Groundwater/Surface Water Interface Protection Criteria (Operational Memorandum #18, December 21, 2002).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
+	+ Correlation coefficient for method of standard addition was not within control limits.
B	Constituent was also detected in laboratory blank.
D	Dilution.
DUP	Duplicate sample.
E	Interference, result is estimated.
J	Estimated result.
N	Presumptive evidence of compound was identified (TICs only).
NA	Not analyzed.
S	Value was determined by the Method of Standard Additions.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile Organic Compounds.
W	Post-digestion spike for furnace A-A analysis is out of control limits.

Criteria Footnotes:

AD	Hazardous substance causes developmental effects. Residential and Commercial I Direct Contact Criteria are protective of both prenatal and postnatal exposure.
B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, therefore it is reduced to 100%.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Criteria Footnotes (continued)

DD	Hazardous substance causes developmental effects.
G	GSI criterion is hardness dependent.
I	Hazardous substance may exhibit the characteristic of ignitability as defined in 40 CFR 261.21.
NA	Criterion or value is not available.
NE	Not established.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
NLL	Chemical is not likely to leach under most soil conditions.
NLV	Chemical is not likely to volatilize under most soil conditions.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
T	Refer to Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended.
W	Concentrations of trihalomethanes must be added together.
X	The GSI criterion shown is not protective for surface water that is used as a drinking water source.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
VOC					
1,1,2,2-Tetrachloroethane	<4,300	<13	<25 J	<32 J	4,900 J
1,2,4-Trimethylbenzene	NA	86 J	92 J	55,000 DJ	55,000 J
1,2-Dichloroethane	<4,300	<13	<25 J	<32 J	<3,800 J
1,3,5-Trimethylbenzene	NA	<13 J	<25 J	13,000 DJ	13,000 J
2-Butanone (MEK)	10,000 J	120 J	180 J	140,000 DBJ	140,000 J
2-Hexanone	<43,000	<66 J	<130 J	23,000 DJ	23,000 J
4-Methyl-2-pentanone (MIBK)	<43,000	<66 J	<130 J	3,800 J	<19,000 J
Acetone	12,000 J	500 J	370 J	95,000 DJ	95,000 J
Benzene	<4,300	35	21 J	3,000 DJ	3,000 J
Carbon disulfide	<4,300	63 J	50 J	<32 J	<3,800 J
Chlorobenzene	<4,300	<13	<25 J	<32 J	<3,800 J
Ethylbenzene	2,300 J	15	15 J	8,300 DJ	8,300 J
Isopropylbenzene	NA	<13	<25 J	1,200 J	<3,800 J
Methylene chloride	<4,300	<13 J	<25 J	<32 J	<3,800 J
Naphthalene	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA
n-Propylbenzene	NA	<13 J	<25 J	8,800 DJ	8,800 J
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA
Styrene	<4,300	<13	<25 J	<32 J	6,100 J
Toluene	3,300 J	50	42 J	14,000 DJ	14,000 J
Trichloroethene	<4,300	<13	<25 J	<32 J	<3,800 J
Xylene, o	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA
Xylenes (total)	7,600	72 J	78 J	58,000 DJ	58,000 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	15,000	<4,900	NA	76,000	NA
2-Methylnaphthalene	3,900	<4,900	NA	56,000	NA
2-Methylphenol	14,000	<4,900	NA	77,000	NA
2-Nitrophenol	<1,400	<10,000	NA	<58,000	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	<4,900	NA	62,000	NA
4-Methylphenol	18,000	NA	NA	NA	NA
4-Nitrophenol	<6,900	<25000	NA	<150,000	NA
Acenaphthene	<1,400	<4,900	NA	<29,000	NA
Anthracene	<1,400	<4,900	NA	<29,000	NA
Benzo(a)anthracene	<1,400	<4,900	NA	<29,000	NA
Benzoic acid	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	<1,400	<4,900	NA	<29,000	NA
Chrysene	<1,400	<4,900	NA	<29,000	NA
Dibenzofuran	<1,400	<4,900	NA	<29,000	NA
Diethylphthalate	<1,400	<4,900	NA	<29,000	NA
Di-n-butylphthalate	<1,400	<4,900	NA	99,000	NA
Fluoranthene	<1,400	<4,900	NA	<29,000	NA
Fluorene	880 J	<4,900 J	NA	<29,000 J	NA
Naphthalene	4,200	<4,900	NA	220,000	NA
Phenanthrene	<1,400	<4,900	NA	<29,000	NA
Phenol	15,000	<4,900	NA	40,000	NA
Pyrene	<1,400	<4,900 J	NA	<29,000 J	NA
Metals					
Aluminum	3,340,000	1,600,000 J	NA	830,000 J	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Metals (continued)					
Aluminum in Oil	NA	NA	NA	NA	NA
Antimony	804	1,400 BJ	NA	<3,800 J	NA
Arsenic	884	2,500 J	NA	900 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA
Barium	104,000	240,000	NA	48,000	NA
Barium in Oil	NA	NA	NA	NA	NA
Beryllium	<866	120 B	NA	39 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA
Cadmium	120	180 J	NA	R	NA
Cadmium in Oil	NA	NA	NA	NA	NA
Calcium	42,600,000	40,000,000	NA	52,000,000	NA
Chromium	8,270	22,000	NA	2,400	NA
Chromium in Oil	NA	NA	NA	NA	NA
Cobalt	<8,660	780 B	NA	230 B	NA
Cobalt in Oil	NA	NA	NA	NA	NA
Copper	463,000	410,000	NA	460,000	NA
Copper in Oil	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Iron	5,530,000 MBB	2,700,000	NA	1,700,000	NA
Iron in Oil	NA	NA	NA	NA	NA
Lead	37,100	68,000	NA	12,000	NA
Lead in Oil	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA
Magnesium	3,400,000	2,300,000	NA	3,000,000	NA
Manganese	129,000	140,000	NA	360,000	NA
Manganese in Oil	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Metals (continued)					
Mercury	167	120 B	NA	20 B	NA
Mercury in Oil	NA	NA	NA	NA	NA
Molybdenum	NA	1,200 B	NA	<7,600	NA
Molybdenum in Oil	NA	NA	NA	NA	NA
Nickel	5,930	2,200 B	NA	1,600	NA
Nickel in Oil	NA	NA	NA	NA	NA
Potassium	<866,000	310,000	NA	45,000	NA
Selenium	<433	4,100 J	NA	R	NA
Silver	<433	270 B	NA	120 B	NA
Sodium	1,160,000	68,000	NA	3,900,000	NA
Thallium	<433	<2,400	NA	<1,500	NA
Titanium	NA	340,000	NA	59,000	NA
Titanium in Oil	NA	NA	NA	NA	NA
Vanadium	11,100	6,000	NA	1,800	NA
Vanadium in Oil	NA	NA	NA	NA	NA
Zinc	22,800 MBD	68,000	NA	27,000	NA
Zinc in Oil	NA	NA	NA	NA	NA
Alcohols					
1-Propanol	NA	<2,600	NA	8,800	NA
Ethanol	NA	1,600 J	NA	66,000	NA
Ethylacetate	NA	<13,000	NA	<38,000	NA
Isobutanol	NA	<12,000	NA	1,000 J	NA
Isopropanol	NA	<12,000	NA	1,500 J	NA
Methanol	NA	19,000 B	NA	610,000 B	NA
n-Butanol	NA	<12,000	NA	4,300 J	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Aldehydes					
Acetaldehyde	NA	<4,800	NA	25,000	NA
Formaldehyde	NA	<4,800	NA	<4,000	NA
Hexanal	NA	<4,800	NA	<4,000	NA
m-Tolualdehyde	NA	<4,800	NA	<4,000	NA
Paraldehyde	NA	<60	NA	1,100	NA
Pentanal	NA	<4,800	NA	<4,000	NA
Propanal	NA	<4,800	NA	<4,000	NA
Pest/PCB					
Aldrin	<14	NA	NA	NA	NA
Aroclor 1242	<140	NA	NA	NA	NA
BHC (Lindane) (gamma)	<14	NA	NA	NA	NA
Chlordane (alpha)	<14	NA	NA	NA	NA
Chlordane (gamma)	<14	NA	NA	NA	NA
Endrin	<29	NA	NA	NA	NA
Heptachlor epoxide	<14	NA	NA	NA	NA
Methoxychlor	<140	NA	NA	NA	NA
Acetic Acid	NA	13,000	NA	12,000,000	NA
Total Organic Carbon	24,000,000	220,000,000	NA	460,000,000	NA
Percent Solids	NA	42	NA	65	NA
Total Solids	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
VOC					
1,1,2,2-Tetrachloroethane	<6.5	<1,300	<5,000	<510 J	<510 J
1,2,4-Trimethylbenzene	20,000 D	20,000 D	88,000	310 J	300 J
1,2-Dichloroethane	<6.5	<1,300	<5,000	<510 J	<510 J
1,3,5-Trimethylbenzene	4,600 D	4,600 D	23,000	<510 J	<510 J
2-Butanone (MEK)	55,000 DB	55,000 BD	<110,000	<2,600 J	<2,600 J
2-Hexanone	1,100	7,800 D	32,000	<2,600 J	<2,600 J
4-Methyl-2-pentanone (MIBK)	540	6,000 JD	<25,000	<2,600 J	<2,600 J
Acetone	46,000 D	46,000 D	100,000	<5,100 J	<5,100 J
Benzene	*8,500 D*	*8,500 D*	*21,000*	<510 J	<510 J
Carbon disulfide	<6.5	<1,300	<5,000	<510 J	<510 J
Chlorobenzene	<6.5	<1,300	<5,000	<510 J	<510 J
Ethylbenzene	8,800 D	8,800 D	40,000	<510 J	<510 J
Isopropylbenzene	100	650 JD	2,900 J	<510 J	<510 J
Methylene chloride	<6.5 J	<1,300	<5,000	<510 J	<510 J
Naphthalene	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA
n-Propylbenzene	3,600 D	3,600 D	19,000	<510 J	<510 J
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA
Styrene	<6.5	<1,300	16,000	<510 J	<510 J
Toluene	16,000 D	16,000 D	110,000	310 J	300 J
Trichloroethene	48	<1,300	<5,000	<510 J	<510 J
Xylene, o	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA
Xylenes (total)	48,000 D	48,000 D	***220,000***	390 J	210 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	900,000	NA	960,000	<4,900	NA
2-Methylnaphthalene	370,000	NA	220,000	<4,900	NA
2-Methylphenol	810,000	NA	1,000,000	<4,900	NA
2-Nitrophenol	<100,000	NA	<130,000	<9,900	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	850,000	NA	1,400,000	<4,900	NA
4-Methylphenol	NA	NA	NA	NA	NA
4-Nitrophenol	<260,000	NA	470,000	<25000	NA
Acenaphthene	<51,000	NA	<64,000	<4,900	NA
Anthracene	<51,000	NA	<64,000	<4,900	NA
Benzo(a)anthracene	<51,000	NA	<64,000	<4,900	NA
Benzoic acid	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	<51,000	NA	<64,000	<4,900	NA
Chrysene	<51,000	NA	<64,000	<4,900	NA
Dibenzofuran	140,000	NA	240,000	<4,900	NA
Diethylphthalate	<51,000	NA	<64,000	<4,900	NA
Di-n-butylphthalate	<51,000	NA	<64,000	<4,900	NA
Fluoranthene	<51,000	NA	<64,000	<4,900	NA
Fluorene	62,000	NA	76,000	<4,900 J	NA
Naphthalene	370,000	NA	160,000	<4,900	NA
Phenanthrene	<51,000	NA	<64,000	<4,900	NA
Phenol	660,000	NA	1,100,000	<4,900	NA
Pyrene	<51,000	NA	<64,000	<4,900 J	NA
Metals					
Aluminum	220,000 J	NA	150,000 J	640,000 J	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Metals (continued)					
Aluminum in Oil	NA	NA	NA	NA	NA
Antimony	640 BJ	NA	<2,300 J	1,500 BJ	NA
Arsenic	790 J	NA	470 J	1,600 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA
Barium	78,000	NA	19,000	260,000	NA
Barium in Oil	NA	NA	NA	NA	NA
Beryllium	13 B	NA	<450	73 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA
Cadmium	110 J	NA	98 J	290 J	NA
Cadmium in Oil	NA	NA	NA	NA	NA
Calcium	28,000,000	NA	9,100,000	10,000,000	NA
Chromium	1,600	NA	810	13,000	NA
Chromium in Oil	NA	NA	NA	NA	NA
Cobalt	100 B	NA	<450	420 B	NA
Cobalt in Oil	NA	NA	NA	NA	NA
Copper	430,000	NA	290,000	570,000	NA
Copper in Oil	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Iron	1,200,000	NA	360,000	2,700,000	NA
Iron in Oil	NA	NA	NA	NA	NA
Lead	11,000	NA	4,800	67,000	NA
Lead in Oil	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA
Magnesium	860,000	NA	310,000	700,000	NA
Manganese	61,000	NA	15,000	310,000	NA
Manganese in Oil	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Metals (continued)					
Mercury	8.3 B	NA	15 B	120 B	NA
Mercury in Oil	NA	NA	NA	NA	NA
Molybdenum	260 B	NA	150 B	770 B	NA
Molybdenum in Oil	NA	NA	NA	NA	NA
Nickel	1,000 B	NA	590 B	1,600 B	NA
Nickel in Oil	NA	NA	NA	NA	NA
Potassium	15,000	NA	9,200	1,100,000	NA
Selenium	R	NA	R	1,400 BJ	NA
Silver	93 B	NA	83 B	300 B	NA
Sodium	420,000	NA	360,000	82,000	NA
Thallium	<1,200	NA	<910	<2,300	NA
Titanium	23,000	NA	18,000	230,000	NA
Titanium in Oil	NA	NA	NA	NA	NA
Vanadium	1,300	NA	1,000	3,300	NA
Vanadium in Oil	NA	NA	NA	NA	NA
Zinc	35,000	NA	11,000	55,000	NA
Zinc in Oil	NA	NA	NA	NA	NA
Alcohols					
1-Propanol	<1,300	6,100 J	<1,000	<2,600	NA
Ethanol	370,000	380,000 J	5,800	1,300 J	NA
Ethylacetate	<6,500	6,000 J	1,200 J	<13,000	NA
Isobutanol	<5,700	810 J	<4,400	<11,000	NA
Isopropanol	<5,700	2,000 J	<4,400	<11,000	NA
Methanol	440,000	420,000 J	54,000 B	<11,000	NA
n-Butanol	<5,700	400,000 J	<4,400	<11,000	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Aldehydes					
Acetaldehyde	50,000	NA	2,900	<4,000	NA
Formaldehyde	<4,000	NA	3,300	4,900	NA
Hexanal	<4,000	NA	2,400	<4,000	NA
m-Tolualdehyde	<4,000	NA	5,200	<4,000	NA
Paraldehyde	610	NA	730	<55	NA
Pentanal	<4,000	NA	8,000	<4,000	NA
Propanal	<4,000	NA	5,300	<4,000	NA
Pest/PCB					
Aldrin	NA	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA	NA
BHC (Lindane) (gamma)	NA	NA	NA	NA	NA
Chlordane (alpha)	NA	NA	NA	NA	NA
Chlordane (gamma)	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA
Acetic Acid	12,000,000	NA	10,400,000	5,000	NA
Total Organic Carbon	400,000,000	NA	930,000,000 J	200,000,000	NA
Percent Solids	79	NA	85	45	NA
Total Solids	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood	NA	NA	NA
VOC							
1,1,2,2-Tetrachloroethane	NA	<2,000	NA	<350	<12	<7,400	<170
1,2,4-Trimethylbenzene	NA	30,000	NA	1,600	NA	NA	NA
1,2-Dichloroethane	NA	<2,000	NA	<350	6 J	<7,400	17 J
1,3,5-Trimethylbenzene	NA	6,300	NA	470	NA	NA	NA
2-Butanone (MEK)	NA	75,000	NA	<1,800	12,000	120,000	1,100
2-Hexanone	NA	16,000	NA	<1,800	1,200	33,000	390
4-Methyl-2-pentanone (MIBK)	NA	<10,000	NA	<1,800	260	<7,400	370
Acetone	NA	56,000	NA	<3,500	7,700 J	88,000 J	1,300 J
Benzene	NA	3,200	NA	<350	340	3,200 J	1,100
Carbon disulfide	NA	<2,000	NA	<350	<12 J	<7,400	<170 J
Chlorobenzene	NA	<2,000	NA	<350	<12	2,000 J	<170
Ethylbenzene	NA	7,500	NA	320 J	170 J	6,200 J	820
Isopropylbenzene	NA	<2,000	NA	<350	NA	NA	NA
Methylene chloride	NA	<2,000	NA	<350	<12 J	<7,400	<170 J
Naphthalene	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NA	4,600	NA	230 J	NA	NA	NA
p-Isopropyltoluene	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	<2,000	NA	<350	97	4,000 J	<170
Toluene	NA	19,000	NA	360	590 J	12,000	2,800
Trichloroethene	NA	<2,000	NA	<350	60	830 J	<170
Xylene, o	NA	NA	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	NA	48,000	NA	2,500	1,200	46,000	4,700

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood	NA	NA	NA
SVOC							
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	230,000	NA	17,000	110,000	110,000	230,000
2-Methylnaphthalene	NA	150,000 J	NA	45,000	78,000	82,000	41,000
2-Methylphenol	NA	240,000	NA	3,500	140,000	140,000	270,000
2-Nitrophenol	NA	<320,000	NA	<6,900	<17,000	<52,000	<19,000
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	230,000	NA	4,100	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	180,000	180,000	370,000
4-Nitrophenol	NA	<800,000	NA	<18,000	<43,000	<130,000	<48,000
Acenaphthene	NA	<160,000	NA	2,800 J	4,800 J	<52,000	3,600 J
Anthracene	NA	<160,000	NA	<3,400	2,200 J	<52,000	3,900 J
Benzo(a)anthracene	NA	<160,000	NA	<3,400	<17,000	<52,000	1,100 J
Benzoic acid	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	<160,000	NA	<3,400	<17,000	<52,000	<19,000
Chrysene	NA	<160,000	NA	<3,400	<17,000	<52,000	1,500 J
Dibenzofuran	NA	<160,000	NA	18,000	7,800 J	8,300 J	13,000 J
Diethylphthalate	NA	<160,000	NA	<3,400	<17,000	<52,000	**1,200,000**
Di-n-butylphthalate	NA	200,000	NA	<3,400	14,000 J	14,000 J	1,000 J
Fluoranthene	NA	<160,000	NA	<3,400	<17,000	<52,000	2,300 J
Fluorene	NA	<160,000	NA	16,000	9,000 J	5,900 J	17,000 J
Naphthalene	NA	260,000	NA	16,000	58,000	60,000	25,000
Phenanthrene	NA	<160,000	NA	4,200	1,600 J	<52,000	11,000 J
Phenol	NA	200,000	NA	<3,400	160,000	160,000	240,000
Pyrene	NA	<160,000	NA	<3,400	<17,000	<52,000	2,800 J
Metals							
Aluminum	NA	4,200,000 J	8,900,000 J	1,100,000 J	1,900,000 J	NA	669,000 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood	NA	NA	NA
Metals (continued)							
Aluminum in Oil	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	35,000 J	<4,500 J	840 BJ	R	NA	2,900 J
Arsenic	NA	4,600 J	7,500 J	1,500 J	<1,000	NA	900
Arsenic in Oil	NA	NA	NA	NA	NA	NA	NA
Barium	NA	130,000	210,000	53,000	32,000	NA	276,000
Barium in Oil	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	130 B	620 B	89 B	100	NA	50
Beryllium in Oil	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	45 BJ	81 J	220 J	<600	NA	<400
Cadmium in Oil	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	86,000,000	46,000,000	6,000,000	34,100,000	NA	96,400,000
Chromium	NA	21,000	16,000	15,000	5,200	NA	8,300
Chromium in Oil	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	420 B	1,400	340 B	1,300	NA	<500
Cobalt in Oil	NA	NA	NA	NA	NA	NA	NA
Copper	NA	1,400,000	2,400,000	260,000	186,000 J	NA	1,050,000 J
Copper in Oil	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	1,500 J	NA	1,500 J
Iron	NA	3,500,000	7,800,000	2,800,000	2,400,000	NA	353,000
Iron in Oil	NA	NA	NA	NA	NA	NA	NA
Lead	NA	30,000	150,000	20,000	9,500 J	NA	78,200 J
Lead in Oil	NA	NA	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	6,300,000	8,000,000	300,000	911,000 J	NA	187,000 J
Manganese	NA	690,000	81,000	320,000	58,200	NA	44,400
Manganese in Oil	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood	NA	NA	NA
Metals (continued)							
Mercury	NA	380	380 B	100 B	<100	NA	100
Mercury in Oil	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	410 B	210 B	1,200 B	NA	NA	NA
Molybdenum in Oil	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	2,800	9,500	1,100 B	3,600	NA	<1,500
Nickel in Oil	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	51,000	46,000	300,000	260,000 J	NA	204,000 J
Selenium	NA	3,400 BJ	1,400 BJ	730 J	1,500	NA	<700
Silver	NA	530 B	950	180 B	<400	NA	300
Sodium	NA	4,100,000	2,300,000	58,000	2,640,000	NA	186,000
Thallium	NA	<2,000	<1,800	<1,600	<1,100	NA	<700
Titanium	NA	310,000	510,000	310,000	NA	NA	NA
Titanium in Oil	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	5,100	5,400	8,100	8,900	NA	4,500
Vanadium in Oil	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	57,000	220,000	23,000	17,900	NA	23,300
Zinc in Oil	NA	NA	NA	NA	NA	NA	NA
Alcohols							
1-Propanol	NA	21,000	NA	<1,800	NA	NA	NA
Ethanol	NA	320,000	NA	890 J	NA	NA	NA
Ethylacetate	NA	16,000 J	NA	<8,800	NA	NA	NA
Isobutanol	NA	1,600 J	NA	<7,700	NA	NA	NA
Isopropanol	NA	<90,000	NA	<7,700	NA	NA	NA
Methanol	NA	830,000 B	NA	<7,700	NA	NA	NA
n-Butanol	NA	3,700 J	NA	<7,700	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood	NA	NA	NA
Aldehydes							
Acetaldehyde	100,000	NA	NA	8,400	NA	NA	NA
Formaldehyde	<20,000	NA	NA	4,200	NA	NA	NA
Hexanal	<20,000	NA	NA	<4,000	NA	NA	NA
m-Tolualdehyde	<20,000	NA	NA	<4,000	NA	NA	NA
Paraldehyde	980	NA	NA	<45	NA	NA	NA
Pentanal	<20,000	NA	NA	<4,000	NA	NA	NA
Propanal	<20,000	NA	NA	<4,000	NA	NA	NA
Pest/PCB							
Aldrin	NA	NA	NA	NA	<23 J	NA	43 J
Aroclor 1242	NA	NA	NA	NA	<460	NA	<320
BHC (Lindane) (gamma)	NA	NA	NA	NA	120 J	NA	<16
Chlordane (alpha)	NA	NA	NA	NA	11 J	NA	<16 J
Chlordane (gamma)	NA	NA	NA	NA	50 J	NA	8.0 J
Endrin	NA	NA	NA	NA	<46	NA	57 J
Heptachlor epoxide	NA	NA	NA	NA	25 J	NA	<16 J
Methoxychlor	NA	NA	NA	NA	29 J	NA	<160
Acetic Acid	NA	18,000,000	NA	11,000	NA	NA	NA
Total Organic Carbon	NA	520,000,000	NA	110,000,000	NA	NA	NA
Percent Solids	58	NA	NA	55	NA	NA	NA
Total Solids	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste		
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5
Type	NA	NA	NA	NA	NA	NA
VOC						
1,1,2,2-Tetrachloroethane	NA	<25	NA	<1,000	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	<25	<25	<500	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	<25	<25	45 J	NA	NA
2-Hexanone	NA	<25	<25	<1,000	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	<25	<25	<1,000	NA	NA
Acetone	NA	230	220	<1,000	NA	NA
Benzene	NA	17 J	28	<500	NA	NA
Carbon disulfide	NA	16 J	<25	<500	NA	NA
Chlorobenzene	NA	<25	<25	<500	NA	NA
Ethylbenzene	NA	<25	<25	<500	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	<130 B	120	<500	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA
Styrene	NA	<25	<25	<500	NA	NA
Toluene	NA	17 J	25	<500	NA	NA
Trichloroethene	NA	<25	<25	<500	NA	NA
Xylene, o	NA	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA	NA
Xylenes (total)	NA	35	79	<500	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste		
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5
Type	NA	NA	NA	NA	NA	NA
SVOC						
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	240,000 J	2,400 J	NA	NA	<340	<380
2-Methylnaphthalene	42,000 J	2,200 J	NA	NA	1,300	<380
2-Methylphenol	310,000 J	<12,000	NA	NA	<340	<380
2-Nitrophenol	<380,000	<12,000	NA	NA	<340	<380
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	NA	NA	NA
4-Methylphenol	400,000	1,300 J	NA	NA	1,300	<380
4-Nitrophenol	<960,000	<31,000	NA	NA	<1,700	<1,800
Acenaphthene	<380,000	<12,000	NA	NA	<340	<380
Anthracene	<380,000	<12,000	NA	NA	<340	<380
Benzo(a)anthracene	<380,000	<12,000	NA	NA	<340	<380
Benzoic acid	NA	NA	NA	NA	<1,700	850 J
bis(2-Ethylhexyl)phthalate	<380,000	<12,000	NA	NA	<340	1,800
Chrysene	<380,000	<12,000	NA	NA	<340	<380
Dibenzofuran	<380,000	<12,000	NA	NA	<340	<380
Diethylphthalate	**2,000,000**	<12,000	NA	NA	<340	<380
Di-n-butylphthalate	<380,000	<12,000	NA	NA	3,200	<380
Fluoranthene	<380,000	<12,000	NA	NA	<340	<380
Fluorene	<380,000	<12,000	NA	NA	<340	<380
Naphthalene	26,000 J	2,000 J	NA	NA	3,700	<380
Phenanthrene	<380,000	<12,000	NA	NA	<340	<380
Phenol	280,000 J	1,400 J	NA	NA	<340	<380
Pyrene	<380,000	<12,000	NA	NA	<340	<380
Metals						
Aluminum	NA	860,000	NA	3,890,000	NA	4,100,000

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste		
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5
Type	NA	NA	NA	NA	NA	NA
Metals (continued)						
Aluminum in Oil	NA	NA	NA	NA	NA	NA
Antimony	NA	6,200 B	NA	3,100 BN	NA	3,600 BN
Arsenic	NA	2,500 B	NA	2,500 NS	NA	1,200 BN
Arsenic in Oil	NA	NA	NA	NA	NA	NA
Barium	NA	291,000	NA	18,100 NS	NA	42,600 B
Barium in Oil	NA	NA	NA	NA	NA	NA
Beryllium	NA	<290	NA	<40	NA	120 B
Beryllium in Oil	NA	NA	NA	NA	NA	NA
Cadmium	NA	540 B	NA	<30	NA	<340
Cadmium in Oil	NA	NA	NA	NA	NA	NA
Calcium	NA	98,300,000	NA	904,000 B	NA	2,080,000
Chromium	NA	10,700	NA	10,300	NA	17,200
Chromium in Oil	NA	NA	NA	NA	NA	NA
Cobalt	NA	2,600 B	NA	3,800 B	NA	3,900 B
Cobalt in Oil	NA	NA	NA	NA	NA	NA
Copper	NA	546,000	NA	16,100 *	NA	54,800 *
Copper in Oil	NA	NA	NA	NA	NA	NA
Cyanide	NA	<280	NA	<1,000	NA	<1,100
Iron	NA	6,320,000	NA	6,760,000	NA	7,600,000
Iron in Oil	NA	NA	NA	NA	NA	NA
Lead	NA	125,000	NA	2,000 S	NA	7,200
Lead in Oil	NA	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA	NA
Magnesium	NA	287,000 B	NA	1,620,000	NA	2,060,000
Manganese	NA	210,000 N	NA	111,000	NA	104,000 *
Manganese in Oil	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste		
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5
Type	NA	NA	NA	NA	NA	NA
Metals (continued)						
Mercury	NA	210 B	NA	<100	NA	<110
Mercury in Oil	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	NA	NA
Molybdenum in Oil	NA	NA	NA	NA	NA	NA
Nickel	NA	13,300 B	NA	8,400	NA	9,600
Nickel in Oil	NA	NA	NA	NA	NA	NA
Potassium	NA	262,000 B	NA	254,000 B	NA	453,000 B
Selenium	NA	2,700	NA	500 BS	NA	<520
Silver	NA	<1,700	NA	1,400 BN	NA	<960 N
Sodium	NA	253,000 B	NA	59,300 B	NA	60,000 B
Thallium	NA	<1,600	NA	<200 W	NA	<240
Titanium	NA	NA	NA	NA	NA	NA
Titanium in Oil	NA	NA	NA	NA	NA	NA
Vanadium	NA	4,100 B	NA	13,600	NA	14,800
Vanadium in Oil	NA	NA	NA	NA	NA	NA
Zinc	NA	96,900	NA	11,700 *E	NA	22,200 *E
Zinc in Oil	NA	NA	NA	NA	NA	NA
Alcohols						
1-Propanol	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA
Ethylacetate	NA	NA	NA	NA	NA	NA
Isobutanol	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA
n-Butanol	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste		
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5
Type	NA	NA	NA	NA	NA	NA
Aldehydes						
Acetaldehyde	NA	NA	NA	NA	NA	NA
Formaldehyde	NA	NA	NA	NA	NA	NA
Hexanal	NA	NA	NA	NA	NA	NA
m-Tolualdehyde	NA	NA	NA	NA	NA	NA
Paraldehyde	NA	NA	NA	NA	NA	NA
Pentanal	NA	NA	NA	NA	NA	NA
Propanal	NA	NA	NA	NA	NA	NA
Pest/PCB						
Aldrin	NA	<3	NA	<82	NA	<1,800
Aroclor 1242	NA	<58	NA	**7,300 D**	NA	**48,000 D**
BHC (Lindane) (gamma)	NA	<5.5 P	NA	<82	NA	<1,800
Chlordane (alpha)	NA	<3	NA	<820	NA	<18,000
Chlordane (gamma)	NA	32	NA	<820	NA	<18,000
Endrin	NA	<5.8	NA	<160	NA	<3,600
Heptachlor epoxide	NA	<3	NA	<82	NA	<1,800
Methoxychlor	NA	<30	NA	<820	NA	<18,000
Acetic Acid	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA
Percent Solids	NA	NA	NA	NA	NA	NA
Total Solids	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Waste (continued)	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	0.5'	2'	3'	2'	2	2
Sample Date	05/04/88	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	S-5 RE	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	NA	Tar	Tar	Tar	Tar	Tar
VOC						
1,1,2,2-Tetrachloroethane	<5	<5,000	<5,000	<5,000	<130	<1,300
1,2,4-Trimethylbenzene	NA	***160,000***	***150,000***	***210,000***	54,000 D	54,000 D
1,2-Dichloroethane	<5	<5,000	<5,000	<5,000	<63	<630
1,3,5-Trimethylbenzene	NA	57,000	48,000	55,000	7,000	9,900 D
2-Butanone (MEK)	52	NA	NA	NA	25,000	32,000 D
2-Hexanone	6 J	NA	NA	NA	12,000	<32,000
4-Methyl-2-pentanone (MIBK)	<10	NA	NA	NA	<3,200	<32,000
Acetone	66	NA	NA	NA	13,000	<63,000
Benzene	<5	*16,000*	*16,000*	*18,000*	1,900	3,000 D
Carbon disulfide	<5	NA	NA	NA	<320	<3,200
Chlorobenzene	<5	<5,000	<5,000	<5,000	<63	<630
Ethylbenzene	<5	46,000	36,000	39,000	3,300	6,000 D
Isopropylbenzene	NA	<5,000	<5,000	<5,000	590	<1,300
Methylene chloride	18	<5,000	<5,000	<5,000	<320	<3,200
Naphthalene	NA	320,000	390,000	440,000	NA	NA
n-Butylbenzene	NA	220,000	230,000	370,000	NA	NA
n-Propylbenzene	NA	88,000	65,000	92,000	4,400	6,400 D
p-Isopropyltoluene	NA	140,000	170,000	250,000	NA	NA
sec-Butylbenzene	NA	74,000	90,000	130,000	NA	NA
Styrene	<5	NA	NA	NA	2,100	4,000 D
Toluene	<5	64,000	38,000	42,000	6,800	12,000 D
Trichloroethene	<5	*110,000*	17,000	*46,000*	4,700	7,900 D
Xylene, o	NA	***150,000***	***100,000***	***120,000***	NA	NA
Xylenes, m+p	NA	***150,000***	***78,000***	***100,000***	NA	NA
Xylenes (total)	<5	NA	NA	NA	23,000	43,000 D

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Waste (continued)	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	0.5'	2'	3'	2'	2	2
Sample Date	05/04/88	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	S-5 RE	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	NA	Tar	Tar	Tar	Tar	Tar
SVOC						
1-Methylnaphthalene	NA	100,000	65,000	56,000	NA	NA
2,4-Dimethylphenol	NA	870,000	230,000	220,000	2,300	NA
2-Methylnaphthalene	NA	150,000	98,000	86,000	2,200 J	NA
2-Methylphenol	NA	1,000,000	280,000	210,000	1,800 J	NA
2-Nitrophenol	NA	<45,000	<45,000	310,000	<8,400	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	1,100,000	310,000	230,000	1,800 J	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA
4-Nitrophenol	NA	<48,000	<48,000	<48,000	<21,000	NA
Acenaphthene	NA	<21,000	<21,000	<21,000	<4,100	NA
Anthracene	NA	<36,000	<36,000	<36,000	<4,100	NA
Benzo(a)anthracene	NA	<23,000	<23,000	<23,000	<4,100	NA
Benzoic acid	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	<36,000	<36,000	<36,000	<4,100	NA
Chrysene	NA	<42,000	<42,000	<42,000	<4,100	NA
Dibenzofuran	NA	NA	NA	NA	<4,100	NA
Diethylphthalate	NA	<34,000	<34,000	<34,000	<4,100	NA
Di-n-butylphthalate	NA	400,000	320,000	440,000	7,600	NA
Fluoranthene	NA	<38,000	<38,000	<38,000	<4,100	NA
Fluorene	NA	<47,000	<47,000	<47,000	<4,100	NA
Naphthalene	NA	270,000	290,000	260,000	5,600	NA
Phenanthrene	NA	<35,000	<35,000	<35,000	<4,100	NA
Phenol	NA	880,000	22,000	190,000	1,300 J	NA
Pyrene	NA	<45,000	<45,000	<45,000	<4,100	NA
Metals						
Aluminum	NA	NA	NA	NA	2,600,000 J	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Waste (continued)	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	0.5'	2'	3'	2'	2	2
Sample Date	05/04/88	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	S-5 RE	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	NA	Tar	Tar	Tar	Tar	Tar
Metals (continued)						
Aluminum in Oil	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	560 B	NA
Arsenic	NA	NA	NA	NA	570 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	16,000	NA
Barium in Oil	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	100 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	<32 J	NA
Cadmium in Oil	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	3,300,000	NA
Chromium	NA	NA	NA	NA	5,400	NA
Chromium in Oil	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	2,100	NA
Cobalt in Oil	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	160,000	NA
Copper in Oil	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	4,400,000	NA
Iron in Oil	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	4,200	NA
Lead in Oil	NA	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	1,400,000 J	NA
Manganese	NA	NA	NA	NA	110,000	NA
Manganese in Oil	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Waste (continued)	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	0.5'	2'	3'	2'	2	2
Sample Date	05/04/88	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	S-5 RE	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	NA	Tar	Tar	Tar	Tar	Tar
Metals (continued)						
Mercury	NA	NA	NA	NA	11 B	NA
Mercury in Oil	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	<6,300	NA
Molybdenum in Oil	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	5,600	NA
Nickel in Oil	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	160,000	NA
Selenium	NA	NA	NA	NA	<250 J	NA
Silver	NA	NA	NA	NA	<630	NA
Sodium	NA	NA	NA	NA	260,000	NA
Thallium	NA	NA	NA	NA	<1,300	NA
Titanium	NA	NA	NA	NA	200,000 J	NA
Titanium in Oil	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	9,900	NA
Vanadium in Oil	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	13,000 J	NA
Zinc in Oil	NA	NA	NA	NA	NA	NA
Alcohols						
1-Propanol	NA	NA	NA	NA	2,200	NA
Ethanol	NA	NA	NA	NA	2,700 J	NA
Ethylacetate	NA	NA	NA	NA	5,800 J	NA
Isobutanol	NA	NA	NA	NA	<5,600	NA
Isopropanol	NA	NA	NA	NA	<5,600	NA
Methanol	NA	NA	NA	NA	30,000 J	NA
n-Butanol	NA	NA	NA	NA	<5,600	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Waste (continued)	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	0.5'	2'	3'	2'	2	2
Sample Date	05/04/88	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	S-5 RE	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	NA	Tar	Tar	Tar	Tar	Tar
Aldehydes						
Acetaldehyde	NA	NA	NA	NA	33,000	NA
Formaldehyde	NA	NA	NA	NA	<8,000	NA
Hexanal	NA	NA	NA	NA	17,000	NA
m-Tolualdehyde	NA	NA	NA	NA	17,000	NA
Paraldehyde	NA	NA	NA	NA	79	NA
Pentanal	NA	NA	NA	NA	<8,000	NA
Propanal	NA	NA	NA	NA	10,000	NA
Pest/PCB						
Aldrin	NA	NA	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA	NA	NA
BHC (Lindane) (gamma)	NA	NA	NA	NA	NA	NA
Chlordane (alpha)	NA	NA	NA	NA	NA	NA
Chlordane (gamma)	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA
Acetic Acid	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	650,000,000	19,000,000	57,000,000	590,000,000	NA
Percent Solids	NA	NA	NA	NA	86	NA
Total Solids	NA	77.4	80.9	78.8	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12	NA	Criteria	
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial Direct Contact	Residential Drinking Water Protection
Type	Organic/Wood	Organic/Wood	Tar		
VOC					
1,1,2,2-Tetrachloroethane	<140	<710	<18	240,000	170
1,2,4-Trimethylbenzene	24,000 D	24,000 D	530	110,000 (l) C	2,100 (l)
1,2-Dichloroethane	<71	<360	<18	420000 (l)	100 (l)
1,3,5-Trimethylbenzene	5,900	5,500 D	130	94,000 (l) C	1,800 (l)
2-Butanone (MEK)	8,700	<18,000	80,000	27,000,000 (l) C,DD	260,000 (l)
2-Hexanone	<3,600	<18,000	1,600	2,500,000 C	20,000
4-Methyl-2-pentanone (MIBK)	<3,600	<18,000	220	2,700,000 (l) C	36,000 (l)
Acetone	5,800 J	<36,000	63,000	73,000,000 (l)	15,000 (l)
Benzene	2,500	3,000 D	190	400,000 (l) C	100 (l)
Carbon disulfide	<360	<1,800	<100	280,000 (l,R) C,DD	16,000 (l,R)
Chlorobenzene	<71	<360	<18	260,000 (l) C	2,000 (l)
Ethylbenzene	7,800	9,300 D	140	140,000 (l) C	1,500 (l)
Isopropylbenzene	660	580 JD	<18	390,000 C	91,000
Methylene chloride	<360	<1,800	<18	2,300,000 C	100
Naphthalene	NA	NA	790	52,000,000	35,000
n-Butylbenzene	NA	NA	NA	8,000,000	1,600
n-Propylbenzene	4,100	3,700 D	65	8,000,000 (l)	1,600 (l)
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	8,000,000	1,600
Styrene	2,500	3,000 D	120	520,000 C	2,700
Toluene	17,000 D	17,000 D	480	250,000 (l) C	16,000 (l)
Trichloroethene	22,000 D	22,000 D	89,000	500,000 C,DD	100
Xylene, o	NA	NA	NA	150,000 (l) C J	5,600 (l) J
Xylenes, m+p	NA	NA	NA	150,000 (l) C J	5,600 (l) J
Xylenes (total)	47,000 D	47,000 D	950	150,000 (l) C	5,600 (l)

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12	NA	Criteria	
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial Direct Contact	Residential Drinking Water Protection
Type	Organic/Wood	Organic/Wood	Tar		
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	590,000	NA	490,000	36,000,000	7,400
2-Methylnaphthalene	150,000	NA	200	26,000,000	57,000
2-Methylphenol	560,000	NA	450,000	36,000,000 J	7,400 J
2-Nitrophenol	<90,000	NA	<71,000	2,000,000	400
3-Methylphenol/4-Methylphenol(m&p-cresol)	580,000	NA	480,000	36,000,000 J	7,400 J
4-Methylphenol	NA	NA	NA	36,000,000 J	7,400 J
4-Nitrophenol	<230,000	NA	<290,000	NA	NA
Acenaphthene	<44,000	NA	<15,000	130,000,000	300,000
Anthracene	<44,000	NA	<15,000	730,000,000	41,000
Benzo(a)anthracene	<44,000	NA	<15,000	80,000 (Q)	(Q) NLL
Benzoic acid	NA	NA	NA	1,000,000,000 D	640,000
bis(2-Ethylhexyl)phthalate	<44,000	NA	<71,000	10,000,000 C	NLL
Chrysene	<44,000	NA	<15,000	8,000,000 (Q)	(Q) NLL
Dibenzofuran	56,000	NA	NA	ID	ID
Diethylphthalate	<44,000	NA	<71,000	740,000 C	110,000
Di-n-butylphthalate	<44,000	NA	270,000	760,000 C	760,000 C
Fluoranthene	<44,000	NA	<15,000	130,000,000	730,000
Fluorene	<44,000	NA	22,000	87,000,000	390,000
Naphthalene	77,000	NA	320,000	52,000,000	35,000
Phenanthrene	<44,000	NA	<15,000	5,200,000	56,000
Phenol	300,000	NA	480,000	12,000,000 C,DD	88,000
Pyrene	<44,000	NA	<15,000	84,000,000	480,000
Metals					
Aluminum	2,400,000	NA	NA	370,000,000 (B) DD	1,000 (B)

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12	NA	Criteria	
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Residential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
Metals (continued)					
Aluminum in Oil	NA	NA	430,000	370,000,000 (B) DD	1,000 (B)
Antimony	690 B	NA	NA	670,000	500 M
Arsenic	830 J	NA	NA	37,000	23,000
Arsenic in Oil	NA	NA	560	37,000	23,000
Barium	34,000	NA	NA	130,000,000 (B)	1,300,000 (B)
Barium in Oil	NA	NA	14,000	130,000,000 (B)	1,300,000 (B)
Beryllium	77 B	NA	NA	1,600,000	51,000
Beryllium in Oil	NA	NA	K200	1,600,000	51,000
Cadmium	110 J	NA	NA	2,100,000 (B)	6,000 (B)
Cadmium in Oil	NA	NA	K4,000	2,100,000 (B)	6,000 (B)
Calcium	6,400,000	NA	NA	NA	NA
Chromium	8,900	NA	NA	9,200,000	30,000
Chromium in Oil	NA	NA	K2,000	9,200,000	30,000
Cobalt	2,000	NA	NA	9,000,000	800
Cobalt in Oil	NA	NA	K10,000	9,000,000	800
Copper	240,000	NA	NA	73,000,000 (B)	5,800,000 (B)
Copper in Oil	NA	NA	303,000	73,000,000 (B)	5,800,000 (B)
Cyanide	NA	NA	6,000	250,000 (P,R)	4,000 (P,R)
Iron	5,800,000	NA	NA	580,000,000 (B)	6,000 (B)
Iron in Oil	NA	NA	940,000	580,000,000 (B)	6,000 (B)
Lead	17,000	NA	NA	900,000 (B) DD	700,000 (B)
Lead in Oil	NA	NA	K10,000	900,000 (B) DD	700,000 (B)
Lithium in Oil	NA	NA	K4,000	31,000,000 (B) DD	3,400 (B)
Magnesium	1,400,000 J	NA	NA	1,000,000,000 (B) D	8,000,000 (B)
Manganese	160,000	NA	NA	90,000,000 (B)	1,000 (B)
Manganese in Oil	NA	NA	78,000	90,000,000 (B)	1,000 (B)

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12	NA	Criteria	
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Residential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
Metals (continued)					
Mercury	45 B	NA	NA	580,000 (B,Z) (total)	1,700 (B,Z) (total)
Mercury in Oil	NA	NA	K1,000 DM	580,000 (B,Z) (total)	1,700 (B,Z) (total)
Molybdenum	370 B	NA	NA	9,600,000 (B)	1,500 (B)
Molybdenum in Oil	NA	NA	K5,000	9,600,000 (B)	1,500 (B)
Nickel	5,100	NA	NA	150,000,000 (B)	100,000 (B)
Nickel in Oil	NA	NA	K10,000	150,000,000 (B)	100,000 (B)
Potassium	180,000	NA	NA	NA	NA
Selenium	<1,400 J	NA	NA	9,600,000 (B)	4,000 (B)
Silver	<650	NA	NA	9,000,000 (B)	4,500 (B)
Sodium	210,000	NA	NA	1,000,000,000 D	2,500,000
Thallium	580 B	NA	NA	130,000 (B)	2300 (B)
Titanium	270,000 N	NA	NA	NA	NA
Titanium in Oil	NA	NA	34,000	NA	NA
Vanadium	14,000	NA	NA	5,500,000 DD	72,000
Vanadium in Oil	NA	NA	2,400	5,500,000 DD	72,000
Zinc	39,000 J	NA	NA	630,000,000 (B)	2,400,000 (B)
Zinc in Oil	NA	NA	20,000	630,000,000 (B)	2,400,000 (B)
Alcohols					
1-Propanol	<1,400	NA	NA	74,000,000 (l) DD	28,000 (l)
Ethanol	<6,300	NA	NA	110,000,000 (l) C,DD	38,000,000 (l)
Ethylacetate	1,200 J	NA	NA	7,500,000 (l) C	130,000 (l)
Isobutanol	<6,300	NA	NA	8,900,000 (l) C	46,000 (l)
Isopropanol	<6,300	NA	NA	47,000,000 (l)	9,400 (l)
Methanol	5,400 J	NA	NA	3,100,000 C	74,000
n-Butanol	<6,300	NA	NA	8,700,000 (l) C	19,000 (l)

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12	NA	Criteria	
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Residential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
Aldehydes					
Acetaldehyde	29,000	NA	NA	95,000,000 (I)	19,000 (I)
Formaldehyde	<8,000	NA	NA	60,000,000 C	26,000
Hexanal	<8,000	NA	NA	NA	NA
m-Tolualdehyde	<8,000	NA	NA	NA	NA
Paraldehyde	<25	NA	NA	NA	NA
Pentanal	<8,000	NA	NA	NA	NA
Propanal	<8,000	NA	NA	NA	NA
Pest/PCB					
Aldrin	NA	NA	NA	4,300	NLL
Aroclor 1242	NA	NA	<0.33	1,000 (J,T) T	(J,T) NLL
BHC (Lindane) (gamma)	NA	NA	NA	42,000	20 M
Chlordane (alpha)	NA	NA	NA	150,000 (J)	(J) NLL
Chlordane (gamma)	NA	NA	NA	150,000 (J)	(J) NLL
Endrin	NA	NA	NA	190,000	NLL
Heptachlor epoxide	NA	NA	NA	9,500	NLL
Methoxychlor	NA	NA	NA	5,600,000	16,000
Acetic Acid	NA	NA	NA	420,000,000	900,000 M
Total Organic Carbon	760,000,000	NA	NA	NA	NA
Percent Solids	75	NA	NA	NA	NA
Total Solids	NA	NA	57	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring			
Depth	Criteria (continued)		
Sample Date		Industrial Ambient	Groundwater
Sample I.D.	Industrial	Air Source	Surface Water
Type	Indoor-Inhalation	VSIC	Interface Protection
VOC			
1,1,2,2-Tetrachloroethane	23,000	34,000	1,600 X
1,2,4-Trimethylbenzene	110,000 (I) C	25,000,000 (I)	570 (I)
1,2-Dichloroethane	11,000 (I)	21,000 (I)	7,200 (I) X
1,3,5-Trimethylbenzene	94,000 (I) C	19,000,000 (I)	1,100 (I)
2-Butanone (MEK)	27,000,000 (I) C	35,000,000 (I)	44,000 (I)
2-Hexanone	1,800,000	1,300,000	NA
4-Methyl-2-pentanone (MIBK)	2,700,000 (I) C	53,000,000 (I)	(I) ID
Acetone	110,000,000 (I) C	160,000,000 (I)	34,000 (I)
Benzene	8,400 (I)	45,000 (I)	4,000 (I) X
Carbon disulfide	140,000 (I,R)	1,600,000 (I,R)	(I,R) ID
Chlorobenzene	220,000 (I)	920,000 (I)	940 (I)
Ethylbenzene	140,000 (I) C	2,400,000 (I)	360 (I)
Isopropylbenzene	390,000 C	2,000,000	ID
Methylene chloride	240,000	700,000	19,000 X
Naphthalene	470,000	350,000	870
n-Butylbenzene	ID	ID	ID
n-Propylbenzene	(I) ID	(I) ID	(I) NA
p-Isopropyltoluene	NA	NA	NA
sec-Butylbenzene	ID	ID	ID
Styrene	520,000 C	3,300,000	2,200
Toluene	250,000 (I) C	3,300,000 (I)	2,800 (I)
Trichloroethene	37,000	260,000	4,000 X
Xylene, o	150,000 (I) C J	54,000,000 (I) J	700 (I) J
Xylenes, m+p	150,000 (I) C J	54,000,000 (I) J	700 (I) J
Xylenes (total)	150,000 (I) C	54,000,000 (I)	700 (I)

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued) Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface Water Interface Protection
SVOC			
1-Methylnaphthalene	NA	NA	NA
2,4-Dimethylphenol	NLV	NLV	7,600
2-Methylnaphthalene	ID	ID	ID
2-Methylphenol	NLV	NLV	1,400 J
2-Nitrophenol	NLV	NLV	ID
3-Methylphenol/4-Methylphenol(m&p-cresol)	NLV	NLV	1,400 J
4-Methylphenol	NLV	NLV	1,400 J
4-Nitrophenol	NA	NA	NA
Acenaphthene	350,000,000	97,000,000	4,400
Anthracene	1,000,000,000 D	1,600,000,000	ID
Benzo(a)anthracene	(Q) NLV	(Q) NLV	(Q) NLL
Benzoic acid	NLV	NLV	NA
bis(2-Ethylhexyl)phthalate	NLV	NLV	NLL
Chrysene	(Q) ID	(Q) ID	(Q) NLL
Dibenzofuran	ID	ID	1,700
Diethylphthalate	NLV	NLV	2,200
Di-n-butylphthalate	NLV	NLV	11,000
Fluoranthene	1,000,000,000 D	890,000,000	5,500
Fluorene	1,000,000,000 D	150,000,000	5,300
Naphthalene	470,000	350,000	870
Phenanthrene	5,100,000	190,000	5,300
Phenol	NLV	NLV	4,200
Pyrene	1,000,000,000 D	780,000,000	ID
Metals			
Aluminum	(B) NLV	(B) NLV	(B) NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued) Industrial Indoor-Inhalation	 Industrial Ambient Air Source VSIC	 Groundwater Surface Water Interface Protection
Metals (continued)			
Aluminum in Oil	(B) NLV	(B) NLV	(B) NA
Antimony	NLV	NLV	94,000
Arsenic	NLV	NLV	70,000 X
Arsenic in Oil	NLV	NLV	70,000 X
Barium	(B) NLV	(B) NLV	0 (B) G,X
Barium in Oil	(B) NLV	(B) NLV	0 (B) G,X
Beryllium	NLV	NLV	0 G
Beryllium in Oil	NLV	NLV	0 G
Cadmium	(B) NLV	(B) NLV	0 (B) G,X
Cadmium in Oil	(B) NLV	(B) NLV	0 (B) G,X
Calcium	NA	NA	NA
Chromium	NLV	NLV	3,300
Chromium in Oil	NLV	NLV	3,300
Cobalt	NLV	NLV	2,000
Cobalt in Oil	NLV	NLV	2,000
Copper	(B) NLV	(B) NLV	0 (B) G
Copper in Oil	(B) NLV	(B) NLV	0 (B) G
Cyanide	(P,R) NLV	(P,R) NLV	200 (P,R) M
Iron	(B) NLV	(B) NLV	(B) NA
Iron in Oil	(B) NLV	(B) NLV	(B) NA
Lead	(B) NLV	(B) NLV	0 (B) G,M,X
Lead in Oil	(B) NLV	(B) NLV	0 (B) G,M,X
Lithium in Oil	(B) NLV	(B) NLV	1,900 (B)
Magnesium	(B) NLV	(B) NLV	(B) NA
Manganese	(B) NLV	(B) NLV	0 (B) G,X
Manganese in Oil	(B) NLV	(B) NLV	0 (B) G,X

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued) Industrial Indoor-Inhalation	 Industrial Ambient Air Source VSIC	 Groundwater Surface Water Interface Protection
Metals (continued)			
Mercury	89,000 (B,Z) (total)	62,000 (B,Z) (total)	100 (B,Z) (total) M
Mercury in Oil	89,000 (B,Z) (total)	62,000 (B,Z) (total)	100 (B,Z) (total) M
Molybdenum	(B) NLV	(B) NLV	16,000 (B) X
Molybdenum in Oil	(B) NLV	(B) NLV	16,000 (B) X
Nickel	(B) NLV	(B) NLV	0 (B) G
Nickel in Oil	(B) NLV	(B) NLV	0 (B) G
Potassium	NA	NA	NA
Selenium	(B) NLV	(B) NLV	400 (B)
Silver	(B) NLV	(B) NLV	500 (B) M
Sodium	NLV	NLV	NA
Thallium	(B) NLV	(B) NLV	4,200 (B) X
Titanium	NA	NA	NA
Titanium in Oil	NA	NA	NA
Vanadium	NLV	NLV	190,000
Vanadium in Oil	NLV	NLV	190,000
Zinc	(B) NLV	(B) NLV	0 (B) G
Zinc in Oil	(B) NLV	(B) NLV	0 (B) G
Alcohols			
1-Propanol	(I) NLV	(I) NLV	(I) NA
Ethanol	(I) NLV	(I) NLV	(I) NA
Ethylacetate	7,500,000 (I) C	59,000,000 (I)	(I) NA
Isobutanol	8,900,000 (I) C	95,000,000 (I)	(I) NA
Isopropanol	(I) NLV	(I) NLV	1,100,000 (I) X
Methanol	3,100,000 C	37,000,000	9,600
n-Butanol	(I) NLV	(I) NLV	(I) NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface Water Interface Protection
Aldehydes			
Acetaldehyde	400,000 (I)	210,000 (I)	2,600 (I)
Formaldehyde	65,000	43,000	2,400
Hexanal	NA	NA	NA
m-Tolualdehyde	NA	NA	NA
Paraldehyde	NA	NA	NA
Pentanal	NA	NA	NA
Propanal	NA	NA	NA
Pest/PCB			
Aldrin	7,100,000	200,000	NLL
Aroclor 1242	16,000,000 (J,T)	810,000 (J,T)	(J,T) NLL
BHC (Lindane) (gamma)	ID	ID	20 M
Chlordane (alpha)	59,000,000 (J)	4,200,000 (J)	(J) NLL
Chlordane (gamma)	59,000,000 (J)	4,200,000 (J)	(J) NLL
Endrin	NLV	NLV	NLL
Heptachlor epoxide	NLV	NLV	NLL
Methoxychlor	ID	ID	NA
Acetic Acid	NLV	NLV	900,000 M
Total Organic Carbon	NA	NA	NA
Percent Solids	NA	NA	NA
Total Solids	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

All results are in micrograms per kilogram (µg/kg).

Bold	Value above Commercial Direct Contact Criteria (Operational Memorandum #18, June 6, 2000).
Italics	Value above Commercial Indoor Inhalation Criteria (Operational Memorandum #18, June 6, 2000).
▨	Value above Residential Drinking Water Protection Criteria (Operational Memorandum #18, June 6, 2000).
☐	Value above Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, June 6, 2000).
underline	Value above Groundwater Surface Water Interface Protection Criteria (Operational Memorandum #18, June 6, 2000).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
+	"+ Correlation coefficient for method of standard addition was not within control limits.
B	Constituent was also detected in laboratory blank.
D	Result was obtained from analysis of a dilution.
DL	Dilution.
E	Analyte was detected at a concentration greater than the calibration range, and is therefore estimated.
J	Estimated result.
MBB	This analyte is present at a reportable level in the associated method blank but is less than 5 percent of the sample amount.
MBD	This analyte is present in the associated method blank at an amount that is less than two times the reporting limit.
N	Spike sample recovery is not within control limits.
NA	Not analyzed.
P	Greater than 25% RPD between two columns for pesticide or PCB
R	Rejected result.
RE	Re-extraction.
S	Value was determined by the Method of Standard Additions.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile organic compounds.
W	Post-digestion spike for furnace A-A analysis is out of control limits while sample absorbance is less than 50% of spike absorbance.

Criteria Footnotes:

AD	Substance causes developmental effects. Residential and Commercial I direct contact criteria are protective of both prenatal and postnatal exposure.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Criteria Footnotes (continued)

B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
DD	Hazardous substance causes developmental effects.
G	GSI criterion is hardness dependent.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
INO	Inorgranic.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
NE	Not established.
NLL	Chemical is not likely to leach under most soil conditions.
NLV	Chemical is not likely to volatilize under most soil conditions.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
Q	Criterion for carcinogenic polycyclic aromatic hydrocarbons (PAHs) were developed using "relative potential potenicies" (RPPs) to benzo(a)pyrene.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
P	Amenable or Method OIA-1677 analysis are used to quanitfy cyanide concentrations for compliance with all groundwater criteria.
T	Refer to Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as ammended
X	The GSI criterion is not protective for surface water that is used as a drinking water source.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Sample Date	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Name	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Depth	35-45'	65'	90'	115'	140'	170'	202'	237'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	24 J	NA	67	190	<56	9.3 J	NA	8.1 J
2-Hexanone	<55	NA	<55	<120	<56	<62	NA	<58
4-Methyl-2-pentanone (MIBK)	<55	NA	<55	<120	<56	<62	NA	<58
Acetone	19 J	NA	56	220	<56	<62	NA	8.5 J
Benzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Carbon disulfide	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Chlorobenzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Ethylbenzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Methylene chloride	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Toluene	<5.5	NA	<5.5	10 J	<5.6	<6.2	NA	<5.8
Trichloroethene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Xylenes (total)	<5.5	NA	2.3 J	8.5 J	<5.6	<6.2	NA	<5.8
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	1,600	440	400	670	<180	<200	NA	<190
2-Methylnaphthalene	170 J	<200	72 J	<390	<180	<200	NA	<190
2-Methylphenol	970	400	320	2,000	<180	<200	NA	<190
4-Methylphenol	1,800	2,400	1,400	3,400	<180	<200	NA	<190
bis(2-Ethylhexyl)phthalate	<180	<200	<180	<390	52 J	<200	NA	<190

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Sample Date	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Name	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Depth	35-45'	65'	90'	115'	140'	170'	202'	237'
SVOC (continued)								
Butylbenzylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Dibenzofuran	<180	<200	<180	<390	<180	<200	NA	<190
Diethylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Di-n-butylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Di-n-octylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Fluoranthene	<180	<200	<180	<390	<180	<200	NA	<190
Fluorene	<180	<200	<180	<390	<180	<200	NA	<190
Naphthalene	110 J	97 J	330	<390	<180	<200	NA	<190
Phenanthrene	<180	<200	<180	<390	<180	<200	NA	<190
Phenol	1,100	1,000	570	5,500	<180	<200	NA	<190
Pyrene	<180	<200	<180	<390	<180	<200	NA	<190
Metals								
Aluminum	2,660,000	NA	NA	NA	NA	NA	NA	NA
Antimony	497	NA	NA	NA	NA	NA	NA	NA
Arsenic	727	NA	NA	NA	NA	NA	NA	NA
Barium	31,300	NA	NA	NA	NA	NA	NA	NA
Beryllium	<551	NA	NA	NA	NA	NA	NA	NA
Cadmium	<27.5 Wa	NA	NA	NA	NA	NA	NA	NA
Calcium	1,700,000	NA	NA	NA	NA	NA	NA	NA
Chromium	6,490	NA	NA	NA	NA	NA	NA	NA
Cobalt	<5,510	NA	NA	NA	NA	NA	NA	NA
Copper	139,000	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Sample Date	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Name	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Depth	35-45'	65'	90'	115'	140'	170'	202'	237'
Metals (continued)								
Iron	4,150,000	NA	NA	NA	NA	NA	NA	NA
Lead	6,900	NA	NA	NA	NA	NA	NA	NA
Magnesium	1,470,000	NA	NA	NA	NA	NA	NA	NA
Manganese	40,500	NA	NA	NA	NA	NA	NA	NA
Mercury	<55.1	NA	NA	NA	NA	NA	NA	NA
Nickel	5,660	NA	NA	NA	NA	NA	NA	NA
Potassium	<551,000	NA	NA	NA	NA	NA	NA	NA
Selenium	<275	NA	NA	NA	NA	NA	NA	NA
Silver	<275	NA	NA	NA	NA	NA	NA	NA
Sodium	<551,000	NA	NA	NA	NA	NA	NA	NA
Vanadium	10,300	NA	NA	NA	NA	NA	NA	NA
Zinc	8,600 MBD	NA	NA	NA	NA	NA	NA	NA
Pest/PCBs								
Chlordane (gamma)	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	<3.6 J	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	1,200,000	910,000	1,400,000	3,900,000	860,000	5,100,000	840,000	580,000

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Sample Date	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Name	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Depth	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	<12	<11	3 J	<56
2-Butanone (MEK)	NA	NA	<55	NA	100	22	12	600
2-Hexanone	NA	NA	<55	NA	17	<11	<12	74
4-Methyl-2-pentanone (MIBK)	NA	NA	<55	NA	5 J	<11	<12	<56
Acetone	NA	NA	<55	NA	<85 J	<61 J	<58 J	<570 J
Benzene	NA	NA	<5.5	NA	5 J	<11	2 J	<56
Carbon disulfide	NA	NA	<5.5	NA	<12 J	<11	17	<56
Chlorobenzene	NA	NA	<5.5	NA	<12	<11	<12	<56
Ethylbenzene	NA	NA	<5.5	NA	4 J	<11	4 J	<56
Methylene chloride	NA	NA	<5.5	NA	<12 J	<11 J	<12 J	<56 J
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	<5.5	NA	<12	11	<12	<56
Toluene	NA	NA	<5.5	NA	<12 J	<11	<12	<56
Trichloroethene	NA	NA	<5.5	NA	<12	<11	<12	<56
Xylenes (total)	NA	NA	<5.5	NA	24	<11	22	<56
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	NA	NA	<180	NA	1,300	220 J	670	1,200
2-Methylnaphthalene	NA	NA	<180	NA	160 J	220 J	76 J	68 J
2-Methylphenol	NA	NA	<180	NA	700	<370	86 J	290 J
4-Methylphenol	NA	NA	<180	NA	1,300	120 J	410	3,200
bis(2-Ethylhexyl)phthalate	NA	NA	<180	NA	20 J	510	24 J	<370

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Sample Date	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Name	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Depth	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
SVOC (continued)								
Butylbenzylphthalate	NA	NA	<180	NA	<380	<370	<400	<370
Dibenzofuran	NA	NA	<180	NA	<380	<370	<400	<370
Diethylphthalate	NA	NA	<180	NA	<380	<370	<400	<370
Di-n-butylphthalate	NA	NA	<180	NA	21 J	21 J	21 J	25 J
Di-n-octylphthalate	NA	NA	<180	NA	42 J	220 J	33 J	<370
Fluoranthene	NA	NA	<180	NA	<380	<370	<400	<370
Fluorene	NA	NA	<180	NA	<380	<370	21 J	<370
Naphthalene	NA	NA	<180	NA	100 J	46 J	110 J	160 J
Phenanthrene	NA	NA	<180	NA	<380	<370	<400	<370
Phenol	NA	NA	<180	NA	780	24 J	56 J	1,400
Pyrene	NA	NA	<180	NA	<380	<370	<400	<370
Metals								
Aluminum	NA	NA	NA	NA	1,560,000 J	2,540,000 J	1,570,000 J	3,230,000 J
Antimony	NA	NA	NA	NA	R	R	R	R
Arsenic	NA	NA	NA	NA	<500	800	<500	2,600
Barium	NA	NA	NA	NA	33,200	11,000	10,500	14,500
Beryllium	NA	NA	NA	NA	40	70	70	200
Cadmium	NA	NA	NA	NA	<300	1,000	<300	<300
Calcium	NA	NA	NA	NA	823,000	932,000	685,000	16,800,000
Chromium	NA	NA	NA	NA	4,500	7,500	3,600	7,000
Cobalt	NA	NA	NA	NA	1,500	5,300	1,500	5,400
Copper	NA	NA	NA	NA	99,900 J	178,000 J	22,400 J	11,000 J
Cyanide	NA	NA	NA	NA	100 J	80 J	80 J	100 J

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Sample Date	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Name	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Depth	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
Metals (continued)								
Iron	NA	NA	NA	NA	2,390,000	4,380,000	3,630,000	8,670,000
Lead	NA	NA	NA	NA	5,700 J	16,400 J	2,300 J	3,000 J
Magnesium	NA	NA	NA	NA	903,000 J	1,500,000 J	813,000 J	9,920,000 J
Manganese	NA	NA	NA	NA	26,400	42,600	34,900	160,000
Mercury	NA	NA	NA	NA	<60	<60	<60	<50
Nickel	NA	NA	NA	NA	3,500	12,800	4,700	7,800
Potassium	NA	NA	NA	NA	315,000 J	385,000 J	323,000 J	484,000 J
Selenium	NA	NA	NA	NA	<500	<500	<600	<500
Silver	NA	NA	NA	NA	<200	<200	<200	<200
Sodium	NA	NA	NA	NA	99,100	100,000	78,100	162,000
Vanadium	NA	NA	NA	NA	5,400	6,200	5,800	14,600
Zinc	NA	NA	NA	NA	9,500	18,700	11,100	13,000
Pest/PCBs								
Chlordane (gamma)	NA	NA	NA	NA	<1.9 J	<1.9 J	1.5 J	<16 J
Endosulfan I	NA	NA	NA	NA	<1.9	<1.9	<2.0	<16
Endosulfan II	NA	NA	NA	NA	<3.8 J	<3.7 J	1.0 J	<30 J
Heptachlor epoxide	NA	NA	NA	NA	<1.9 J	<1.9 J	0.860 J	<16 J
Total Organic Carbon	390,000	730,000	640,000	910,000	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Sample Date	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Name	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Depth	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	<10	<10	NA	NA
1,2-Dichloroethene (total)	<62	NA	<12	<11	<10	<10	<11	<11
2-Butanone (MEK)	740	NA	38	76	<100	<100	<11	<11
2-Hexanone	86	NA	<12	9 J	<100	<100	<11	<11
4-Methyl-2-pentanone (MIBK)	<62	NA	<12	<11	<100	<100	<11	<11
Acetone	1,200 J	NA	<72 J	<84 J	<100	<100	9 J	21
Benzene	<62	NA	<12	<11	<10	<10	<11	<11
Carbon disulfide	<62 J	NA	<12	<11	<100	<100	<11	<11
Chlorobenzene	<62	NA	<12	<11	<10	<10	<11	<11
Ethylbenzene	13 J	NA	<12	<11	<10	58	<11	<11
Methylene chloride	<62 J	NA	<12 J	<23 J	R	R	<29 B	<30 B
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	8 J	NA	<12	<11	<10	<10	<11	<11
Toluene	<62	NA	<12	<11	<10	80	<11	<11
Trichloroethene	<62	NA	<12	<11	<10	<10	<11	<11
Xylenes (total)	<62	NA	<12	<11	<30	400	<11	<11
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	1,100	1,100 J	150 J	84 J	<330	12,000	<350	<350
2-Methylnaphthalene	22 J	<1,200	<410	<360	<330	<7,300 *	<350	<350
2-Methylphenol	1,900	2,000	100 J	86 J	<330	8,000	<350	<350
4-Methylphenol	3,500	3,500	440	500	<330	9,400	<350	<350
bis(2-Ethylhexyl)phthalate	<410	<1,200	<410	<360	<330	<7,300 *	670 B	<350

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Sample Date	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Name	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Depth	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
SVOC (continued)								
Butylbenzylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Dibenzofuran	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Diethylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Di-n-butylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Di-n-octylphthalate	<410	<1,200	<410	<360	<330	<18,000 *	<350	<350
Fluoranthene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Fluorene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Naphthalene	<410	<1,200	43 J	<360	<330	12,000	<350	<350
Phenanthrene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Phenol	4,100	4,400	150 J	230 J	<330	<7,300 *	<350	<350
Pyrene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Metals								
Aluminum	14,300,000 J	NA	13,200,000 J	1,980,000 J	NA	NA	3,450,000	NA
Antimony	R	NA	R	R	NA	NA	<2,500	NA
Arsenic	2,600	NA	3,000	5,800 J	NA	NA	1,100 B	NA
Barium	73,800	NA	83,000	9,000	17,000	27,000	11,100 B	NA
Beryllium	600	NA	600	90	NA	NA	<120	NA
Cadmium	<300	NA	<300	<200	NA	NA	<180	NA
Calcium	28,700,000	NA	28,200,000	20,900,000	NA	NA	1,540,000	NA
Chromium	23,500	NA	23,000	4,000	3,100	8,900	10,800	NA
Cobalt	8,600	NA	9,600	2,400	NA	NA	4,200 B	NA
Copper	32,200 J	NA	30,900 J	10,900	15,000	28,000	18,200	NA
Cyanide	100 J	NA	<40	100 J	NA	NA	180 B	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Sample Date	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Name	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Depth	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
Metals (continued)								
Iron	20,500,000	NA	20,500,000	6,010,000	NA	NA	7,240,000	NA
Lead	5,200 J	NA	6,000 J	1,600 J	4,200	8,200	2,100	NA
Magnesium	17,200,000 J	NA	15,400,000 J	11,100,000	NA	NA	2,160,000	NA
Manganese	368,000	NA	635,000	143,000	NA	NA	76,200 N	NA
Mercury	<60	NA	<60	<50	NA	NA	60 B	NA
Nickel	21,500	NA	23,000	6,600	NA	NA	121,000	NA
Potassium	2,310,000 J	NA	2,340,000 J	221,000	NA	NA	309,000 B	NA
Selenium	<600	NA	<600	<500 J	NA	NA	<610	NA
Silver	200	NA	400	<200	NA	NA	<670	NA
Sodium	509,000	NA	329,000	92,300	NA	NA	65,300 B	NA
Vanadium	41,500	NA	39,700	11,700	NA	NA	13,800	NA
Zinc	34,600	NA	38,700	11,200	2,500	30,000	12,200	NA
Pest/PCBs								
Chlordane (gamma)	<2.1 J	NA	<2.1 J	<1.8 J	NA	NA	<1.8	<1.8
Endosulfan I	<2.1	NA	<2.1	<1.8	NA	NA	<1.8	<1.8
Endosulfan II	<4.1 J	NA	<4.1 J	<3.6 J	NA	NA	<3.5	<3.5
Heptachlor epoxide	<2.1 J	NA	<2.1 J	<1.8 J	NA	NA	<1.8	<1.8
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB1	SB1-B	SB2-B	SB3	
Sample Date	05/16/96	05/16/96	05/16/96	05/16/96	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85
Sample Name	SS-4	SS-5	PB2	SS-13	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')
Depth	12-16'	24-28'	24-28'	12-16'	15'	15'	15'	52'	54'
VOC									
1,2,4-Trimethylbenzene	NA	NA	<1.1	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	<11	NA	<12	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	<11	8.9	<12	NA	NA	NA	NA	NA
2-Hexanone	NA	<11	1.2 J	<12	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	<11	<2.2	<12	NA	NA	NA	NA	NA
Acetone	NA	37	25	15	NA	NA	NA	NA	NA
Benzene	NA	<11	<1.1	<12	NA	NA	NA	NA	NA
Carbon disulfide	NA	4 J	29	1 J	NA	NA	NA	NA	NA
Chlorobenzene	NA	<11	<1.1	<12	NA	NA	NA	NA	NA
Ethylbenzene	NA	<11	<1.1	<12	NA	ND	ND	ND	ND
Methylene chloride	NA	<39 B	<1.1	<34 B	NA	NA	NA	NA	NA
Naphthalene	NA	NA	8.1	NA	NA	NA	NA	NA	NA
Styrene	NA	<11	<1.1	<12	NA	NA	NA	NA	NA
Toluene	NA	<11	<1.1	2 J	NA	ND	ND	ND	ND
Trichloroethene	NA	<11	<1.1	<12	NA	NA	NA	NA	NA
Xylenes (total)	NA	<11	NA	7 J	NA	ND	ND	ND	ND
Xylenes, m+p	NA	NA	0.4 J	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	<350	<360	560 J	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	<350	98 J	880 J	NA	NA	NA	NA	NA
2-Methylphenol	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
4-Methylphenol	NA	<350	<360	430 J	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	<350	65 JB	<1,900	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB1	SB1-B	SB2-B	SB3	
Sample Date	05/16/96	05/16/96	05/16/96	05/16/96	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85
Sample Name	SS-4	SS-5	PB2	SS-13	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')
Depth	12-16'	24-28'	24-28'	12-16'	15'	15'	15'	52'	54'
SVOC (continued)									
Butylbenzylphthalate	NA	<350	150 J	<1,900	NA	NA	NA	NA	NA
Dibenzofuran	NA	<350	34 J	250 J	NA	NA	NA	NA	NA
Diethylphthalate	NA	<350	200 JB	<1,900	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	<350	1,400 B	<1,900	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
Fluoranthene	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
Fluorene	NA	<350	<360	250 J	NA	NA	NA	NA	NA
Naphthalene	NA	<350	58 J	450 J	NA	NA	NA	NA	NA
Phenanthrene	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
Phenol	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
Pyrene	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
Metals									
Aluminum	1,420,000	2,760,000	NA	861,000	NA	NA	NA	NA	NA
Antimony	<2,700	<2,500	NA	<2,600	NA	NA	NA	NA	NA
Arsenic	<810	1,400 B	NA	2,300	NA	NA	NA	NA	NA
Barium	11,300 B	5,800 B	NA	206,000	29,000	<10,000	35,000	18,000	16,000
Beryllium	<130	<120	NA	<130	NA	NA	NA	NA	NA
Cadmium	<200	<180	NA	280 B	NA	NA	NA	NA	NA
Calcium	731,000 B	1,060,000	NA	5,250,000	NA	NA	NA	NA	NA
Chromium	4,700	5,000	NA	5,100	16,000	15,000	10,000	11,000	26,000
Cobalt	2,700 B	5,100 B	NA	2,400 B	NA	NA	NA	NA	NA
Copper	9,000	21,900	NA	62,600	14,000	16,000	17,000	9,800	11,000
Cyanide	<120	<120	NA	<120	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB1	SB1-B	SB2-B	SB3	
Sample Date	05/16/96	05/16/96	05/16/96	05/16/96	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85
Sample Name	SS-4	SS-5	PB2	SS-13	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')
Depth	12-16'	24-28'	24-28'	12-16'	15'	15'	15'	52'	54'
Metals (continued)									
Iron	3,140,000	7,630,000	NA	11,200,000	NA	NA	NA	NA	NA
Lead	4,800	2,700	NA	92,200	<9,100	<5,300	<5,400	<2,700	<1,200
Magnesium	842,000 B	1,170,000	NA	1,580,000	NA	NA	NA	NA	NA
Manganese	34,700 N	36,300 N	NA	71,200 N	NA	NA	NA	NA	NA
Mercury	<50	60 B	NA	90 B	NA	NA	NA	NA	NA
Nickel	15,100	34,900	NA	7,300 B	NA	NA	NA	NA	NA
Potassium	214,000 B	296,000 B	NA	169,000 B	NA	NA	NA	NA	NA
Selenium	<680	<640	NA	<660	NA	NA	NA	NA	NA
Silver	<740	<700	NA	<720	NA	NA	NA	NA	NA
Sodium	51,000 B	68,300 B	NA	57,400 B	NA	NA	NA	NA	NA
Vanadium	7,900 B	9,900 B	NA	4,600 B	NA	NA	NA	NA	NA
Zinc	4,700	13,800	NA	99,900	NA	NA	NA	NA	NA
Pest/PCBs									
Chlordane (gamma)	NA	<1.8	NA	<3.4 P	NA	NA	NA	NA	NA
Endosulfan I	NA	2.8 P	NA	<2	NA	NA	NA	NA	NA
Endosulfan II	NA	<3.5	NA	<3.9	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	<1.8	NA	<2	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB4		SB5						
Sample Date	07/24/85	07/24/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
Sample Name	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')
Depth	54'	56'	05'	10'	15'	20'	25'	30'	35'
VOC									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	97	70	1,800	6,400	1,600	1,300	23,000
2-Hexanone	NA	NA	31	89	370	ND	ND	ND	1,500
4-Methyl-2-pentanone (MIBK)	NA	NA	10	16	ND	89	93	ND	500
Acetone	NA	NA	16,000	3,000	3,500	11,000	36,000	7,600	68,000
Benzene	NA	NA	ND	ND	230	50	170	17	470
Carbon disulfide	NA	NA	ND	ND	ND	ND	19	ND	79
Chlorobenzene	NA	NA	ND	11	ND	31	120	28	ND
Ethylbenzene	7	ND	ND	11	550	66	360	90	1,600
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	8	ND	ND	24	1,100	140	520	120	1,900
Trichloroethene	NA	NA	ND	ND	100	15	ND	ND	19
Xylenes (total)	55	ND	ND	82	2,700	520	3,300	750	10,000
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB4		SB5						
Sample Date	07/24/85	07/24/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
Sample Name	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')
Depth	54'	56'	05'	10'	15'	20'	25'	30'	35'
SVOC (continued)									
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	<12,000	<12,000	<12,000	<11,000	<16,000	<12,000	<12,000
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	12,000	11,000	39,000	20,000	22,000	100,000	36,000	130,000	21,000
Beryllium	NA	NA	<2,400	<2,400	<2,400	<2,200	<3,200	<2,400	<2,300
Cadmium	NA	NA	<2,400	<2,400	<2,400	<2,200	<3,200	<2,400	<2,300
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	5,000	7,900	12,000	9,800	12,000	11,000	9,500	4,900	8,100
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	7,800	5,700	6,000	7,300	29,000	<2,200	320,000	56,000	85,000
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB4		SB5						
Sample Date	07/24/85	07/24/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
Sample Name	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')
Depth	54'	56'	05'	10'	15'	20'	25'	30'	35'
Metals (continued)									
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	<8,800	<9,600	<2,400	<2,400	<2,400	<2,200	11,000	13,000	3,500
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	ND	ND	ND	<420	<600	<460	ND
Nickel	NA	NA	3,600	3,600	13,000	4,400	6,300	<2,400	3,500
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	710	<490	<490	<440	950	<490	<460
Silver	NA	NA	<1,200	<1,200	<1,200	<1,100	<1,600	<1,200	<1,200
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	11,000	7,300	12,000	23,000	48,000	35,000	12,000
Pest/PCBs									
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB6		SB7		SB8		SB9		SB-22
Sample Date	07/28/85	11/08/85	07/24/85	07/24/85	07/26/85	07/26/85	07/23/85	07/23/85	06/01/86
Sample Name	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	SB-22 (40')
Depth	15'	16.5'	45'	54'	35'	49'	30'	35'	40'
VOC									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	ND
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	ND
Ethylbenzene	NA	ND	ND	ND	NA	NA	NA	NA	ND
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	ND
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	ND	ND	ND	NA	NA	NA	NA	ND
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	ND
Xylenes (total)	NA	ND	ND	ND	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB6		SB7		SB8		SB9		SB-22
Sample Date	07/28/85	11/08/85	07/24/85	07/24/85	07/26/85	07/26/85	07/23/85	07/23/85	06/01/86
Sample Name	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	SB-22 (40')
Depth	15'	16.5'	45'	54'	35'	49'	30'	35'	40'
SVOC (continued)									
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	18,000	<11,000	39,000	24,000	22,000	16,000	16,000	1,000	14,000
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	9,200	7,600	13,000	31,000	12,000	7,100	11,000	9,000	12,000
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	9,400	9,400	11,000	16,000	11,000	7,600	27,000	8,400	10,000
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB6		SB7		SB8		SB9		SB-22
Sample Date	07/28/85	11/08/85	07/24/85	07/24/85	07/26/85	07/26/85	07/23/85	07/23/85	06/01/86
Sample Name	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	SB-22 (40')
Depth	15'	16.5'	45'	54'	35'	49'	30'	35'	40'
Metals (continued)									
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	<9,400	<5,500	<6,300	<810	<2,000	<2,000	<7,500	<10,000	ND
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pest/PCBs									
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)						SB-23	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Name	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')
Depth	50'	60'	75'	90'	105'	120'	40'	45'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ND	ND	ND	ND	ND	ND	7	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)						SB-23	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Name	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')
Depth	50'	60'	75'	90'	105'	120'	40'	45'
SVOC (continued)								
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,900	20,000	14,000	ND	17,000	18,000	14,000	14,000
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	19,000	14,000	19,000	9,000	22,000	12,000	7,000	8,200
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	15,000	25,000	9,600	6,700	7,600	8,000	90,000	24,000
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)						SB-23	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Name	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')
Depth	50'	60'	75'	90'	105'	120'	40'	45'
Metals (continued)								
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Pest/PCBs								
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)					SB-96-1	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/11/96	06/11/96
Sample Name	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')
Depth	55'	70'	85'	105'	120'	6-8'	14-16'
VOC							
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	<10	17
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	<10	<10
2-Butanone (MEK)	NA	NA	NA	NA	NA	<100	<100
2-Hexanone	NA	NA	NA	NA	NA	<100	<100
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	NA	<100	<100,000
Acetone	NA	NA	NA	NA	NA	<100	<100
Benzene	ND	ND	ND	ND	ND	<10	<10
Carbon disulfide	NA	NA	NA	NA	NA	<100	<100
Chlorobenzene	ND	ND	ND	ND	ND	<10	<10
Ethylbenzene	ND	ND	ND	ND	ND	<10	<10
Methylene chloride	ND	ND	ND	ND	ND	11	11
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	<10	<10
Toluene	ND	ND	ND	ND	ND	15	20
Trichloroethene	ND	ND	ND	ND	ND	<10	<10
Xylenes (total)	NA	NA	NA	NA	NA	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA
SVOC							
2,4-Dimethylphenol	NA	NA	NA	NA	NA	<330	7,200
2-Methylnaphthalene	NA	NA	NA	NA	NA	<330	610
2-Methylphenol	NA	NA	NA	NA	NA	<330	2,000
4-Methylphenol	NA	NA	NA	NA	NA	<330	6,300
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	<330	<410 *

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)					SB-96-1	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/11/96	06/11/96
Sample Name	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')
Depth	55'	70'	85'	105'	120'	6-8'	14-16'
SVOC (continued)							
Butylbenzylphthalate	NA	NA	NA	NA	NA	<330	<410 *
Dibenzofuran	NA	NA	NA	NA	NA	<330	<410 *
Diethylphthalate	NA	NA	NA	NA	NA	<330	<410 *
Di-n-butylphthalate	NA	NA	NA	NA	NA	<330	<410 *
Di-n-octylphthalate	NA	NA	NA	NA	NA	<330	<4,100 *
Fluoranthene	NA	NA	NA	NA	NA	<330	620
Fluorene	NA	NA	NA	NA	NA	<330	<410 *
Naphthalene	NA	NA	NA	NA	NA	<330	820
Phenanthrene	NA	NA	NA	NA	NA	<330	880
Phenol	NA	NA	NA	NA	NA	<330	4,000
Pyrene	NA	NA	NA	NA	NA	<330	770 *
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Barium	16,000	24,000	26,000	140,000	18,000	14,000	61,000
Beryllium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Chromium	9,300	7,000	8,200	40,000	6,900	13,000	6,100
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	14,000	12,000	10,000	34,000	5,200	22,000	117,000
Cyanide	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)					SB-96-1	
Sample Date	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/11/96	06/11/96
Sample Name	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')
Depth	55'	70'	85'	105'	120'	6-8'	14-16'
Metals (continued)							
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	ND	ND	ND	ND	ND	7,500	31,000
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	25,000	22,000
Pest/PCBs							
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-2		SB-96-3		SB-96-4	
Sample Date	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')
Depth	6-8'	18-20'	8-10'	18-20'	6-8'	22-24'
VOC						
1,2,4-Trimethylbenzene	<10	<10	<10	<10	<10	<10
1,2-Dichloroethene (total)	<10	<10	<10	<10	<10	<10
2-Butanone (MEK)	<100	<100	<100	<100	<100	<100
2-Hexanone	<100	<100	<100	<100	<100	<100
4-Methyl-2-pentanone (MIBK)	<100,000	<100	<100	<100	<100	<100
Acetone	<100	<100	<100	<100	<100	<100
Benzene	<10	<10	<10	<10	<10	<10
Carbon disulfide	<100	<100	<100	<100	<100	<100
Chlorobenzene	<10	<10	<10	<10	<10	<10
Ethylbenzene	<10	<10	<10	<10	<10	<10
Methylene chloride	<10	<10	R	R	R	R
Naphthalene	NA	NA	NA	NA	NA	NA
Styrene	<10	<10	<10	<10	<10	<10
Toluene	<10	<10	<10	<10	<10	<10
Trichloroethene	<10	<10	<10	<10	<10	<10
Xylenes (total)	<30	<30	<30	<30	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA
SVOC						
2,4-Dimethylphenol	<330	<330	<330	<330	<330	<330
2-Methylnaphthalene	<330	<330	<330	<330	<330	<330
2-Methylphenol	<330	<330	<330	<330	<330	<330
4-Methylphenol	<330	<330	<330	<330	<330	<330
bis(2-Ethylhexyl)phthalate	<330	<330	<330	<330	<330	<330

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-2		SB-96-3		SB-96-4	
Sample Date	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')
Depth	6-8'	18-20'	8-10'	18-20'	6-8'	22-24'
SVOC (continued)						
Butylbenzylphthalate	<330	<330	<330	<330	<330	<330
Dibenzofuran	<330	<330	<330	<330	<330	<330
Diethylphthalate	<330	<330	<330	<330	<330	<330
Di-n-butylphthalate	<330	<330	<330	<330	<330	<330
Di-n-octylphthalate	<330	<330	<330	<330	<330	<330
Fluoranthene	<330	<330	<330	<330	<330	<330
Fluorene	<330	<330	<330	<330	<330	<330
Naphthalene	<330	<330	<330	<330	<330	<330
Phenanthrene	<330	<330	<330	<330	<330	<330
Phenol	<330	<330	<330	<330	<330	<330
Pyrene	<330	<330	<330	<330	<330	<330
Metals						
Aluminum	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA
Barium	11,000	14,000	12,000	21,000	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	9,400	7,400	8,200	5,100	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA
Copper	14,000	9,100	12,000	18,000	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-2		SB-96-3		SB-96-4	
Sample Date	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')
Depth	6-8'	18-20'	8-10'	18-20'	6-8'	22-24'
Metals (continued)						
Iron	NA	NA	NA	NA	NA	NA
Lead	4,800	5,600	1,600	5,300	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	14,000	12,000	9,500	4,500	NA	NA
Pest/PCBs						
Chlordane (gamma)	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5				SB-96-6	
Sample Date	06/12/96	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')
Depth	6-8'	8-10'	18-20'	22-24'	6-8'	24-26'
VOC						
1,2,4-Trimethylbenzene	NA	<10	<10	NA	<10	<10
1,2-Dichloroethene (total)	NA	<10	<10	NA	<10	<10
2-Butanone (MEK)	NA	<100	<100	NA	<100	<100
2-Hexanone	NA	<100	<100	NA	<100	<100
4-Methyl-2-pentanone (MIBK)	NA	<100	<100	NA	<100	<100
Acetone	NA	<100	<100	NA	<100	<100
Benzene	NA	<10	<10	NA	<10	<10
Carbon disulfide	NA	<100	<100	NA	<100	<100
Chlorobenzene	NA	<10	<10	NA	<10	<10
Ethylbenzene	NA	<10	<10	NA	<10	<10
Methylene chloride	NA	<10	<10	NA	R	R
Naphthalene	NA	NA	NA	NA	NA	NA
Styrene	NA	<10	<10	NA	<10	<10
Toluene	NA	<10	20	NA	11	<10
Trichloroethene	NA	<10	<10	NA	<10	<10
Xylenes (total)	NA	<30	<30	NA	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA
SVOC						
2,4-Dimethylphenol	NA	<330	<330	NA	<1,800 *	<330
2-Methylnaphthalene	NA	<330	<330	NA	<1,800 *	<330
2-Methylphenol	NA	<330	<330	NA	<1,800 *	<330
4-Methylphenol	NA	<330	<330	NA	<1,800 *	<330
bis(2-Ethylhexyl)phthalate	NA	<330	<330	NA	<1,800 *	<330

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5				SB-96-6	
Sample Date	06/12/96	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')
Depth	6-8'	8-10'	18-20'	22-24'	6-8'	24-26'
SVOC (continued)						
Butylbenzylphthalate	NA	<330	<330	NA	<1,800 *	<330
Dibenzofuran	NA	<330	<330	NA	<1,800 *	<330
Diethylphthalate	NA	<330	<330	NA	<1,800 *	<330
Di-n-butylphthalate	NA	<330	<330	NA	<1,800 *	<330
Di-n-octylphthalate	NA	<330	<330	NA	<1,800 *	<330
Fluoranthene	NA	<330	<330	NA	<1,800 *	<330
Fluorene	NA	<330	<330	NA	<1,800 *	<330
Naphthalene	NA	<330	<330	NA	<1,800 *	<330
Phenanthrene	NA	<330	<330	NA	<1,800 *	<330
Phenol	NA	<330	<330	NA	<1,800 *	<330
Pyrene	NA	<330	<330	NA	<1,800 *	<330
Metals						
Aluminum	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA
Barium	7,600	9,100	16,000	11,000	12,000	23,000
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	9,000	9,000	8,100	6,700	9,600	10,000
Cobalt	NA	NA	NA	NA	NA	NA
Copper	12,000	16,000	11,000	12,000	17,000	17,000
Cyanide	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5				SB-96-6	
Sample Date	06/12/96	06/11/96	06/11/96	06/12/96	06/12/96	06/12/96
Sample Name	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')
Depth	6-8'	8-10'	18-20'	22-24'	6-8'	24-26'
Metals (continued)						
Iron	NA	NA	NA	NA	NA	NA
Lead	1,400	2,900	5,600	6,600	1,900	4,500
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	12,000	13,000	12,000	6,600	14,000	19,000
Pest/PCBs						
Chlordane (gamma)	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-7		SB-96-8	SB-96-9	Criteria	
Sample Date	06/10/96	06/10/96	06/14/96	06/14/96	Industrial Direct Contact	Residential Drinking Water Protection
Sample Name	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9		
Depth	6-8'	16-18'	NA	NA		
VOC						
1,2,4-Trimethylbenzene	<10	28	<10	<10	110,000 (l) C	2,100 (l)
1,2-Dichloroethene (total)	<10	<10	<10	<10	640,000 C, (iso)	14,00 iso
2-Butanone (MEK)	<100	<100	<100	<100	27,000,000 (l) C,DD	260,000 (l)
2-Hexanone	<100	<100	<100	<100	2,500,000 C	20,000
4-Methyl-2-pentanone (MIBK)	<100	<100	<100	<100	2,700,000 (l) C	36,000 (l)
Acetone	<100	<100	<100	<100	73,000,000 (l)	15,000 (l)
Benzene	<10	<10	<10	<10	400,000 (l) C	100 (l)
Carbon disulfide	<100	<100	<100	<100	280,000 (l,R) C,DD	16,000 (l,R)
Chlorobenzene	<10	<10	<10	<10	260,000 (l) C	2,000 (l)
Ethylbenzene	<10	<10	<10	<10	140,000 (l) C	1,500 (l)
Methylene chloride	<10	44	<10	R	2,300,000 C	100
Naphthalene	NA	NA	NA	NA	52,000,000	35,000
Styrene	<10	<10	<10	<10	520,000 C	2,700
Toluene	<10	<10	<10	<10	250,000 (l) C	16,000 (l)
Trichloroethene	<10	<10	<10	<10	500,000 C,DD	100
Xylenes (total)	<30	<30	<30	<30	150,000 (l) C	5,600 (l)
Xylenes, m+p	NA	NA	NA	NA	150,000 (l) C J	5,600 (l) J
SVOC						
2,4-Dimethylphenol	<330	<330	<330	<330	36,000,000	7,400
2-Methylnaphthalene	<330	<330	<330	<330	26,000,000	57,000
2-Methylphenol	<330	<330	<330	<330	36,000,000 J	7,400 J
4-Methylphenol	<330	<330	<330	<330	36,000,000 J	7,400 J
bis(2-Ethylhexyl)phthalate	<330	630	<330	<330	10,000,000 C	NLL

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-7		SB-96-8	SB-96-9	Criteria	
Sample Date	06/10/96	06/10/96	06/14/96	06/14/96	Industrial Direct Contact	Residential Drinking Water Protection
Sample Name	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9		
Depth	6-8'	16-18'	NA	NA		
SVOC (continued)						
Butylbenzylphthalate	<330	<330	<330	<330	310,000 C	310,000 C
Dibenzofuran	<330	<330	<330	<330	ID	ID
Diethylphthalate	<330	<330	<330	<330	740,000 C	110,000
Di-n-butylphthalate	<330	<330	<330	<330	760,000 C	760,000 C
Di-n-octylphthalate	<330	<330	<330	<330	20,000,000	100,000,000
Fluoranthene	<330	<330	<330	<330	130,000,000	730,000
Fluorene	<330	<330	<330	<330	87,000,000	390,000
Naphthalene	<330	<330	<330	<330	52,000,000	35,000
Phenanthrene	<330	<330	<330	<330	5,200,000	56,000
Phenol	<330	<330	<330	<330	12,000,000 C,DD	88,000
Pyrene	<330	<330	<330	<330	84,000,000	480,000
Metals						
Aluminum	NA	NA	NA	NA	370,000,000 (B) DD	1,000 (B)
Antimony	NA	NA	NA	NA	670,000	500 M
Arsenic	NA	NA	NA	NA	37,000	23,000
Barium	21,000	8,300	15,000	88,000	130,000,000 (B)	1,300,000 (B)
Beryllium	NA	NA	NA	NA	1,600,000	51,000
Cadmium	NA	NA	NA	NA	2,100,000 (B)	6,000 (B)
Calcium	NA	NA	NA	NA	NA	NA
Chromium	9,000	7,700	12,000	28,000	9,200,000	30,000
Cobalt	NA	NA	NA	NA	9,000,000	800
Copper	12,000	10,000	18,000	36,000	73,000,000 (B)	5,800,000 (B)
Cyanide	NA	NA	NA	NA	250,000 (P,R)	4,000 (P,R)

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-7		SB-96-8	SB-96-9	Criteria	
Sample Date	06/10/96	06/10/96	06/14/96	06/14/96	Industrial	Residential Drinking
Sample Name	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9	Direct Contact	Water Protection
Depth	6-8'	16-18'	NA	NA		
Metals (continued)						
Iron	NA	NA	NA	NA	580,000,000 (B)	6,000 (B)
Lead	9,200	1,500	2,600	9,700	900,000 (B) DD	700,000 (B)
Magnesium	NA	NA	NA	NA	1,000,000,000 (B) D	8,000,000 (B)
Manganese	NA	NA	NA	NA	90,000,000 (B)	1,000 (B)
Mercury	NA	NA	NA	NA	580,000 (B,Z)	1,700 (B,Z)
Nickel	NA	NA	NA	NA	150,000,000 (B)	100,000 (B)
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	9,600,000 (B)	4,000 (B)
Silver	NA	NA	NA	NA	9,000,000 (B)	4,500 (B)
Sodium	NA	NA	NA	NA	1,000,000,000 D	2,500,000
Vanadium	NA	NA	NA	NA	5,500,000 DD	72,000
Zinc	14,000	10,000	20,000	46,000	630,000,000 (B)	2,400,000 (B)
Pest/PCBs						
Chlordane (gamma)	NA	NA	NA	NA	150,000 (J)	(J) NLL
Endosulfan I	NA	NA	NA	NA	4,400,000 (J)	(J) NLL
Endosulfan II	NA	NA	NA	NA	4,400,000 (J)	(J) NLL
Heptachlor epoxide	NA	NA	NA	NA	9,500	NLL
Total Organic Carbon	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Criteria (continued)		
Sample Date	Industrial Indoor-Inhalation	Insutrial Ambient Air Source VSIC	Groundwater Surface Water Interface Protection
Sample Name			
Depth			
VOC			
1,2,4-Trimethylbenzene	110,000 (l) C	25,000,000 (l)	570 (l)
1,2-Dichloroethene (total)	41,000 (iso)	210,000 (iso)	12,000 (iso)
2-Butanone (MEK)	27,000,000 (l) C	35,000,000 (l)	44,000 (l)
2-Hexanone	1,800,000	1,300,000	NA
4-Methyl-2-pentanone (MIBK)	2,700,000 (l) C	53,000,000 (l)	(l) ID
Acetone	110,000,000 (l) C	160,000,000 (l)	34,000 (l)
Benzene	8,400 (l)	45,000 (l)	4,000 (l) X
Carbon disulfide	140,000 (l,R)	1,600,000 (l,R)	(l,R) ID
Chlorobenzene	220,000 (l)	920,000 (l)	940 (l)
Ethylbenzene	140,000 (l) C	2,400,000 (l)	360 (l)
Methylene chloride	240,000	700,000	19,000 X
Naphthalene	470,000	350,000	870
Styrene	520,000 C	3,300,000	2,200
Toluene	250,000 (l) C	3,300,000 (l)	2,800 (l)
Trichloroethene	37,000	260,000	4,000 X
Xylenes (total)	150,000 (l) C	54,000,000 (l)	700 (l)
Xylenes, m+p	150,000 (l) C J	54,000,000 (l) J	700 (l) J
SVOC			
2,4-Dimethylphenol	NLV	NLV	7,600
2-Methylnaphthalene	ID	ID	ID
2-Methylphenol	NLV	NLV	1,400 J
4-Methylphenol	NLV	NLV	1,400 J
bis(2-Ethylhexyl)phthalate	NLV	NLV	NLL

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Sample Date Sample Name Depth	Criteria (continued) Industrial Indoor-Inhalation	Insutrial Ambient Air Source VSIC	Groundwater Surface Water Interface Protection
SVOC (continued)			
Butylbenzylphthalate	NLV	NLV	26,000 X
Dibenzofuran	ID	ID	1,700
Diethylphthalate	NLV	NLV	2,200
Di-n-butylphthalate	NLV	NLV	11,000
Di-n-octylphthalate	NLV	NLV	ID
Fluoranthene	1,000,000,000 D	890,000,000	5,500
Fluorene	1,000,000,000 D	150,000,000	5,300
Naphthalene	470,000	350,000	870
Phenanthrene	5,100,000	190,000	5,300
Phenol	NLV	NLV	4,200
Pyrene	1,000,000,000 D	780,000,000	ID
Metals			
Aluminum	(B) NLV	(B) NLV	(B) NA
Antimony	NLV	NLV	94,000
Arsenic	NLV	NLV	70,000 X
Barium	(B) NLV	(B) NLV	0 (B) G,X
Beryllium	NLV	NLV	0 G
Cadmium	(B) NLV	(B) NLV	0 (B) G,X
Calcium	NA	NA	NA
Chromium	NLV	NLV	3,300
Cobalt	NLV	NLV	2,000
Copper	(B) NLV	(B) NLV	0 (B) G
Cyanide	(P,R) NLV	(P,R) NLV	200 (P,R) M

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Sample Date Sample Name Depth	Criteria (continued) Industrial Indoor-Inhalation	 Insutrial Ambient Air Source VSIC	 Groundwater Surface Water Interface Protection
Metals (continued)			
Iron	(B) NLV	(B) NLV	(B) NA
Lead	(B) NLV	(B) NLV	0 (B) G,M,X
Magnesium	(B) NLV	(B) NLV	(B) NA
Manganese	(B) NLV	(B) NLV	0 (B) G,X
Mercury	89,000 (B,Z)	62,000 (B,Z)	100 (B,Z) M
Nickel	(B) NLV	(B) NLV	0 (B) G
Potassium	NA	NA	NA
Selenium	(B) NLV	(B) NLV	400 (B)
Silver	(B) NLV	(B) NLV	500 (B) M
Sodium	NLV	NLV	NA
Vanadium	NLV	NLV	190,000
Zinc	(B) NLV	(B) NLV	0 (B) G
Pest/PCBs			
Chlordane (gamma)	59,000,000 (J)	4,200,000 (J)	(J) NLL
Endosulfan I	(J) ID	(J) ID	(J) NLL
Endosulfan II	(J) ID	(J) ID	(J) NLL
Heptachlor epoxide	NLV	NLV	NLL
Total Organic Carbon	NA	NA	NA

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

All results are in micrograms per kilogram (ug/kg).

Bold	Value above the Industrial Direct Contact Criteria (Operational Memorandum #18, June 7, 2000).
Italics	Value above the Industrial Indoor Inhalation Criteria (Operational Memorandum #18, June 7, 2000).
▨	Value above the Residential Drinking Water Protection Criteria (Operational Memorandum #18, June 7, 2000).
☐	Value above the Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, June 7, 2000).
underline	Value above the Groundwater/Surface Water Interface Protection Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
B	Constituent was also detected in laboratory blank.
DUP	Duplicate sample.
J	Estimated result.
MBD	This analyte is present in the associated method blank at an amount that is less than two times the reporting limit.
N	Presumptive evidence of compound was identified (TICs only).
NA	Not analyzed.
ND	Not Detected.
P	Greater than 25% RPD between two columns for pesticide or PCB
R	Rejected data.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile Organic Compounds.
Wa	Matrix interference reported by laboratory.

Criteria Footnotes:

AD	Hazardous substance causes developmental effects. Residential and Commercial I Direct Contact Criteria are protective of both prenatal and postnatal exposure.
B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, therefore it is reduced to 100%.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Criteria Footnotes (continued)

DD	Hazardous substance causes developmental effects.
G	GSI criterion is hardness dependent..
I	Hazardous substance may exhibit the characteristic of ignitability as defined in 40 CFR 261.21.
ID	Insufficient data.
NA	Not available.
NE	Not established.
INO	Inorgranic.
Iso	Isomer specific.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
NLL	Chemical is not likely to leach under most soil conditions.
NLV	Chemical is not likely to volatilize under most soil conditions.
P	Amenable or Method OIA-1677 analysis are used to quantify cyanide concentrations for compliance with all groundwter criteria.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
X	The GSI criterion shown is not protective for surface water that is used as a drinking water source.
Z	Mercury generic cleanup criteria based on data for different species of mercury.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-1	GMSB-1	GMSB-1	GMSB-1
Sample Depth (ft bls)	85	135	215	275	325
Sample Date	05/16/97	05/17/97	05/18/97	05/19/97	06/02/97
Sample I.D.	GBGMSB-1/85	GBGMSB-1/135	GBGMSB-1/215	GBGMSB-1/275'	GBGMSB-1/325
VOCs					
1,1,2-Trichloroethane	<12	0.52 J	<3.1	<5 J	<1
2-Butanone (MEK)	1,600	<10	920	<50 J	<10
2-Hexanone	160	<10	210	<50 J	<10
4-Methyl-2-pentanone (MIBK)	<120	<10	32	<50 J	<10
Acetone	2,000	<10	1,100	<50 J	16
Benzene	11 J	<1	20	5.7 J	2.8
Carbon disulfide	8.1 J	<1	3.5	84 J	17
Carbon tetrachloride	<12	<1	<3.1	<5 J	0.12 J
cis-1,2-Dichloroethene	8.6 J	<1	4.8	<5 J	0.21 J
Ethylbenzene	<12	<1	6.3	<5 J	1.2
Tetrachloroethene	<12	<1	<3.1	2.8 J	<1
Toluene	12	0.69 J	30	5.0 J	2.7
Trichloroethene	6.2 J	<1	11	<5 J	0.70 J
Xylenes (total)	<12	<1	32	4.6 J	3.8
SVOC					
2,4-Dimethylphenol	1,100	2.3 J	2,500	130	100
2-Methylnaphthalene	<500	4.0 J	<1,000	<12	<10
2-Methylphenol	1,000	<5	2,800	<12	<10
4-Methylphenol	5,600	<5	11,000	<12	8.7 J

Footnotes on Page 5.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-1	GMSB-1	GMSB-1	GMSB-1
Sample Depth (ft bls)	85	135	215	275	325
Sample Date	05/16/97	05/17/97	05/18/97	05/19/97	06/02/97
Sample I.D.	GBGMSB-1/85	GBGMSB-1/135	GBGMSB-1/215	GBGMSB-1/275'	GBGMSB-1/325
SVOC (continued)					
bis(2-Ethylhexyl)phthalate	<500	3.2 J	<1,000	<12	14
Naphthalene	<500	4.2 J	<1,000	<12	<10
Phenol	2,000	<5	3,300 J	<12	<10
Methane	NA	7,400	87,200	NA	34,000
Biochemical Oxygen Demand	1,300,000 J	3,000 J	1,200,000	44,000 J	6,000
Chemical Oxygen Demand	3,100,000	33,000	2,700,000	180,000	73,000
Density	NA	NA	NA	NA	1,000
Total Organic Carbon	1,100,000	18,000	1,000,000	68,000	33,000

Footnotes on Page 5.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Criteria		
Well/Boring Sample Depth (ft bls) Sample Date Sample I.D.	Residential Drinking Water Protection Criteria	Residential Indoor Air Inhalation Criteria	Industrial Groundwater Contact Criteria
VOCs			
1,1,2-Trichloroethane	5A	17,000	21,000
2-Butanone (MEK)	13,000 I	240,000,000 I, S	240,000,000 I, S
2-Hexanone	1,000	4,200,000	5,200,000
4-Methyl-2-pentanone (MIBK)	1,800 I	20,000,000 I, S	13,000,000 I
Acetone	730 I	1,000,000,000 D, I, S	31,000,000 I
Benzene	5 A, I	5,600 I	11,000 I
Carbon disulfide	800 I, R	250,000 I, R	1,200,000 I,R,S
Carbon tetrachloride	5A	370	4,600
cis-1,2-Dichloroethene	70 A	93,000	200,000
Ethylbenzene	74 E, I	110,000 I	170,000 I, S
Tetrachloroethene	5A	25,000	12,000
Toluene	790 E, I	530,000 I, S	530,000 I, S
Trichloroethene	5A	15,000	22,000
Xylenes (total)	280 E, I	190,000 I, S	190,000 I, S
SVOC			
2,4-Dimethylphenol	370	NLV	520,000
2-Methylnaphthalene	260	ID	25,000 S
2-Methylphenol	370 J	NLV	810,000 J
4-Methylphenol	370 J	NLV	810,000 J

Footnotes on Page 5.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Sample Depth (ft bls) Sample Date Sample I.D.	Criteria Residential Drinking Water Protection Criteria	 Residential Indoor Air Inhalation Criteria	 Industrial Groundwater Contact Criteria
SVOC (continued)			
bis(2-Ethylhexyl)phthalate	6A	NLV	320 AA
Naphthalene	520	31,000 S	31,000 S
Phenol	4,400	NLV	29,000,000
Methane	ID	K	ID
Biochemical Oxygen Demand	NE	NE	NE
Chemical Oxygen Demand	NE	NE	NE
Density	NE	NE	NE
Total Organic Carbon	NE	NE	NE

Footnotes on Page 5.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Results are reported in micrograms per liter (µg/L).

▨	Value above the Residential Drinking Water Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
ft bls	Feet below land surface.
J	Estimated result.
NA	Not analyzed.
VOC	Volatile organic compounds.
SVOC	Semi-volatile organic compounds.

Criteria Footnotes:

A	Criterion is the State of Michigan Drinking Water Standard, Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
AA	Filtered groundwater samples must be collected for appropriate comparison.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
E	Criterion is the aesthetic drinking water value.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
K	Hazardous substance may be flammable and/or explosive.
NE	Not established.
NLV	Chemical is not likely to volatilize under most soil conditions.
R	Chemical may exhibit the characteristic of reactivity, as defined in 40 CFR 261.23.
S	Criterion defaults to the chemical-specific water solubility limit.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
VOC							
1,2,4-Trimethylbenzene	0.44	NA	<0.8	NA	NA	NA	1.4
1,3,5-Trimethylbenzene	<0.8	NA	<0.8	NA	NA	NA	<1.0
2-Butanone (MEK)	NA	<10	NA	NA	<10	<10	<50
Acetone	NA	<10	NA	NA	<10	<10	<100
Benzene	<0.8	0.56 J	1.1	NA	2.2	2.2	0.58 J
Carbon disulfide	NA	0.72 J	NA	NA	<1	<1	<5.0
Chloromethane	<0.8	<1	<.8	NA	<1	<1	<1.0
cis-1,2-Dichloroethene	<0.8	0.22 J	<.8	NA	<1	<1	<1.0
Ethylbenzene	<0.8	0.41 J	0.25 E	NA	0.48 J	0.52 J	0.58 J
Tetrachloroethene	<0.8	<1	<.8	NA	<1	<1	1.5
Toluene	<0.8	1.6	0.33 E	NA	0.62 J	0.63 J	0.94 J
Trichloroethene	<0.8	0.26 J	<.8	NA	<1	<1	<1.0
Xylenes (total)	<0.8	1.3	0.78	NA	1.4	1.5	3
SVOC							
2,4-Dimethylphenol	NA	R	NA	NA	<5	<5	<5.0
2-Methylnaphthalene	NA	<5	NA	NA	<5	<5	<5.0
2-Methylphenol	NA	R	NA	NA	<5	<5	<5.0
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	NA	NA	NA	<5.0
Benzo(a)anthracene	NA	<5	NA	NA	<5	<5	<5.0
Benzo(a)pyrene	NA	<5	NA	NA	<5	<5	<5.0
Benzo(b)fluoranthene	NA	<5	NA	NA	<5	<5	<5.0

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
SVOC (continued)							
Benzo(k)fluoranthene	NA	<5	NA	NA	<5	<5	<5.0
bis(2-Ethylhexyl)phthalate	NA	1.5 J	NA	NA	15	21	<5.0
Butylbenzylphthalate	NA	<5	NA	NA	<5	<5	<5.0
Chrysene	NA	<5	NA	NA	<5	<5	<5.0
Dibenzo(a,h)anthracene	NA	<5	NA	NA	<5	<5	<5.0
Fluoranthene	NA	<5	NA	NA	<5	<5	<5.0
Naphthalene	NA	<5	NA	NA	<5	<5	<5.0
Phenol	NA	R	NA	NA	<5	<5	<5.0
Pyrene	NA	<5	NA	NA	<5	<5	<5.0
Metals							
Arsenic	NA	NA	NA	NA	NA	NA	NA
Arsenic-DISS	NA	NA	NA	NA	NA	NA	7.0 B
Barium	NA	NA	NA	NA	NA	NA	NA
Barium-DISS	NA	NA	NA	NA	NA	NA	180
Boron	NA	NA	NA	29	NA	NA	NA
Calcium	236,920	270,000	NA	46,845	154,000	162,000	NA
Calcium-DISS	NA	NA	NA	NA	NA	NA	130,000
Chromium-DISS	NA	NA	NA	NA	NA	NA	<4.6
Cobalt-DISS	NA	NA	NA	NA	NA	NA	2.2 B
Iron	8,020	13,200	NA	ND	5,070	5,270	NA
Iron-DISS	NA	11,400	NA	NA	2,180	2,110	5,700

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
Metals (continued)							
Magnesium	109,630	107,000	NA	27,286	61,700	62,200	NA
Magnesium-DISS	NA	NA	NA	NA	NA	NA	35,000
Manganese	1,381	1,440	NA	47	691	713	NA
Manganese-DISS	NA	1,390	NA	NA	638	690	1,600
Mercury-DISS	NA	NA	NA	NA	NA	NA	<0.20
Molybdenum-DISS	NA	NA	NA	NA	NA	NA	6.2 B
Nickel-DISS	NA	NA	NA	NA	NA	NA	<25
Potassium	NA	5,350	NA	2,099	6,960	6,800	NA
Potassium-DISS	NA	NA	NA	NA	NA	NA	5,500
Sodium	8,446	6,880	NA	12,932	16,600	16,000	NA
Sodium-DISS	NA	NA	NA	NA	NA	NA	49,000 J
Titanium-DISS	NA	NA	NA	NA	NA	NA	4.3 B
Vanadium-DISS	NA	NA	NA	NA	NA	NA	<7.0
Zinc	NA	NA	NA	53	NA	NA	NA
Zinc-DISS	NA	NA	NA	NA	NA	NA	3.4 B
Inorganic							
Acetate	ND	NA	NA	128	NA	NA	NA
Alkalinity	510,000	460,000	NA	297,000	330,000	320,000	370,000
Ammonium	1,524	NA	NA	647	NA	NA	NA
Chloride	NA	40,000	NA	NA	35,000	35,000	5,200 J
Formate	108	NA	NA	98	NA	NA	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
Inorganic (continued)							
Hardness as CaCO3	NA	NA	NA	NA	NA	NA	480,000
Nitrogen, (Ammonia)	NA	1,000	NA	NA	900	1,200	150
Ortho-Phosphate	NA	NA	NA	NA	NA	NA	200
Phosphorus	NA	<100	NA	NA	<100	<100	NA
Propionate	ND	NA	NA	ND	NA	NA	NA
Silica	24,986	56,000	NA	7,269	26,000	41,000	NA
Silica, Dissolved	NA	NA	NA	NA	NA	NA	36,000
Sulfate	NA	320,000	NA	NA	2,600,000	390,000	160,000
Sulfide	380	2,000	NA	50	1,600	1,600	<100
Alcohols							
Methanol	NA	NA	NA	NA	NA	NA	41,000
Aldehydes							
Pentanal	NA	NA	NA	NA	NA	NA	<100 J
Propanal	NA	NA	NA	NA	NA	NA	<100 J
Methane	NA	820	NA	NA	15,800	17,100	16,300
Acetic Acid	NA	NA	NA	NA	NA	NA	1,700
Biochemical Oxygen Demand	NA	NA	NA	NA	NA	NA	<2,000 J
Chemical Oxygen Demand	NA	35,000	NA	NA	52,000	50,000	380,000
Total Organic Carbon	NA	6,000	NA	NA	12,000	13,000	120,000
Density	NA	1	NA	NA	1	1	NA

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
VOC							
1,2,4-Trimethylbenzene	<1.0	17	NA	NA	<0.8	<1	<50
1,3,5-Trimethylbenzene	<1.0	4.6	NA	NA	<0.8	<1	<50
2-Butanone (MEK)	<50	200	NA	NA	NA	<50	<500
Acetone	<100	260	NA	NA	NA	<50	<500
Benzene	<1.0	15	<5	<5	<0.8	<1	<50
Carbon disulfide	<5.0	<5.0	NA	NA	NA	<10	<500
Chloromethane	<1.0	<1.0	<10	<10	<0.8	<1	<50
cis-1,2-Dichloroethene	<1.0	<1.0	NA	NA	<0.8	NA	NA
Ethylbenzene	<1.0	9.6	<5	<5	<0.8	<1	<50
Tetrachloroethene	6.8	1.8	<5	<5	<0.8	<1	<50
Toluene	<1.0	15	<5	<5	<0.8	<1	<50
Trichloroethene	<1.0	<1.0	<5	<5	<0.8	<1	<50
Xylenes (total)	<3.0	53	NA	NA	<0.8	<3	<50
SVOC							
2,4-Dimethylphenol	<5.0	2,000	<10	NA	NA	<5	<50
2-Methylnaphthalene	20	<50	NA	NA	NA	<5	<50
2-Methylphenol	<5.0	180	NA	NA	NA	<5	<50
3-Methylphenol/4-Methylphenol(m&p-cresol)	<5.0	630	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.73 J	<50	<10	NA	NA	<5	<50
Benzo(a)pyrene	1.2 J	<50	<10	NA	NA	<5	<50
Benzo(b)fluoranthene	1.0 J	<50	<10	NA	NA	<5	<50

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
SVOC (continued)							
Benzo(k)fluoranthene	0.99 J	<50	<10	NA	NA	<5	<50
bis(2-Ethylhexyl)phthalate	<5.0	<50	<10	NA	NA	<5	<50
Butylbenzylphthalate	0.75 J	<50	<10	NA	NA	<5	<50
Chrysene	0.95 J	<50	<10	NA	NA	<5	<50
Dibenzo(a,h)anthracene	0.94 J	<50	<10	NA	NA	<5	<50
Fluoranthene	0.64 J	<50	<10	NA	NA	<5	<50
Naphthalene	44	40 J	<10	NA	NA	<5	<50
Phenol	<5.0	180	<10	NA	NA	<5	<50
Pyrene	0.84 J	<50	<10	NA	NA	<5	<50
Metals							
Arsenic	NA	NA	<2	3.5	NA	NA	NA
Arsenic-DISS	11 B	40	NA	NA	NA	NA	NA
Barium	NA	NA	70	<20	NA	<200	<200
Barium-DISS	87 BJ	190 J	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	463,213	NA	NA
Calcium-DISS	120,000	680,000	NA	NA	NA	NA	NA
Chromium-DISS	<3.3	9.9	NA	NA	NA	NA	NA
Cobalt-DISS	14	1.2 B	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	18,862	15,400	6,470
Iron-DISS	34,000	1,300	NA	NA	NA	NA	NA

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
Metals (continued)							
Magnesium	NA	NA	NA	NA	231,330	NA	NA
Magnesium-DISS	34,000	27,000	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	10,323	NA	NA
Manganese-DISS	2,000 J	1,800 J	NA	NA	NA	NA	NA
Mercury-DISS	<0.20	1.4	NA	NA	NA	NA	NA
Molybdenum-DISS	<10	3.0 B	NA	NA	NA	NA	NA
Nickel-DISS	5.8 B	2.8 B	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Potassium-DISS	5,400	12,000	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	9,732	NA	NA
Sodium-DISS	5,300	76,000	NA	NA	NA	NA	NA
Titanium-DISS	<0.49	45 B	NA	NA	NA	NA	NA
Vanadium-DISS	<2.4	27	NA	NA	NA	NA	NA
Zinc	NA	NA	30	80	332	NA	NA
Zinc-DISS	<5.3	<9.1	NA	NA	NA	NA	NA
Inorganic							
Acetate	NA	NA	NA	NA	2,141	1,012	NA
Alkalinity	140,000	1,000,000	NA	NA	395,000	307,000	650,000
Ammonium	NA	NA	NA	NA	1,112	1,149	494
Chloride	8,100 J	200,000	NA	30,000	NA	NA	NA
Formate	NA	NA	NA	NA	1,587	312	NA

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
Inorganic (continued)							
Hardness as CaCO3	IS	1,700,000	NA	NA	NA	NA	NA
Nitrogen, (Ammonia)	140	62	NA	NA	NA	NA	NA
Ortho-Phosphate	NA	NA	NA	NA	NA	NA	NA
Phosphorus	<100	780	NA	NA	NA	NA	NA
Propionate	NA	NA	NA	NA	307	ND	NA
Silica	NA	NA	NA	NA	16,428	25,817	28,073
Silica, Dissolved	28,000	44,000	NA	NA	NA	NA	NA
Sulfate	220,000	360,000	NA	NA	NA	NA	NA
Sulfide	<100 J	7,800 J	NA	NA	20	590	460
Alcohols							
Methanol	<1,000	<1,000	NA	NA	NA	NA	NA
Aldehydes							
Pentanal	<100 J	160	NA	NA	NA	NA	NA
Propanal	<100 J	250	NA	NA	NA	NA	NA
Methane	2,630	13,600	NA	NA	NA	NA	NA
Acetic Acid	210	31,000	NA	NA	NA	NA	NA
Biochemical Oxygen Demand	<2,000	65,000	NA	NA	NA	NA	NA
Chemical Oxygen Demand	29,000	950,000	NA	NA	NA	NA	NA
Total Organic Carbon	8,900	270,000	NA	NA	NA	NA	NA
Density	NA	NA	NA	NA	NA	NA	NA

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential	Residential
Sample Date	06/14/96	06/14/96	06/14/96	Drinking Water	Indoor Air
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4	Protection	Inhalation
VOC					
1,2,4-Trimethylbenzene	<1	<2	<1	63 E, I	56,000 I, S
1,3,5-Trimethylbenzene	<1	<2	<1	72 E, I	61,000 S, I
2-Butanone (MEK)	<50	NA	<50	13,000 I	240,000,000 I, S
Acetone	<50	NA	<50	730 I	1,000,000,000 D, I, S
Benzene	<1	<2	1.9	5 A, I	5,600 I
Carbon disulfide	<10	NA	<10	800 I, R	250,000 I, R
Chloromethane	<1	1.6	<1	260 I	8,600 I
cis-1,2-Dichloroethene	NA	<2	NA	70 A	93,000
Ethylbenzene	<1	<2	<1	74 E, I	110,000 I
Tetrachloroethene	<1	<2	<1	5 A	25,000
Toluene	<1	<2	1.8	790 E, I	530,000 I, S
Trichloroethene	<1	<2	<1	5 A	15,000
Xylenes (total)	<3	<2	<3	280 E, I	190,000 I, S
SVOC					
2,4-Dimethylphenol	<5	NA	<25 *	370	NLV
2-Methylnaphthalene	<5	NA	<25 *	260	ID
2-Methylphenol	<5	NA	<25 *	370 J	NLV
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	370 J	NLV
Benzo(a)anthracene	<5	NA	<25 *	2.1 Q	NLV
Benzo(a)pyrene	<5	NA	<25 *	5 A, Q	NLV
Benzo(b)fluoranthene	<5	NA	<25 *	2 M, Q	NLV

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential Drinking Water Protection	Residential Indoor Air Inhalation
Sample Date	06/14/96	06/14/96	06/14/96		
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4		
SVOC (continued)					
Benzo(k)fluoranthene	<5	NA	<25 *	5 M, Q	NLV
bis(2-Ethylhexyl)phthalate	<5	NA	<25 *	6 A	NLV
Butylbenzylphthalate	<5	NA	<25 *	1,200	NLV
Chrysene	<5	NA	<25 *	5 M, Q	ID
Dibenzo(a,h)anthracene	<5	NA	<25 *	2 M, Q	NLV
Fluoranthene	<5	NA	<25 *	210 S	210 S
Naphthalene	<5	NA	<25 *	520	31,000 S
Phenol	<5	NA	<25 *	4,400	NLV
Pyrene	<5	NA	<25 *	140 S	140 S
Metals					
Arsenic	NA	NA	NA	50 A	NLV
Arsenic-DISS	NA	NA	NA	50 A	NLV
Barium	<200	NA	<200	2,000 A, B	NLV
Barium-DISS	NA	NA	NA	2,000 A, B	NLV
Boron	NA	NA	NA	500 B, F	NLV
Calcium	NA	NA	NA	NE	NE
Calcium-DISS	NA	NA	NA	NE	NE
Chromium-DISS	NA	NA	NA	100 A	NLV
Cobalt-DISS	NA	NA	NA	40	NLV
Iron	4,840	NA	110	300 B, E	NLV
Iron-DISS	NA	NA	NA	300 B, E	NLV

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential Drinking Water Protection	Residential Indoor Air Inhalation
Sample Date	06/14/96	06/14/96	06/14/96		
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4		
Metals (continued)					
Magnesium	NA	NA	NA	400,000 B	NLV
Magnesium-DISS	NA	NA	NA	400,000 B	NLV
Manganese	NA	NA	NA	50 E,B	NLV
Manganese-DISS	NA	NA	NA	50 E,B	NLV
Mercury-DISS	NA	NA	NA	2 A, INO, B	INO 56 (S)
Molybdenum-DISS	NA	NA	NA	73 B	NLV
Nickel-DISS	NA	NA	NA	100 A, B	NLV
Potassium	NA	NA	NA	NE	NE
Potassium-DISS	NA	NA	NA	NE	NE
Sodium	NA	NA	NA	120,000	NLV
Sodium-DISS	NA	NA	NA	120,000	NLV
Titanium-DISS	NA	NA	NA	NE	NE
Vanadium-DISS	NA	NA	NA	4.5	NLV
Zinc	NA	NA	NA	2,400 B	NLV
Zinc-DISS	NA	NA	NA	2,400 B	NLV
Inorganic					
Acetate	498	NA	98	NE	NE
Alkalinity	457,000	NA	395,000	NE	NE
Ammonium	836	NA	161	NE	NE
Chloride	NA	NA	NA	250,000 E	NLV
Formate	117	NA	69	NE	NE

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential	Residential
Sample Date	06/14/96	06/14/96	06/14/96	Drinking Water	Indoor Air
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4	Protection	Inhalation
Inorganic (continued)					
Hardness as CaCO3	NA	NA	NA	NE	NE
Nitrogen, (Ammonia)	NA	NA	NA	10,000 N	3,200,000
Ortho-Phosphate	NA	NA	NA	NE	NE
Phosphorus	NA	NA	NA	63,000 Total	NLV, TOTAL
Propionate	551	NA	282	NE	NE
Silica	22,541	NA	27,159	NE	NE
Silica, Dissolved	NA	NA	NA	NE	NE
Sulfate	NA	NA	NA	250,000 E	NLV
Sulfide	210	NA	240	NE	NE
Alcohols					
Methanol	NA	NA	NA	3,700	29,000,000 S
Aldehydes					
Pentanal	NA	NA	NA	NE	NE
Propanal	NA	NA	NA	NE	NE
Methane	NA	NA	NA	ID	K
Acetic Acid	NA	NA	NA	18,000 M	NLV
Biochemical Oxygen Demand	NA	NA	NA	NE	NE
Chemical Oxygen Demand	NA	NA	NA	NE	NE
Total Organic Carbon	NA	NA	NA	NE	NE
Density	NA	NA	NA	NE	NE

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Top of Screen Depth (ft bls) Sample Date Sample I.D.	Criteria (continued) Groundwater Contact
VOC	
1,2,4-Trimethylbenzene	56,000 I, S
1,3,5-Trimethylbenzene	61,000 S, I
2-Butanone (MEK)	240,000,000 I, S
Acetone	31,000,000 I
Benzene	11,000 I
Carbon disulfide	1,200,000 I,R,S
Chloromethane	490,000
cis-1,2-Dichloroethene	200,000
Ethylbenzene	170,000 I, S
Tetrachloroethene	12,000
Toluene	530,000 I, S
Trichloroethene	22,000
Xylenes (total)	190,000 I, S
SVOC	
2,4-Dimethylphenol	520,000
2-Methylnaphthalene	25,000 S
2-Methylphenol	810,000 J
3-Methylphenol/4-Methylphenol(m&p-cresol)	810,000 J
Benzo(a)anthracene	9.4 Q, S, AA
Benzo(a)pyrene	2 M,Q, AA
Benzo(b)fluoranthene	2 M,Q, AA

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Top of Screen Depth (ft bls) Sample Date Sample I.D.	Criteria (continued) Groundwater Contact
SVOC (continued)	
Benzo(k)fluoranthene	5 M, Q, AA
bis(2-Ethylhexyl)phthalate	320 AA
Butylbenzylphthalate	2,700 S
Chrysene	5 M, Q, AA
Dibenzo(a,h)anthracene	2 M, Q, AA
Fluoranthene	210 S
Naphthalene	31,000 S
Phenol	29,000,000
Pyrene	140 S
Metals	
Arsenic	4,300
Arsenic-DISS	4,300
Barium	14,000,000 B
Barium-DISS	14,000,000 B
Boron	62,000,000 B
Calcium	NE
Calcium-DISS	NE
Chromium-DISS	460,000
Cobalt-DISS	2,400,000
Iron	58,000,000 B
Iron-DISS	58,000,000 B

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Top of Screen Depth (ft bls) Sample Date Sample I.D.	Criteria (continued) Groundwater Contact
Metals (continued)	
Magnesium	1,000,000,000 B, D
Magnesium-DISS	1,000,000,000 B, D
Manganese	9,100,000 B
Manganese-DISS	9,100,000 B
Mercury-DISS	56 S, INO
Molybdenum-DISS	970,000 B
Nickel-DISS	74,000,000 B
Potassium	NE
Potassium-DISS	NE
Sodium	1,000,000,000 D
Sodium-DISS	1,000,000,000 D
Titanium-DISS	NE
Vanadium-DISS	970,000
Zinc	110,000,000 B
Zinc-DISS	110,000,000 B
Inorganic	
Acetate	NE
Alkalinity	NE
Ammonium	NE
Chloride	ID
Formate	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Top of Screen Depth (ft bls) Sample Date Sample I.D.	Criteria (continued) Groundwater Contact
Inorganic (continued)	
Hardness as CaCO3	NE
Nitrogen, (Ammonia)	ID
Ortho-Phosphate	NE
Phosphorus	ID, Total
Propionate	NE
Silica	NE
Silica, Dissolved	NE
Sulfate	ID
Sulfide	NE
Alcohols	
Methanol	29,000,000 S
Aldehydes	
Pentanal	NE
Propanal	NE
Methane	ID
Acetic Acid	180,000,000
Biochemical Oxygen Demand	NE
Chemical Oxygen Demand	NE
Total Organic Carbon	NE
Density	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Results are reported in micrograms per liter (µg/L).

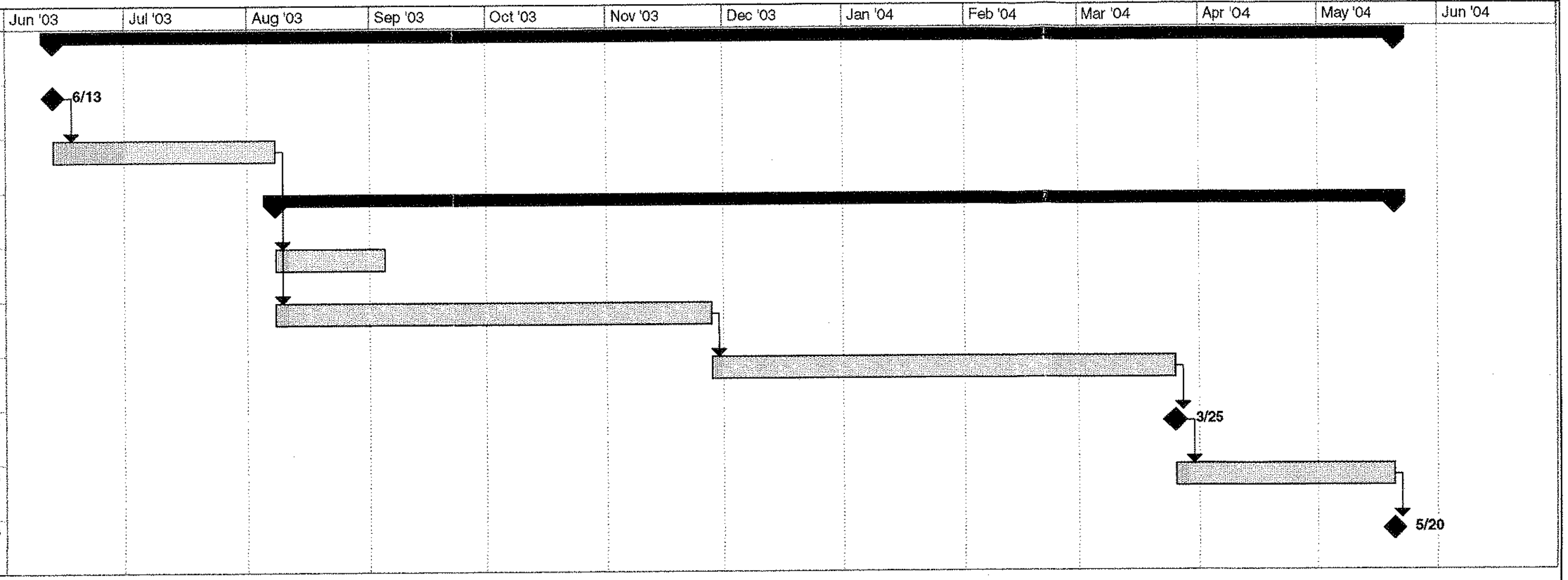
▨	Value above the Residential Drinking Water Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
*	Duplicate analysis not within control limits.
E	Analyte was detected at concentration greater than the calibration range, and is therefore estimated.
ft bls	Feet below land surface.
J	Estimated result.
NA	Not analyzed.
VOC	Volatile organic compounds.
SVOC	Semi-volatile organic compounds.

Criteria Footnotes:

A	Criterion is the State of Michigan Drinking Water Standard, Section 5 of the Safe Drinking Water Act, Act no. 399 of the Public Acts of 1976.
AA	Filtered groundwater samples must be collected for appropriate comparison.
B	Background, as defined in Rule 299.57019(c), may be substituted if higher than the calculated cleanup criteria. Background levels may not exceed criteria for all inorganic compounds.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
E	Criterion is the aesthetic drinking water value.
F	Criterion is based on impacts to plant life.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
INO	Inorganic.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
K	Hazardous substance may be flammable and/or explosive.
M	Calculated value is below the analytical Target Dectection Limit (TDL), therefore, the criterion defaults to the TDL.
N	Add all potential sources of nitrate-nitrogen.
NE	Not established.
NLV	Chemical is not likely to volatilize under most soil conditions.
Q	Criterion for carcinogenic polycyclic aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
R	Chemical may exhibit the characteristic of reactivity, as defined in 40 CFR 261.23.
S	Criterion defaults to the chemical-specific water solubility limit.

Figure 14. Project Schedule, Former Northeast Pit IRAP, Kingsford, Michigan

ID	Task Name	Duration
1	**NE Pit**	**245 days**
2	MDEQ Approve IRAP	0 days
3	Bids/Contractor Selection	40 days
4	**Capping Option**	**205 days**
5	Site Civil/Stormwater Controls Implementation	20 days
6	IRAP Implementation Complete	80 days
7	IRAP Construction Report Preparation/Final Documentation	85 days
8	Submit Construction Report to MDEQ	0 days
9	MDEQ Review Construction Report	40 days
10	MDEQ Approval, NE Pit Complete	0 days



Project: NE Pit
Date: Wed 5/14/03

Task ▨
Split ⋯⋯⋯⋯
Progress ▬
Milestone ◆
Summary ▬
Project Summary ▬
External Tasks ▨
External Milestone ◆
Deadline ⇩

aproject/ford/wi0637/2003/general/NE Pit IRAP Schedule Update 8
Wed 5/14/03 7:22 AM

Ford Motor Company and
Kingsford Products Company

FORMER NORTHEAST PIT INTERIM RESPONSE ACTION PLAN (IRAP)

FORD/KINGSFORD SITE,
KINGSFORD MICHIGAN

January 2003

ARCADIS
Infrastructure, buildings, environment, communications

ARCADIS

Former Northeast Pit Interim Response Action Plan (IRAP)

Ford/Kingsford Site,
Kingsford Michigan

R.L. Studebaker Jr

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Our Ref.:
WI0009750012.0001

Date:
8 January 2003

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Appendices

Introduction

ARCADIS, on behalf of Ford Motor Company (Ford) and The Kingsford Products Company (KPC), has performed a remedial investigation of the Ford/Kingsford Site in Kingsford, Michigan. A Remedial Investigation (RI) Report has been prepared for the Ford/Kingsford Site and submitted to the Michigan Department of Environmental Quality (MDEQ) (June 2002). The results of the RI identified a historic disposal area, referred to as the former Northeast Pit (NE Pit), as an area requiring an evaluation of potential response actions. The location of the NE Pit is shown in Figure 1.

A work plan entitled, "*Work Plan for Implementing Response Options at the Former Northeast Pit*", was prepared and submitted to the MDEQ, on June 29, 2000. The Work Plan provided a process for completing the characterization of the NE Pit and for implementing an appropriate response action. The characterization work for the NE Pit was completed in the fall of 2000, and the findings of this work were summarized in a reported entitled "*Former NE Pit Investigation Report*", dated October 25, 2000. Stratigraphic and construction logs for these investigation activities are included in the Former NE Pit Investigation Report and are not reproduced in this document.

In accordance with the Work Plan, this Interim Response Action Plan (IRAP) for the NE Pit has been prepared to evaluate exposure pathways and propose an interim response action. The regulatory guidance documents used for this evaluation is the MDEQ Remedial Action Plan (RAP) guidance Section 2.0120a(1) dated January 21, 1998 and the Operational Memorandum #18 (Part 201 Standards), dated June 7, 2000.

A draft IRAP for the NE Pit was submitted to the MDEQ on February 6, 2001, and a second draft of the IRAP for the NE Pit was submitted to the MDEQ on January 9, 2002. Comments on the initial draft IRAP were received from the MDEQ in a letter dated April 10, 2001, and comments on the second draft IRAP were received from the MDEQ in a letter dated July 10, 2002. This current IRAP document for the NE Pit has been revised based on MDEQ comments. Ford and KPC are seeking MDEQ approval to implement this revised IRAP for the NE Pit, which will ultimately be incorporated into a final site-wide RAP for the Ford/Kingsford Site.

For the purposes of this IRAP, the NE Pit is defined as the waste material present within an area identified in Figure 2 as the "Northeast Pit", which also shows the location of the former Southwest Pit (SW Pit). A proposed response action for the SW Pit is addressed in a separate IRAP previously submitted to the MDEQ (Former Southwest Pit Interim Response Action Plan, May 2002). The dividing line between the NE Pit and the SW Pit is the Lodal Park property line. A legal description for the NE Pit is included as Appendix A.

The NE Pit IRAP is intended to satisfy the requirements for the Limited Industrial and Commercial II, III, IV Closure category. This IRAP addresses the NE Pit material only; it does not address groundwater contamination beneath the NE Pit, nor does it address environmental media beyond the boundaries of the NE Pit. The lower boundary of the NE Pit is established as the groundwater table, which ranges in depth from 39 to 50 feet below land surface (ft bls). This IRAP proposes relocation of some waste material at the edges of the NE Pit (primarily from within the channel area), consolidation of the waste material within the NE Pit, and the construction of a cover system. This response action for the NE Pit will be incorporated into the site-wide RAP for the Ford/Kingsford Site.

The site-wide RAP will include land and groundwater use restrictions that would apply to the NE Pit. Land use restrictions will be finalized prior to implementation of any interim response actions. The NE Pit would be limited to Industrial and Commercial II, III, and IV uses in the future. A groundwater use institutional control (Ordinance A of The City of Kingsford Restricting Wells) is expected to be finalized and in effect prior to submittal of the site-wide RAP for the Ford/Kingsford Site. A draft copy of this groundwater use institutional control, which has been submitted to the city of Kingsford, is included for reference as Appendix B.

Site Background

The NE Pit is located within the southeastern quarter of the northeastern quarter of Section 2, Township 39 North, Range 31 West, in the city of Kingsford in southwestern Dickinson County, Michigan (south-central part of the Upper Peninsula). The NE Pit (center point) is approximately 1,500 feet north of Breitung Avenue and approximately 600 feet west of Balsam Street (Figure 1). The NE Pit is in a relatively flat upland area of a topographic feature identified as the Upper Terrace, and is interpreted to be a former glacial kettle. The NE Pit area includes the former elliptically shaped pit, approximately 30 feet deep, a former channel that connected the NE Pit to a second pit to the southwest, and a portion of an enlarged area of this channel as shown on Figure 2. The NE Pit is approximately 3 acres in size and lies in an area zoned for industrial use. City of Kingsford zoning information for the area is included in Appendix C. The land containing the NE Pit is currently owned by Dickinson Homes, Inc., although a small portion lies on land owned by the Foley-Martens Company (Figure 2).Two surface water bodies are located within 1 mile of the NE Pit. These include the

Menominee River and Crystal Lake/Mud Lake. The Menominee River is located approximately 4,000 feet to the west and is hydraulically down gradient of the NE Pit. Crystal Lake/Mud Lake is located approximately 0.7 miles to the northeast and hydraulically upgradient from the NE Pit. The nearest public water supply wells (located near the Ford Airport, approximately 1.3 miles northwest of the NE Pit) are hydraulically cross-gradient from the NE Pit. However, based on the presence of a bedrock ridge just north of the NE Pit that trends east-west, and a groundwater divide that exists between the city of Kingsford water supply wells and the NE Pit as shown by the groundwater elevations of Monitoring Wells MW-8 and GM-60 (*Remedial Investigation Report, Ford/Kingsford Site, Kingsford, Michigan, June, 2002*), there is no groundwater communication between the NE Pit area and the area where the city wells are located.

Aerial photographs and historic records indicate that waste disposal at the NE Pit began in the 1920s. Wood pieces, wood sawdust, wood bark chips, and charcoal were reportedly disposed of in the NE Pit along with wastewater containing dissolved organic material from wood pyrolysis processes. Aerial photographs show continued disturbances to the surface of the area after 1961, despite suspension of operations in the area by KPC in 1961.

Land use near the NE Pit is primarily industrial/commercial. There exists a wooded and cleared area to the west. Lodal Park is to the southwest and the industrial businesses Foley-Martens and Dickinson Homes are located to the south. Balsam Street and the former plant area are on the east side. The Kingsford Municipal Garage and other commercial businesses are located to the north. The NE Pit is vacant land that is sparsely vegetated, with several areas where wood tar occasionally seeps to the land surface. The locations of these wood tar seeps are shown on Figures 2 and 5 (TS-2 and TS-3). In accordance with a plan approved by the MDEQ, ARCADIS personnel periodically remove the surface wood tar for off-site non-hazardous disposal. Dickinson Homes periodically uses the NE Pit property for materials storage.

Investigative Activities and Removals

Six previous investigations of the Ford/Kingsford Site have included the NE Pit. These investigations included subsurface soil and waste sampling by Environment & Water Resources Management, Inc. (EWA) for Phase I and Phase II investigations from 1985 through 1987. Based on the findings of these studies, a removal program was implemented in 1987 and 1988 by Ford, that consisted of excavation and off-site disposal of approximately 40,697 cubic yards of material, including 26,949 cubic yards of wood tar. Additional investigations of the NE Pit included surface material sampling by Ecology and Environment, Inc. (E&E) in 1988, subsurface material sampling by BLDI in 1996, and the completion of soil borings and material sampling by the MDEQ in 1996. ARCADIS performed additional investigations of the NE Pit from 1997 to 2001 that included the completion of soil borings and test pits, installation of monitoring wells, collection of groundwater samples, and the collection of surface and subsurface material samples.

To date, 40 soil borings, 11 monitoring wells, and 32 test pits have been completed in the area of the NE Pit. These soil borings, monitoring wells, and test pits are summarized in Table 1, and their locations are shown on Figure 2. The soil and waste samples that have been collected and submitted for laboratory analyses from the area of the NE Pit are provided in Table 2. The groundwater samples from the NE Pit area, including those collected from soil borings (groundwater grab samples), are summarized in Table 3. The analytical results discussed in the following investigations are included in Table 4 and Table 5.

EWA 1985

The initial Phase I site investigation was conducted by EWA from June through August 1985 (EWA, 1986). As part of the initial field investigation, nine soil borings (SB-1 through SB-9) were completed in or adjacent to the NE Pit Area (Figure 2). In addition, two soil borings (SB-1B and SB-2B) were completed for additional soil samples. One monitoring well, Monitoring Well MW-3, was also installed during the Phase I activities. A total of 22 subsurface soil and waste samples from these borings were submitted for laboratory analysis of most United States Environmental Protection Agency (U.S. EPA) Priority Pollutants, including select volatile organic compounds (VOCs) and metals.

The analytical results for the 22 samples indicate that VOCs were detected in eight of the 22 samples. Acetone, benzene, ethylbenzene, and xylenes (total) were detected above the Michigan Part 201 Drinking Water Protection Criteria (DWPC) in Soil Boring SB-5 at various depths. Inorganics, including common soil constituents, were detected in all of the subsurface material samples. Chromium was the only inorganic constituent present that was above the Part 201 DWPC, collected from Soil Boring SB-7.

EWA 1986-1987

The Phase II site investigation was conducted by EWA from June 1986 to February 1987 (EWA, 1987a). Two soil borings (SB-22 and SB-23) were completed within and adjacent to the NE Pit area during the Phase II field activities. A total of 14 subsurface material samples were collected during advancement of these soil borings. The samples were analyzed for VOCs, barium, copper, lead and chromium.

The analytical results for the 14 subsurface material samples indicated that only one VOC, toluene, was detected in only one sample from Soil Boring SB-23 at a depth of 40 ft bls. There were detections of all the inorganic constituents analyzed for, but only chromium was detected above the Michigan Part 201 DWPC in Soil Boring SB-23.

Waste Removal 1987-1988

In February 1987, two surficial wood tar samples were collected from and adjacent to the NE Pit area (EWA, 1987b). The samples were analyzed using the Extraction Procedure Toxicity (EP TOX) tests for metals and toxic characteristic leaching procedures (TCLP) for metals and volatile and extractable organics. The wood tar sample results indicated that the wood tar was not EP-toxic and not classified as a hazardous waste. Between August 4 and 10, 1987, 62 shallow (5 to 15 ft bls) soil borings were completed in the vicinity of the NE Pit to determine an approximate waste volume; laboratory analyses were not performed on samples collected from these soil borings.

Surficial wood tar removal from the NE Pit area was conducted between November 30, 1987 and March 2, 1988 (EWA, 1988). Subsurface wood tar was also removed from the northern and central portion of the NE Pit, with the exception of a rim on the southern and western side of the historic NE Pit outline. A total of 40,697 cubic yards of material was excavated at the site, with 26,949 cubic yards of wood tar removed from the site by truck to Wayne Disposal. Of the excavated material, 17,200 cubic yards of screened soil and overburden soil were replaced as backfill in the excavated areas. To verify the quality of the replaced soil, a grab sample of the screened soil to be used as backfill material was obtained from the shaker screen used to separate the wood tar from the soil, and submitted for chemical analysis on January 5, 1988. The soil sample was analyzed by TCLP for TCLP list constituents. The soil sample results indicated no detection of any constituents associated with wood tar.

To replace the wood tar transported from the site and restore the surface topography, clean borrow material was transported to the site. The backfill soil material was obtained from a location east of the city of Kingsford. To verify the quality of the backfill material, two composite soil samples were collected from the imported backfill and submitted for analysis of VOCs, semi-volatile organic compounds (SVOCs), and metals. The analytical results of the soil samples indicated that the material used for backfill was clean material and suitable to use.

E&E 1988

E&E performed a Site Screening Inspection in the area of the NE Pit in May 1988. Five surface soil or waste samples (S-1 through S-5) were collected and submitted for chemical analyses to determine the concentrations of U.S. EPA target compound list (TCL), VOCs, polychlorinated biphenyls (PCBs), and target analyte list (TAL) metals present in the vicinity of the pit (E&E, 1989). Each soil or waste sample was collected from a depth of approximately 6 inches.

The surface samples generally showed detections of both VOCs and SVOCs, but the samples only had one VOC, methylene chloride, which is a known laboratory contaminant, and one SVOC, pentachlorophenol, that were detected above the Michigan Part 201 DWPC. There were detections of all the inorganic constituents analyzed, but only aluminum, antimony, cobalt, iron, and manganese were detected above the DWPC. There was only one pesticide/PCB, Aroclor 1242, detected in any of the surface samples, and it was found below the Michigan Part 201 criteria.

BLDI 1996

Between June 10 and 14, 1996, a Site Assessment Fund Investigation was completed for "The 500 Balsam Street Property" (BLDI, 1996). This parcel encompasses a small portion of the NE Pit. As part of this project, nine 26-foot soil borings (SB-96-1 through SB-96-9) were completed. Four groundwater monitoring wells (MW96-1 through MW96-4) were also installed. During advancement of these soil borings, soil samples were collected and submitted for laboratory analysis. A total of 20 subsurface soil samples were collected (18 from soil borings and two from monitoring well borings) and submitted for chemical analysis of VOCs, SVOCs, and select metals (lead, barium, chromium, copper and zinc).

The analytical results show that VOCs were detected in six of the 20 soil samples and SVOCs were detected in two of the 20 soil samples. There were no VOCs detected above any Michigan Part 201 criteria. However, three SVOCs, 2,4-dimethylphenol, 2-methylphenol, and 4-methylphenol, were detected in the soil at concentrations above the DWPC, in soil samples collected from Monitoring Well MW96-3 and Soil Boring SB-96-1, at depth intervals of 4 to 6 ft bls and 14 to 16 ft bls, respectively. All inorganic constituents were detected at levels below Michigan Part 201 criteria. The BLDI report concluded that the land investigated could be redeveloped for industrial and commercial use.

MDEQ 1996

The MDEQ portion of the Integrated Assessment fieldwork was completed on May 6 through 17, and June 3 through 7, 1996. The Integrated Assessment included interviews with site representatives, a site reconnaissance inspection, installation and sampling of temporary Geoprobe monitoring wells, and collection and submittal of soil, groundwater, and air samples for Contract Laboratory Program (CLP) organic and inorganic chemical analyses (MDEQ, 1997). Three soil borings (PB-2, PB-5 and PB-6) were completed in the vicinity of the NE Pit. A total of four subsurface soil samples were collected and submitted for laboratory analysis from the two soil borings. The soil boring number and representative soil samples that were collected are as follows: Soil Boring PB-2 (SS3, SS4 and SS5); and Soil Boring PB-5 (SS13). One waste sample was also collected, from Soil Boring PB-5 (SS-12).

The analytical results show that VOCs were detected in all five samples while SVOCs were detected in three of the five samples. No SVOCs were detected in concentrations above any Michigan Part 201 criteria, while one VOC, methylene chloride, was found above the DWPC in a re-extraction of the waste sample from Soil Boring PB-5. Several inorganics including aluminum, antimony, cobalt, iron, manganese, and nickel showed concentrations above the DWPC. Two pesticides were also detected, including endosulfan I and chlordane (gamma), but were found at concentrations below any Michigan Part 201 criteria.

ARCADIS 1997-2001

Investigations conducted by ARCADIS since 1997 focused on surface and subsurface soils, delineation and characterization of the remaining waste material, the potential for the waste material to be the source of a continuing release to groundwater, and occasional waste removal activities. Detailed descriptions of the field activities, the data collected, and maps showing the locations of the data points are provided in the RI report. The investigations included the following:

- The installation and sampling of one deep soil boring (GMSB-1) to bedrock within the NE Pit. One composite waste sample, 11 subsurface soil samples, and four groundwater grab samples were collected and submitted for laboratory analyses. Waste samples were analyzed for VOCs, SVOCs, total organic carbon (TOC), metals, PCBs, pesticides, and TCLP analyses. Subsurface soil samples were analyzed for VOCs, SVOCs, TOC, TCLP, select metals, PCBs, and pesticides. The groundwater grab samples were analyzed for VOCs, SVOCs, TOC, chemical oxygen demand (COD), dissolved gases, and several biochemical oxygen demand (BOD)/sulfate analyses.

- The excavation of 32 test pits (see Table 1 for a complete list). Nine of the test pits were completed on October 21, 1998, and three test pits were completed on November 2 through November 6, 1999, during the RI. Test pit dimensions ranged from 5 to 16 feet wide, 10 to 20 feet long, and 8 to 11 feet deep. The locations of these 12 test pits (TP-1 through TP-10, TP-5A, and TP-7A) are shown in Figure 2. The other 20 test pits were completed on August 21 and 22, 2000, during a supplemental investigation. The locations of the 20 test pits (TP-12 through TP-30, and TP-27A) are also shown on Figure 2.

- The completion of 13 soil borings (GMSB-30 through GMSB-42), which included the collection of 14 waste samples. The soil borings were drilled to depths between 20 ft bls and 45 ft bls, and were continuously sampled.

- The collection of 11 surface soil samples (SSNE-1, SSNE-2, and SSNE-4 through SSNE-12) for analysis of VOCs, SVOCs, and select metals.

- The installation of three monitoring wells, Monitoring Wells GM-70, GM-71, and GM-72, on July 8 and 9, 2000 as part of a supplemental investigation. The total depth of the boreholes used to install the monitoring wells ranged from 51 to 55 ft bls, and the well screens were installed from a maximum depth of 53 ft bls to as shallow as 39 ft bls. Groundwater samples from these wells were collected on August 17, 21, and 22, 2000, and analyzed for TCL VOCs and SVOCs, dissolved TAL metals, alcohols, aldehydes, organic volatile acids, methane, and biogeochemical parameters.

- The periodic collection and disposal of wood tar that seeps to the ground surface. Approximately 2,365 gallons of wood tar have been removed between 1997 and November 2002.

The analytical results of the material sampling by ARCADIS, as well as the historical samples, are discussed in detail below in the NE Pit Characterization Section.

NE Pit Characterization

As previously noted, the NE Pit is zoned industrial. Current and future use will be restricted to Industrial and Commercial II, III, and IV uses. As part of the NE Pit characterization, exposure pathways were identified and a comparison of the site data to applicable Michigan criteria was completed, resulting in a complete characterization of site issues.

Potential exposure pathways are discussed in detail later in this document. As previously noted, site characterization data indicate that various generic residential criteria are exceeded so the NE Pit would qualify as a "facility" as defined in Michigan Part 201. Ford and KPC are requesting a Limited Industrial and Commercial II, III, IV closure for the NE Pit.

Specific criteria used for comparison for the purpose of this evaluation are State of Michigan soil standards as defined in Operational Memorandum #18 (June 7, 2000) Part 201 Generic Cleanup Criteria for the following five categories:

1. Industrial and Commercial II Direct Contact Criteria (DCC).

2. Residential and Commercial I Drinking Water Protection Criteria (DWPC).

3. Industrial and Commercial II Soil Volatilization to Indoor Air Inhalation Criteria (SVIAIC).

4. Industrial and Commercial II Ambient Air, Particulate Soil Inhalation Criteria (PSIC) for surface soil and Infinite Source Volatile Soil Inhalation Criteria (ISVSIC) for subsurface soil and waste.

5. Groundwater/Surface Water Interface Protection Criteria (GSIPC).

The NE Pit is located more than 4,000 feet upgradient of the closest groundwater/surface water interface (GSI), which occurs at the Menominee River. Potential exposure pathways at the GSI for groundwater are not addressed by the proposed interim response actions for the NE Pit, but will be addressed in the site-wide RAP. However, the soil GSIPC is evaluated as part of this NE Pit IRAP, so that any interim response action selected for the NE Pit will be consistent with future response activities evaluated in the site-wide RAP.

Waste Delineation

The areal extent of the NE Pit, based on historic aerial photographs, was approximately 120,000 square feet (ft^2). However, only a portion of the fill material currently within the areal extent of the NE Pit is waste. The data collected during the investigations were used to construct an isopach map (Figure 3) of the thickness of only the waste material within the areal extent of the NE Pit. The remainder of the fill material within the NE Pit consists of imported sand, with some silt. A portion of the imported sand was placed in the NE Pit area during the waste removal activity in 1987 and 1988. Aerial photographs indicate that other fill materials were placed at the NE Pit at various times since 1961.

The waste material encountered ranged from 4 feet to19 feet in thickness and is underlain by native silt and sand. Figure 4 is a contour map that shows the depth to the base of the fill or waste material. The depth to the base of the fill and waste material at the NE pit ranges from 1.5 to 35 ft bls.

As seen on Figures 3 and 4, the thickness of the waste material and depth to the base of the waste material is greater in the central and eastern portions of the NE Pit outline as defined by historic aerial photographs. The deepest portion of the NE Pit is in an area approximately between Soil Borings GMSB-40 and GMSB-36, and Monitoring Well GM-72. It appears that the main depression of the NE Pit was originally centered in this area, which encompassed approximately 70,000 ft^2. The base of the fill material is much shallower to the west of this main depression (Figure 4).

The material within the NE Pit remaining after the 1987/1988 tar removal was covered by fine to coarse sand ranging from 2 feet to 16 feet thick. Figure 5 shows an isopach map of the thickness of the sand covering the waste/fill material within the NE Pit (or a depth below the ground surface to the top of the waste/fill material). The sand cover is greatest at Soil Boring GMSB-1 and thinnest to the south. Areas outside of the historic areal extent of the NE Pit also have a sand cover over native soil. Figure 5 also shows the locations of the current wood tar seeps at the NE Pit (TS-2 and TS-3).

The waste remaining within the NE Pit is a combination of various types of material. The wastes were grouped into several categories, based upon the types of waste described in the samples from the soil borings. These categories include solely wood products (wood pieces, wood chips, bark, sawdust), wood products mixed with charcoal fragments and carbonized wood, wood tar (similar to the material observed seeping to the surface), and a combination of wood sludge, wood products, charcoal fragments, and carbon fragments. The wood sludge is likely the solid component of wastewater formerly placed in the NE Pit that had settled from the wastewater. In addition, construction debris was observed in several of the test pits. The wastes form zones or layers within the NE Pit, most likely resulting from the historic disposal practices for the different materials. Also, the waste material is interlayered with fill material consisting of sand or silt.

The data collected during the NE Pit investigations was used to construct several cross sections through the NE Pit. The locations of the cross sections are shown on Figure 6 and the cross sections are shown on Figure 7 through Figure 10. The wood products are the predominant material at the base, the northern side, and western side of the NE Pit. A mixture of wood products with charcoal is present in a thin layer in the central and eastern portion of the former pit. The majority of the wood tar material is present in a 5-feet thick layer around the location of Soil Boring GMSB-37, and in a thin 1-foot layer in the central area and southern side of the NE Pit. The combination of wood sludge, wood, charcoal, and carbon is predominant in the eastern and southern portions of the NE Pit. This combined wood sludge-wood unit appears to be inter-layered with the wood products and wood tar, and also appears to have filled the deeper portions of the NE Pit. The zone of construction debris was observed in an area between Test Pits TP-18 and TP-26, and consisted of rebar in concrete, bricks, wood, concrete pieces, and metal bands.

Based upon thickness and extent, the wood product and combined wood sludge-charcoal-wood product units make up the majority of the waste remaining within the NE Pit. Approximately 35 percent of the remaining waste is wood products, 55 percent of the waste is a combination of wood sludge-wood-charcoal, and 10 percent of the waste is wood tar. Calculations of the remaining waste volume, based on data collected to date, indicate that the total remaining waste volume in the NE Pit is approximately 50,000 cubic yards, of which the volume of the wood tar material is estimated to be approximately 5,000 cubic yards. The volume of sand fill above the waste is approximately 30,000 cubic yards.

In addition to the NE Pit, the channel connecting the NE Pit to the SW Pit area also contains sand fill and waste fill material. The distribution and thickness of only the waste material is shown on Figure 3. The waste material thickness remaining in the channel area ranges from 0.5 feet to a maximum of 4 feet near Soil Borings GMSB-41 and GMSB-42. The maximum depth to the base of the remaining fill or waste material in the channel is 11 to 12 ft bls near Soil Boring GMSB-41 and Test Pits TP-10 and TP-11 (Figure 4). The maximum thickness of sand cover encountered within the channel is 7 feet near Soil Boring GMSB-42 and Test Pit TP-29 (Figure 5).

As within the NE Pit, the majority of the remaining waste material is wood products, consisting of wood pieces, bark, sawdust, and tree trunks and branches. A small amount of wood tar mixed in with the wood products was observed in Test Pits TP-25 and TP-29. The volume of waste material within the channel area is calculated to be approximately 3,000 cubic yards. Based on observations, the wood tar material remaining within the channel makes up less than 20 percent of the total waste volume remaining within the channel.

The depth to groundwater in the area of the NE Pit ranges from approximately 39 to 50 ft bls. The water table elevations calculated from the water level measurements on September 25, 2000 were used to construct a water table contour map, which is shown on Figure 11. The contour map indicates a horizontal component of groundwater flow generally to the west in the area of the NE Pit. Directly beneath the NE Pit there is also a limited area of horizontal groundwater flow to the northwest. This is created by a groundwater high in the vicinity of Monitoring Well GM-71.

The general westward groundwater flow direction has a horizontal gradient from approximately 0.009 ft/ft to 0.02 ft/ft. Based on groundwater data collected during the RI from Monitoring Wells GM-62A and GM-62C, and BR-5S and BR-5D, the vertical component of the groundwater gradient is downward, ranging from approximately 0.086 ft/ft to 0.162 ft/ft, respectively.

Perched water is also present in the NE Pit, as indicated by the discovery of water in certain test pits. The limited water that was observed in Test Pits TP-13, TP-16, TP-21, and TP-28 is water that has migrated vertically downward through the porous sand material and has perched at an interface between higher and lower permeability material within the fill material. The observed water is always associated with fill material, as described in the core logs for the test pits. The fact that the water identified in the four test pits is perched is confirmed by the depth to the water table, which is measured at 39 to 50 ft bls in the monitoring wells installed in the area of the NE Pit. Also the absence of water above the measured water table in the test pits outside of the NE Pit footprint (TP-16, TP-17, TP-22, TP-23, TP-24, TP-25, and TP-27) and the monitoring wells and soil borings installed outside of the historic footprint of the NE

Pit (GM-70, GM-71, and GMSB-33) verify that the perched water is not moving horizontally into or out of the NE Pit.

Surface Soil

A total of 14 surface soil samples have been collected in the area of the NE Pit. A summary of the soil samples collected is included in Table 2, and the analytical results of the surface soil samples are provided in Table 4. The locations of the surface soil samples are shown on Figure 2. Samples of wood tar, which occasionally seeps to the land surface, have also been collected. The analytical results of the wood tar samples are discussed separately in the following section, as the surface wood tar material is currently removed and disposed when this material occurs at the land surface. Eleven of the surface soil samples (SSNE-1, SSNE-2, and SSNE-4 through SSNE-12) were collected during the RI and analyzed for VOCs, SVOCs, PCBs, and alcohols. The three additional surface soil samples were collected during previous investigations by E&E.

Comparison of the concentrations of the constituents detected in all the surface soil samples to the Michigan Part 201 Generic Soil Criteria indicate no constituent concentration was above the Industrial and Commercial II DCC, SVIAIC, and PSIC. Surface soil constituent concentrations were found above the Residential and Commercial I DWPC for the following constituents and sample locations in parentheses: methylene chloride (S-2), pentachlorophenol (S-2), aluminum (S-1, S-2, and S-4), antimony (S-4), cobalt (S-1, S-2, and S-4), iron (S-1, S-2, and S-4), and manganese (S-1, S-2, and S-4). Surface soil constituent concentrations were found above the GSIPC for the following constituents and sample locations in parentheses: 2-methylphenol (S-4), naphthalene (S-4), chromium (S-1, S-2, and S-4), cobalt (S-1, S-2, and S-4), selenium (S-4), and silver (S-4). All of the constituent concentrations above the DWPC and GSIPC were found in the historic surface soil samples collected, and could not be replicated by the surface soil samples collected during the recent investigations.

Surface Waste Material

During the summer months, wood tar occasionally seeps to the land surface within the NE Pit. Since 1998, ARCADIS personnel have routinely removed the surface wood tar from several areas within the NE Pit. The locations of current wood tar seeps within the NE Pit (TS-2 and TS-3) are shown on Figures 2 and 5.

A total of six wood tar samples were collected in the NE Pit area, at the ground surface and varying depths. These wood tar samples are summarized in Table 2, and the results of the analyses of the wood tar are provided in Table 5. In addition to the laboratory analyses of the wood tar material, all of the wood tar samples from the RI were subjected to TCLP extraction analysis, and two were also subject to synthetic precipitation leaching procedure (SPLP) extraction analyses.

The analytical results of the six wood tar samples indicate that concentrations of 1,2,4-trimethylbenzene and xylenes (total) were above the Industrial and Commercial II DCC. Concentrations of 1,2,4-trimethylbenzene, benzene, trichloroethene, and xylenes (total) were found above the Industrial and Commercial II SVIAIC. Naphthalene was the only constituent with a concentration above the Industrial and Commercial II PSIC.

A total of 31 constituents were detected in the wood tar samples at concentrations above the Residential and Commercial I DWPC, including: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-hexanone, acetone, benzene, ethylbenzene, n-butylbenzene, n-propylbenzene, sec-butylbenzene, styrene, toluene, trichloroethene, xylenes (total), 2,4-dimethylphenol, 2,6-dimethylphenol, 2-methylnaphthalene, 2-methylphenol, 2-nitrophenol, 3-methylphenol/4-methylphenol, naphthalene, phenol, acetaldehyde, acetic acid, aluminum, antimony, cobalt, iron, lithium, manganese, and molybdenum.

A total of 25 constituents were detected in the wood tar samples at concentrations above the GSIPC, including: 2-butanone, acetone, benzene, ethylbenzene, styrene, toluene, trichloroethene, xylene, 2,4-dimethylphenol, 2-methylphenol, 3-methylphenol/4-methylphenol, dibenzofuran, di-n-butylphthalate, fluorine, phenol, methanol, formaldehyde, acetic acid/acetate, chromium, cobalt, cyanide, lithium, mercury, and selenium.

Subsurface Soil

The 78 subsurface soil samples collected in the area of the NE Pit are summarized in Table 2, and the analytical results are provided in Table 6. Eighteen of the subsurface soil samples were collected during an Engineering Evaluation/Cost Analysis (EE/CA) investigation by ARCADIS and the MDEQ, and analyzed for VOCs, SVOCs, inorganics, TOC, and pesticides. However, as noted in Table 2, not all the samples collected were analyzed for all the constituents, dependent upon the purpose of the sample. Many of the historic subsurface soil samples, collected by multiple organizations shown in Table 2, were often analyzed for VOCs and inorganics only.

A total of 16 VOCs, 16 SVOCs, four pesticides, and 23 inorganics were detected in the subsurface soil samples. Of the constituents detected, no results were above the Michigan Part 201 Generic Soil Criteria for Industrial and Commercial II DCC, ISVSIC, or SVIAIC. There were 16 constituents where the analytical results from the subsurface soil were above the Residential DWPC, including: acetone, benzene, ethylbenzene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, aluminum, antimony, chromium, cobalt, iron, magnesium, manganese, and nickel. There were 11 constituents where the analytical results from the subsurface soil were above the GSIPC, including: acetone, ethylbenzene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, phenol, chromium, cobalt, and selenium. Some of these constituents were detected only once in one subsurface soil sample or from only one location.

Subsurface Waste Material

A total of 20 subsurface waste samples were collected in the NE Pit area. These samples are summarized in Table 2, and the results of these analyses of the subsurface waste material are provided in Table 5. The 14 subsurface waste samples collected during the RI were taken to characterize the type of waste present within the NE Pit, as previously described above. In addition to the laboratory analyses of the waste material, all of the waste samples from the RI were subjected to TCLP extraction analysis and several were also subject to SPLP extraction analyses (Table 7).

Select subsurface waste samples were also analyzed for the presence of radioactive isotopes. The results of analysis are summarized in Table 8. The values of the radioactive isotopes detected are all below U.S. EPA clean up levels for soil. In addition, the radioactive isotope values detected are less than or similar to isotope values measured as background values by the U.S. EPA throughout the United States and in Michigan, as referenced in Table 8.

A total of 87 constituents were detected in the subsurface waste samples analyzed from all the investigations including, 23 VOCs, 15 SVOCs, 26 inorganics/metals, 14 alcohols/aldehydes, eight PCBs/Pesticides, and acetic acid/acetate. The majority of the PCBs/Pesticide concentrations are estimated.

Sections discussing the subsurface waste material sample results in comparison to each of the categories of the applicable Michigan Part 201 Generic Cleanup Criteria follow.

DCC

Comparison of the concentrations of the constituents detected in the subsurface waste samples from the NE Pit to the Michigan Part 201 Generic Soil Criteria shows that three constituents in the waste samples, diethylphthalate, total xylenes, and 1,2,4-trimethylbenzene were present at concentrations above the Industrial and Commercial II DCC. The waste sample from Soil Boring GMSB-1 (SB1-SS2) was above the DCC for diethylphthalate. The waste sample from Soil Boring GMSB-37, and Test Pits TP-7 (also identified as the "Shingle Pile"), TP-3, and TP-5 contained total xylene concentrations above the DCC. Wood tar samples collected from three test pits (TP-3, TP-5, and TP-7) contained 1,2,4-trimethylbenzene concentrations above the DCC.

DWPC

When comparing subsurface waste sample analytical results to the Residential and Commercial I DWPC, results were above the criteria for 36 constituents as follows: 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-hexanone, acetone, benzene, ethylbenzene, n-butylbenzene, n-propylbenzene, methylene chloride, phenol, sec-butylbenzene, styrene, toluene, trichloroethene, xylenes, 2,4-dimethylphenol, 2-methylnaphthalene, 2-methylphenol, 2-nitrophenol, 3-methylphenol/4-methylphenol, 4-methylphenol, diethylphthalate, naphthalene, methanol, n-butanol, acetaldehyde, acetic acid/acetate, lindane, aluminum, antimony, cobalt, iron, manganese, molybdemum, selenium, and sodium. Samples from Soil Borings GMSB-1, MW-96-3, SB-23, SB-1, SB-5, SB-7, S-3, S-4, S-5, and S-13 contained concentrations above the DWPC for at least one constituent.

SVIAIC

Constituents and locations where subsurface waste sample analytical results were above the Industrial and Commercial II SVIAIC were benzene (Soil Borings GMSB-36 and GMSB-37, and Test Pits TP-7, TP-3, and TP-5), 1,2,4-trimethylbenzene (Test Pits TP-7, TP-3, and TP-5), trichloroethene (Test Pits TP-7 and TP-5), and xylenes (Soil Boring GMSB-37, and Test Pits TP-7, TP-3, and TP-5).

ISVSIC

Naphthalene was the only constituent that was present above the Industrial and Commercial II ISVSIC in subsurface waste samples. Naphthalene was above the

ISVSIC in waste samples from Soil Boring GMSB-36 (at 12 ft bls), and Test Pits TP-3 and TP-5.

GSIPC

Comparing subsurface waste sample analytical results to the GSIPC indicated that 32 constituents were present in concentrations above the criteria as follows: 1,1,2,2-tetrachloroethane, 2-butanone, acetone, benzene, ethylbenzene, chlorobenzene, styrene, toluene, trichloroethene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 3-methylphenol/4-methylphenol, 4-methylphenol, acenaphthene, dibenzofuran, di-n-buthylphthalate, diethylphthalate, fluorine, naphthalene, phenol, phenanthrene, methanol, acetic acid/acetate, formaldehyde, lindane, cobalt, chromium, cyanide, lithium, mercury, selenium, and silver.

TCLP Analyses

A TCLP test was performed on a composite waste sample collected from Soil Boring GMSB-1 from a depth of 0 to 31.5 ft bls. The extract from the TCLP test was analyzed for TOC, COD, and limited SVOCs. The results of the TCLP test are shown in Table 7. The extract from the TCLP test contained 2.8 milligrams per liter (mg/L) of 2-methylphenol, 3.3 mg/L of 4-methylphenol, 720 mg/L of TOC, and 800 mg/L of COD.

TCLP tests were performed on three samples of the wood waste materials collected from Soil Borings GMSB-34 (6 ft bls), GMSB-38 (7 ft bls) and GMSB-41 (8 ft bls). In addition, SPLP tests were also performed on samples collected from Soil Borings GMSB-34 and GMSB-38. The extracts from the TCLP tests were analyzed for VOCs, SVOCs, metals, alcohols, and aldehydes. The extracts from the SPLP tests were analyzed for VOCs, SVOCs, metals, alcohols, aldehydes, acetic acid/acetate, and TOC. The results of these analyses are shown in Table 7. The data indicate that the wood extracts generally contained low concentrations of nine constituents, including several VOCs, SVOCs, and aldehydes. A variety of naturally occurring metals were also detected. The constituent with the highest concentration was methanol, which was detected in the sample from Soil Boring GMSB-34 at estimated concentrations between 4.3 and 7.1 mg/L in the SPLP and TCLP analyses, respectively.

TCLP tests were performed on three samples of the wood sludge material collected from Soil Borings GMSB-35 (22 ft bls), GMSB-36 (12 ft bls), and GMSB-40 (12 ft bls). In addition, a SPLP test was also performed on the sample collected from Soil Borings GMSB-35, GMSB-36, and GMSB-37 for acetic acid/acetate only. The extracts from the TCLP extracts were analyzed for VOCs, SVOCs, metals, alcohols, and aldehydes. The SPLP analyses included VOCs, SVOCs, metals, alcohols, aldehydes, acetic acid/acetate, and TOC. The results of the analyses are shown in Table 7. The data primarily show concentrations of VOCs including MEK, 2-hexanone, and acetone; SVOCs including 2,4-dimethylphenol, 2-methylphenol, 2-nitroaniline, 3-methylphenol/4-methylphenol, and phenol; alcohols primarily including 1-propanol, ethanol, ethyl acetate, and methanol; aldehydes primarily acetaldehyde; and acetic acid/acetate. An additional 11 VOCs and three SVOCs were also detected.

TCLP tests were performed on two samples of wood tar collected from Soil Boring GMSB-37 (10 ft bls) and Test Pit TP-5A (2 ft bls). In addition, SPLP tests were also performed on these wood tar samples. The extracts from TCLP tests were analyzed for VOCs, SVOCs, metals, alcohols, and aldehydes, while the SPLP tests were additionally analyzed for TOC and acetic acid/acetate. The results of the analyses are shown in Table 7, and were similar to the results found for the wood sludge material. The data primarily show concentrations of VOCs including MEK, 2-hexanone, and acetone; SVOCs including 2,4-dimethylphenol, 2-methylphenol, 2-nitroaniline, 3-methylphenol/4-methylphenol, and phenol; alcohols including ethanol, ethyl acetate, and methanol; aldehydes primarily acetaldehyde and m-tolualdehyde; and acetic acid/acetate. An additional 12 VOCs and five aldehydes were also detected.

A comparison of TCLP results with Federal Standards found in 40 CFR Part 261.30, which identifies maximum concentrations of constituents for the toxicity characteristic for hazardous waste, indicates that the levels of the analyzed constituents present in the extract of the waste material are not above the levels for defining the material as a hazardous waste.

Potential for Continuing Releases to Groundwater

The TCLP and SPLP data show that the wood material and charcoal in the NE Pit have little potential to be leached, while the wood sludge material and wood tar have a potential to be leached.

The results from the TCLP tests for the wood tar samples (Soil Boring GMSB-37) and wood sludge samples (Soil Boring GMSB-36) were compared to groundwater data collected from Monitoring Well GM-72, which is screened beneath the waste material. To make a comparison between the leachable constituents from the waste material and the groundwater beneath the NE Pit, several VOCs and SVOCs were selected to represent a "signature" of the groundwater currently beneath the NE pit. These "signature" constituents included MEK, 2-hexanone, acetone, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, and phenol. The results of the comparison confirm that the wood sludge material and the wood tar have the potential to leach constituents from the NE Pit into underlying groundwater.

Groundwater

It should be noted that response actions for existing groundwater impacts are planned for discussion in separate documents, including the site-wide RAP. A well ordinance will be an institutional control proposed in the site-wide RAP. A draft copy of this ordinance is included in Appendix B. For completeness in understanding the potential impact to groundwater from the NE Pit, a brief evaluation of groundwater sampling results compared to Michigan Part 201 Generic Cleanup Criteria for Groundwater is included in this document. The categories evaluated include Industrial and Commercial II Groundwater Contact Criteria (GCC), Residential and Commercial I Drinking Water Criteria (DWC), and Residential and Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria (GVIAIC).

A total of five groundwater grab samples from soil borings and seven groundwater samples from monitoring wells have been collected in the area of the NE Pit. These groundwater grab samples are summarized in Table 3, and the results of these analyses of the groundwater are provided in Tables 9 and 10. The locations of the soil borings and monitoring wells are shown on Figure 2.

The groundwater grab samples were collected from Soil Boring GMSB-1 at depths of 85, 135, 215, 275, and 325 ft bls. The groundwater grab samples collected from 85 and 275 ft bls were from zones of very fine or silty sand (materials with limited ability to transport groundwater), whereas the groundwater samples collected from 135, 215, and 325 ft bls were from zones of coarser sand (higher groundwater transport zones). These samples were analyzed for TOC, COD, BOD, VOCs, SVOCs, and methane.

A total of 22 constituents were detected in the groundwater grab samples collected from 85 ft bls or deeper, including 14 VOCs, seven SVOCs, and methane. TOC, BOD, and COD were also measurable in the groundwater grab samples (Table 9). None of the constituents detected in the groundwater grab samples had a concentration above the Industrial and Commercial II GCC or the Residential and Commercial I GVIAIC. Acetone, benzene, trichloroethene, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, and bis(2-ethylhexyl)phthalate were present in the groundwater grab samples in concentrations above the Residential and Commercial I DWC. The groundwater grab data collected at different depths show that the concentrations of the detected constituents vary. Groundwater grab data for samples collected at depths of 85 and 215 ft bls (the fine-grained materials) show higher concentrations of both VOCs and SVOCs, while the samples from the other three depth intervals (135, 275, and 325 ft bls) (the coarser materials) show little or no detection for these same constituents.

Groundwater samples were also collected from 9 monitoring wells installed through, downgradient, and cross-gradient of the NE Pit. One monitoring well (GM-72) was installed through the base of the NE Pit, three monitoring wells (GM-70, GM-71, and MW-96-3) were installed at the edges of the NE Pit, and five additional monitoring wells (BR-5A, BR-5B, MW96-1, MW96-2, and MW-96-4) were installed in the proximity of the NE Pit. The locations of these monitoring wells are shown on Figure 2.

The depths at which the groundwater samples were collected ranged from 39 to 66 ft bls. The historic groundwater samples were collected and analyzed for VOCs, SVOCs, select inorganics, sulfide, and methane, while the groundwater samples from the supplemental RI investigation were analyzed for these same constituents, as well as alcohols, aldehydes, organic volatile acids, and biogeochemical parameters.

The constituents detected in the groundwater collected from the monitoring wells included 12 VOCs and 17 SVOCs (Table 10). VOCs were not detected in the groundwater samples collected from several monitoring wells in the area of the NE Pit (MW-96-1 through 3), and only low estimated concentrations were detected in the groundwater from Monitoring Wells GM-70 and MW-96-4, adjacent to the NE Pit. Only naphthalene and tetrachloroethene were detected in the groundwater collected from Monitoring Well GM-71, also adjacent to the NE Pit. The highest VOC concentrations were detected in the groundwater collected from Monitoring Well GM-72, through the NE Pit, where 10 VOCs were detected. Acetone was the constituent with the highest detected concentration of 260 micrograms per liter (µg/L) in Monitoring Well GM-72.

SVOCs were not detected in the groundwater collected from 3 of the monitoring wells in proximity to the NE Pit and Monitoring Wells GM-71 and BR-5A detected only low, estimated concentrations of SVOCs (Table 10). Only bis(2-ethylhexyl)phthalate was detected in the groundwater collected from Monitoring Well BR-5B, also in the proximity to the NE Pit. The groundwater collected from Monitoring Well GM-72, through the NE Pit, again contained the highest concentrations of SVOCs detected.

The constituent 2,4-dimethylphenol was the highest SVOC concentration at 2,000 µg/L.

The groundwater samples collected at the NE Pit from the newly installed monitoring wells (GM-70, GM-71, and GM-72) also contained 18 detectable metals. The groundwater samples collected from the historic monitoring wells were only sampled for iron.

In the groundwater samples collected from the monitoring wells, comparison with the Michigan Part 201 Generic Criteria for groundwater show that no constituent concentrations were found in the groundwater above the Industrial and Commercial II GCC and Residential and Commercial I GVIAIC.

Concentrations of benzene, tetrachloroethene, 2,4-dimethylphenol, 3-methylphenol/4-methylphenol, bis(2-ethylhexyl)phthalate, methanol, acetic acid/acetate, sulfate, iron, manganese, and vanadium were above the Residential and Commercial I DWC (Table 10). Almost all of the VOC and SVOC concentrations that were above the DWC were found in the groundwater collected from Monitoring Well GM-72, completed through the NE Pit. The metal concentrations that were above the DWC were more dispersed, including the areas surrounding the NE Pit.

The highest constituent concentrations detected in the shallow groundwater were from Monitoring Well GM-72, completed through the NE Pit. Comparison of the groundwater samples collected from deeper within the groundwater system to the shallow groundwater samples collected in the area of the NE Pit indicate that the concentrations of the detected constituents are generally higher in the deeper groundwater than in the shallow groundwater. More VOCs were detected in the deeper groundwater samples than from the shallow groundwater samples (14 versus 12). While there were more SVOCs detected in the shallow groundwater samples than the deeper groundwater samples (17 versus 7), the majority of the SVOC detections in the shallow groundwater were estimated concentrations from Monitoring Well GM-71, and had significantly lower concentrations than in the deeper groundwater.

Methane

The biodegradation of organic materials in the groundwater system is the primary source of methane gas at the Ford/Kingsford Site. Biodegradation of organics in the waste material may also result in methane gas formation at the NE Pit. Methane that is migrating in the unsaturated zone above the water table (vadose zone) may either degrade naturally, or migrate to the surface if no confining layer is present. Investigations have shown that where a confining layer is present the methane migration to the surface is prevented.

Risk Evaluation

Risk pathways are identified showing the potential route(s) and affected receptor(s), so that each response action may be evaluated for necessity and its ability to eliminate or minimize a risk pathway.

The potential pathways for exposure to impacted material from the NE Pit include:

1. Direct contact with wood tar that migrate to the surface, or with subsurface waste material via unauthorized excavation or construction activities.
2. Drinking impacted groundwater.
3. Dermal contact with impacted groundwater.
4. Groundwater venting to the Menominee River.
5. Inhalation of potential vapors from waste material in indoor air and accumulation in future confined structures, if any were to be constructed on this area.
6. Flammability or explosivity of vapors.
7. Inhalation of ambient air impacted with vapors.

A discussion of the pathways grouped by media type and how they will be addressed by response actions is included below.

Direct Contact Pathway (Item 1)

A response action that creates a physical barrier and/or removes the waste material will eliminate the direct contact pathway.

Groundwater Pathways (Items 2, 3, and 4)

A proposed well ordinance restricting construction of, or use of, drinking or irrigation wells within the Kingsford Study Area will prevent the ingestion of or contact with groundwater (Appendix B). The proposed groundwater ordinance has been introduced and will be implemented in the city of Kingsford. Therefore, there will be no risk of exposure to impacted groundwater. Groundwater response actions are not included in this IRAP, but they will be included in the site-wide RAP. A response action that creates a physical barrier to infiltrating surface water and /or removes the waste material will be consistent with the likely remedial activities for the entire site.

Air Pathways (Items 4, 5, and 6)

Air inhalation pathways would be eliminated by i) placing the waste material under a barrier, thus preventing the presence of vapors in the breathing space and the accumulation of vapors in a confined living or work space, or ii) removing the waste material. Flammability and explosivity are minimized if vapors are not compressed or confined, and eliminated if vented.

Response Action Objectives

Soil

Response action objectives for soil at the NE Pit address migration of wood tar to land surface, prevention of contact with certain buried waste material, and minimization (if necessary) of accumulation of vapor from the waste material in confined structures. No structures are currently present at the NE Pit.

Groundwater

Response action objectives for groundwater at the NE Pit are the prevention of contact with or drinking of impacted groundwater, and the prevention of infiltration of surface water through the waste material to minimize leaching of waste constituents to groundwater.

Air

Response action objectives for air at the NE Pit include the prevention of vapor inhalation at the surface in ambient air and in confined buildings, and minimization or elimination of the potential for flammability or explosivity of accumulated vapors.

Response Action Evaluation

Response actions were evaluated to address the objectives for the NE Pit. These response actions included permeable cover systems, low-permeability cover systems, excavation and off-site disposal of waste material, and institutional controls. An evaluation of each of these potential response actions is presented below.

Permeable Cover System

A permeable cover system response action for the NE Pit would consist of in-situ stabilization of wood tar, a common fill layer, and a vegetative protective layer. The permeable cover would comprise an area of approximately 2.7 acres centered over the NE Pit (Figure 12). The permeable cover system would consist of a minimum of 30-inches of common fill. The existing soil cover at the NE Pit overlying the waste material would be removed and staged on-site, so that wood sludge material and wood tar located outside the footprint of a cover system could be excavated for placement beneath the permeable cover system. Prior to placement of the permeable cover system, wood tar would be stabilized to prevent any migration to land surface. The stockpiled cover soil removed from the NE Pit would then be used to serve as the soil cover for the new permeable cover system. The final grading of the permeable cover system would be designed to prevent erosion and surface-water ponding. The permeable cover system area would be fenced to restrict unauthorized access.

During construction, appropriate management of soil and waste would be required, along with ambient air monitoring for both construction worker health and safety requirements and for environmental protection at the site perimeter. Requirements for storm water management/erosion control and waste management would be addressed during design of a permeable cover system. A long-term maintenance plan for a permeable cover system would be prepared to maintain the efficacy of the response action. The estimated cost for a permeable cover system response action at the NE Pit is provided in Table 11.

Low-Permeability Cover System

A low-permeability cover system response option for the NE Pit would consist of a 40- to 60-mil, high-density polyethylene liner (HDPE) or a linear low density polyethylene liner (LLDPE) or equal liner material, a sand drainage layer, a protective soil layer above the sand drainage layer, and an asphalt layer at surface level. The footprint of a low-permeability cover system would be the same area as that for a permeable cover system, as shown on Figure 12. The liner would be buried at a depth of approximately 2.5 ft bls.

As in the case of a permeable cover system, the existing soil cover at the NE Pit overlying the waste material would be removed and staged on-site, so that wood sludge material and wood tar located outside the footprint of a cover system could be removed and consolidated with existing waste for placement beneath the low-permeability cover system. The stockpiled cover soil would be used for the protective soil layer above the sand drainage layer, if the soil is appropriate material.

The sand drainage layer in a low-permeability cover system would serve to prevent the buildup of infiltrate on the liner surface. The sand drainage layer and liner would be gently sloped to route infiltrate away from the waste material to a point beyond the horizontal extent of waste material. After placement of the protective soil layer, an asphalt layer would be placed at the surface level. The low permeable cover system would additionally incorporate a venting system installed beneath the liner for management of vapor by-products potentially generated by decomposition of the waste material beneath the low-permeability cover.

Similar to a permeable soil cover system construction, appropriate management of soil and waste would be required and ambient air monitoring would be implemented during the construction process. Requirements for storm water management/erosion control and waste management would be addressed during design. A long-term maintenance plan for the low-permeability cover system would be prepared to maintain the efficacy of the response action. The estimated cost for constructing a low-permeability cover system response action at the NE Pit is provided in Table 12.

Excavation and Off-site Disposal of Waste Material

An excavation and off-site disposal of waste material response action for the NE Pit would require the excavation of all of the waste material at the NE Pit, transportation of the excavated material, and disposal of the material at an appropriate disposal facility.

The areal and vertical extent of the waste material were determined during the characterization program, and based on the data collected the volume of material requiring removal and disposal is approximately 53,000 cubic yards. The existing soil cover at the NE Pit would be excavated and stockpiled on-site. The wood sludge material and wood tar beneath the existing soil cover at the NE Pit would be removed using standard construction equipment, and would be transported to a disposal facility using trucks. The waste material is non-hazardous, so the material would be disposed of in a Resource Conservation and Recovery Act (RCRA) Subtitle D Landfill. The stockpiled cover soil would be placed back into the excavated area and the area seeded.

During the construction process appropriate management of soil and waste would be required and ambient air monitoring would be implemented. Requirements for storm water management/erosion control and waste management during construction would be addressed during design. The estimated cost for an excavation and off-site disposal of waste material response action for the NE Pit is provided in Table 13.

Restrictive Covenant

An institutional control response action for the NE Pit would consist of a restrictive covenant on the NE Pit property. As a minimum the restrictive covenant would prohibit the use of groundwater located beneath the NE Pit property. If the response action selected were a cover system, a restrictive covenant could also be used and written to:

- Limit the use of the property to Industrial and Commercial II, III and IV purposes.
- Require that the cover system be maintained in accordance with the long-term maintenance plan.
- Allow an authorized person to penetrate the cover system only under controlled, temporary conditions; under provisions that would restore the integrity of the cover system; and in accordance with the waste management plan.
- Require maintenance of permanent markers.
- Require that a vapor barrier system be installed beneath the foundations of any confined structure that would be on the property built in the future.

Comparison of Response Actions

A response action consisting solely of a restrictive covenant would not meet the response action objectives of preventing contact with certain buried and surface waste material, and will not meet the response action objective of minimizing the leaching of waste constituents to groundwater. However, a restrictive covenant could be used to support two of the primary response actions: a permeable cover system or a low-permeability cover system.

Both cover systems achieve the response action objective of preventing contact with certain waste material. The permeable cover system achieves response objectives by consolidating the waste, stabilizing the wood tar to prevent migration, and placing a soil barrier on top of the waste material to prevent direct contact with underlying waste material. The low-permeability cover system achieves response objectives by consolidating the waste material, placing a synthetic liner over them to prevent the migration of wood tar to land surface, and placing a minimum of 30 inches of soil on top of the liner. A restrictive covenant would be used to maintain the integrity of either of the cover systems. Both the permeable and low-permeability cover systems would minimize disturbance of the waste, since only approximately 3,000 cubic yards of waste material would need to be excavated and placed beneath the cover system. Ease of implementation is similar for both. There is a lengthy history of effective application of this technology at similar sites.

Ambient air monitoring and storm water management/erosion controls would be implemented during construction of either cover system, particularly during excavation and waste consolidation activities. Future use of the NE Pit for Industrial or Commercial II, III, and IV purposes could be integrated into a cover design, which could provide a benefit to the community. However, permeable cover system would not meet the response objective of minimizing leaching of waste constituents to groundwater, whereas a low-permeability cover system meets this objective by incorporating a synthetic liner beneath the soil cover. Therefore, of the two cover systems a low-permeability cover system would be the more appropriate cover system for the NE Pit.

Excavation and off-site disposal of waste material would achieve the response action objectives since waste material would no longer remain at the NE Pit. Excavation of the waste material will disturb a significantly larger area of waste material and would require significantly greater air and particulate monitoring beyond that required for construction of a cover system. Off-site transport of the approximate 53,000 cubic yards of waste material would require an estimated 3,600 truckloads to transport the waste material to a RCRA Subtitle D landfill facility. The truck traffic would have a significant impact on the community and on other communities located along the transportation route, and would increase the risk of injury or death due to the increased potential for accidents. After completion of excavation activities, the land would have less of a potential for reuse by the community than with a cover system.

Interim Response Action

A low-permeability cover system and institutional controls have been selected by Ford and KPC as the interim response action for the NE Pit, due to minimization of waste disturbance, ease of implementation, and less impact on the community and adjacent communities by confining the response action activities to the NE Pit. As indicated by a comparison of the potential response action costs, a low-permeability cover system is also the most cost effective option, and achieves the response objectives for the NE Pit. Future use of the NE Pit for Industrial or Commercial II, III, and IV purposes can be integrated into the low-permeability cover design, as appropriate, which will provide a benefit to the community. A conceptual low-permeability cover system footprint is shown on Figure 12. The low-permeability cover will encompass an area of approximately 2.7 acres centered over the NE Pit.

Wood sludge material and wood tar located outside of the low-permeability cover system footprint will be removed and consolidated with the existing waste beneath the low-permeability cover system footprint. The existing clean soil cover at the NE Pit will be excavated, as needed, to create space for consolidation of waste material. The existing NE Pit soil cover will be stockpiled on-site for later use. The existing soil cover from the channel area to the southwest of the NE Pit will also be removed and stockpiled, and any underlying waste material will be excavated and consolidated with NE Pit waste.

The low-permeability cover system will be designed to minimize the migration of waste constituents to groundwater, prevent the migration of wood tar to the ground surface, and control the potential migration of methane and/or vapors to the surface. The proposed low-permeability cover system includes a 40- to 60-mil, HDPE or equal material to be selected during design, a geocomposite drainage layer, a protective soil layer above the geocomposite, and an asphalt layer at surface level. A manufacturer of HDPE liner material has been supplied a waste characterization, and has certified that HDPE liner material is compatible with NE Pit waste constituents that could come in contact with the liner.

The overlying geocomposite drainage layer will be composed of a geonet covered on both sides with a soft, permeable geotextile material. The geocomposite drainage layer serves to prevent the buildup of infiltrate on the liner surface. The geocomposite drainage layer and liner will be gently sloped to route infiltrate away from the waste material to a point beyond the horizontal extent of waste material. The surface layer will be an asphalt layer. A typical low-permeability cover system cross-section is provided on Figure 13.

The low-permeability cover system design will incorporate a venting system beneath the liner for management of vapor by-products generated by decomposition of the waste material. Survey reference markers will be placed in the corners of the low-permeability cover system. The survey reference markers will be used both to delineate the extent of the cover system, as well as provide reference points to monitor any settling of the cover system. Permanent markers will also be installed at locations approved by the MDEQ. The permanent markers will describe the restricted areas of the NE Pit and the nature of the restrictions. Details concerning the permanent markers are provided in Appendix D. The survey reference markers and permanent markers will be inspected at least annually.

The venting system for the low-permeability cover system will be installed below the HDPE liner. The HDPE liner and geocomposite drainage layer will be buried at a minimum depth of 2.5 ft bls. A protective layer of compacted soil will be placed on top of the geocomposite drainage layer. The clean soil cover removed from the NE Pit at the start of the construction activities may be reused as the protective soil layer above the geocomposite drainage layer, if the soil is appropriate for this use and it is tested and verified as clean material.

The surface layer of the low-permeability cover system will be approximately 4 inches of asphalt. The thickness of the asphalt layer, liner, and/or soil layer may be adjusted based on the anticipated specific use for the site after the low-permeability cover system is completed.

The final grade of the low-permeability cover system will be designed to prevent erosion and surface-water ponding. Based on preliminary designs, drainage from the liner and geocomposite layer will be collected at the edges of the low-permeability cover system and directed to a storm-water conveyance system, which will be composed of a retention pond, ditches, and drainage pipes. The configuration and layout of the storm-water management system will be determined during the low-permeability cover system design. The design of the permanent storm-water management system will be such to prevent infiltration of surface water through waste material located beneath the low-permeability cover system.

During the construction process for the low-permeability cover system appropriate management of soil and waste will be required. A plan for waste management has been prepared and is included as Appendix E. Stormwater in contact with waste material will be collected for on-site treatment or discharge to the local wastewater treatment plant, as necessary. Ambient air monitoring will be implemented, both for construction worker health and safety requirements and for environmental protection at the construction perimeter. A guideline for a construction health and safety plan has been prepared and is included as Appendix F. Long-term operation and maintenance (O&M) for the cover system will also be important to maintain the efficacy of the response action. Periodic inspections of the integrity of the asphalt layer will be part of the long-term O&M. A plan for O&M of the cover system has been prepared and is included as Appendix G.

Institutional controls are also a component of the selected response action. A restrictive covenant for the NE Pit has been prepared and is presented in Appendix H. The legal description for the NE Pit area that will encompass the NE Pit cover system was included in Appendix A. The legal description may be changed after the NE Pit cover system is installed and its final dimensions established. Groundwater beneath the covered waste material will be sampled to determine the effectiveness of the low-permeability cover system. The groundwater will be collected from an existing monitoring well (GM-72), which is completed through the waste material in the central portion of the NE Pit. The specifics of the groundwater monitoring will be addressed separately in the site-wide RAP.

Response Action Design

A Pre Design Study has been conducted to evaluate the soil located beneath areas where wood sludge material and wood tar will be excavated for placement beneath the low-permeability cover system. The results of this study will be used to define the base of the excavation. The Pre Design Study will be provided to MDEQ in a separate report, and will contain a soil-verification sampling program for the NE Pit response action.

Cover layer fill depths and suitable compaction standards will be used to provide sufficient strength for compaction and load bearing. These depths and standards will be identified in the response action design. A durable, double-sided geocomposite will help bridge the waste area and provide additional strength to the low-permeability cover system. Multi-year observation of the NE Pit has not indicated that there is a subsidence problem at the NE Pit, and subsidence is not considered to be problematic.

Remedial Action Implementation and Schedule

Construction related to the response action at the NE Pit will adhere to the Waste Management Plan and the Construction Health and Safety Plan Guideline (Appendix E and Appendix F). Construction best management practices will be in accordance with State of Michigan soil disruption and stormwater management regulations. Design documents will include an O&M plan (Appendix G) for the completed cover system, surface water management, construction quality control and quality assurance, and construction verification sampling plans.

Key dates for the implementation of the NE Pit interim response action are detailed on the Gantt chart presented as Figure 14.

Former NE Pit IRAP Property Owners Concurrence

The owners of the properties that comprise the NE Pit have given their concurrence to the response action selected for the NE Pit. Documentation of the owner concurrence is included in Appendix I.

Table 1. Summary of Soil Borings, Monitoring Wells and Test Pits, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan

Soil Borings:

ARCADIS	MDEQ	BLDI	EWA
GMSB-1	PB-2	SB-96-1	SB-1/1B
GMSB-20	PB-5	SB-96-2	SB-2/2B
GMSB-30	PB-6	SB-96-3	SB-3
GMSB-31		SB-96-4	SB-4
GMSB-32		SB-96-5	SB-5
GMSB-33		SB-96-6	SB-6
GMSB-34		SB-96-7	SB-7
GMSB-35		SB-96-8	SB-8
GMSB-36		SB-96-9	SB-9
GMSB-37			SB-22
GMSB-38			SB-23
GMSB-39			
GMSB-40			
GMSB-41			
GMSB-42			

Monitoring Wells:

ARCADIS	BLDI	EWA	USGS
GM-42	MW-96-1	MW-3	BR-5A/5B
GM-70	MW-96-2		
GM-71	MW-96-3		
GM-72	MW-96-4		

Test Pits:

ARCADIS	
TP-1	TP-16
TP-2	TP-17
TP-3	TP-18
TP-4	TP-19
TP-5	TP-20
TP-5A	TP-21
TP-6	TP-22
TP-7	TP-23
TP-7A	TP-24
TP-8	TP-25
TP-9	TP-26
TP-10	TP-27
TP-12	TP-27A
TP-13	TP-28
TP-14	TP-29
TP-15	TP-30

Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	Location	Source	Date	Depth*	Media	VOC	SVOC	Inorganic	TOC	Pest/ PCB's
GMSB-1/Composite	GMSB-1	AG&M	05/16/97	1-25	Waste	X	X	X	X	X
GMSB-1/35-45	GMSB-1	AG&M	05/16/97	35-45	Sand	X	X	X	X	X
GMSB-1/65	GMSB-1	AG&M	05/16/97	65	Sand		X		X	
GMSB-1/90	GMSB-1	AG&M	05/16/97	90	Sand	X	X		X	
GMSB-1/115	GMSB-1	AG&M	05/17/97	115	Silt	X	X		X	
GMSB-1/140	GMSB-1	AG&M	05/17/97	140	Sand	X	X		X	
GMSB-1/170	GMSB-1	AG&M	05/17/97	170	Silt	X	X		X	
GMSB-1/202	GMSB-1	AG&M	05/18/97	202	Silt				X	
GMSB-1/237	GMSB-1	AG&M	05/19/97	237	Sand	X	X		X	
GMSB-1/262	GMSB-1	AG&M	05/19/97	262	Sand				X	
GMSB-1/287	GMSB-1	AG&M	05/19/97	287	Clay/Silt				X	
GMSB-1/312	GMSB-1	AG&M	05/20/97	312	Sand	X	X		X	
GMSB-34/6	GMSB-34	AG&M	10/20/99	6	Waste	X	X	X	X	
GMSB-35/22	GMSB-35	AG&M	10/20/99	22	Waste	X	X	X	X	
GMSB-36/12	GMSB-36	AG&M	10/20/99	12	Waste	X	X	X	X	
GMSB-37/10	GMSB-37	AG&M	10/21/99	10	Waste	X	X	X	X	
GMSB-38/7	GMSB-38	AG&M	10/21/99	7	Waste	X	X	X	X	
GMSB-40/12	GMSB-40	AG&M	10/21/99	12	Waste	X	X	X	X	
GMSB-40/22	GMSB-40	AG&M	10/21/99	22	Waste			X		
GMSB-41/8	GMSB-41	AG&M	10/21/99	8	Waste	X	X	X	X	
TP-10/12	Test Pit 10	AG&M	11/03/99	12	Waste	X	X	X	X	
TP-5A/2	Test Pit 5A	AG&M	11/02/99	2	Waste	X	X	X	X	
Test Pit # 3	Test Pit 3	AG&M	12/13/98	3	Waste	X	X		X	
Test Pit # 5	Test Pit 5	AG&M	12/13/98	2	Waste	X	X		X	
Shingle Pile	Test Pit 7	AG&M	12/13/98	2	Waste	X	X		X	

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	Location	Source	Date	Depth*	Media	VOC	SVOC	Inorganic	TOC	Pest/ PCB's
SB1-SS1	GMSB-1	MDEQ	05/16/97	12.5-13	Waste	X	X	X		X
SB1-SS2	GMSB-1	MDEQ	05/16/97	23-23.5	Waste	X	X	X		X
SB1-SS3	GMSB-1	MDEQ	05/16/97	35-37	Sand	X	X	X		X
SB1-SS4	GMSB-1	MDEQ	05/16/97	47-48	Sand	X	X	X		X
SB1-SS5	GMSB-1	MDEQ	05/16/97	54-55	Sand	X	X	X		X
SB1-SS6	GMSB-1	MDEQ	05/16/97	80-81	Sand	X	X	X		X
SB1-SS7	GMSB-1	MDEQ	05/17/97	122-123	Silt	X	X	X		X
SB1-SS8	GMSB-1	MDEQ	05/17/97	172-173	Silt	X	X	X		X
SB1-SS9	GMSB-1	MDEQ	05/19/97	235	Sand	X	X	X		X
SS-3	PB-2	MDEQ	05/15/96	8-12	Sand	X	X	X		X
SS-4	PB-2	MDEQ	05/15/96	12-16	Sand	X	X	X		X
SS-5	PB-2	MDEQ	05/15/96	24-28	Sand	X	X	X		X
SS-12	PB-5	MDEQ	05/16/96	8-12	Waste	X	X	X		X
SS-13	PB-5	MDEQ	05/16/96	12-16	Sand	X	X	X		X
MW-96-3 (4-6)	MW-96-3	BLDI	06/12/96	4-6	Sand	X	X	X		
MW-96-3 (20-22)	MW-96-3	BLDI	06/12/96	20-22	Sand	X	X	X		
SB-96-1 (6-8)	SB-96-1	BLDI	6/11/96	6-8	Sand	X	X	X		
SB-96-1 (14-16)	SB-96-1	BLDI	6/11/96	14-16	Sand	X	X	X		
SB-96-2 (6-8)	SB-96-2	BLDI	6/11/96	6-8	Sand	X	X	X		
SB-96-2 (18-20)	SB-96-2	BLDI	6/11/96	18-20	Sand	X	X	X		
SB-96-3 (8-10)	SB-96-3	BLDI	6/11/96	8-10	Sand	X	X	X		
SB-96-3 (18-20)	SB-96-3	BLDI	6/11/96	18-20	Sand	X	X	X		
SB-96-4 (6-8)	SB-96-4	BLDI	6/11/96	6-8	Sand	X	X			
SB-96-4 (22-24)	SB-96-4	BLDI	6/11/96	22-24	Sand	X	X			
SB-96-5 (6-8)	SB-96-5	BLDI	06/12/96	6-8	Sand			X		

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	Location	Source	Date	Depth*	Media	VOC	SVOC	Inorganic	TOC	Pest/ PCB's
SB-96-5 (8-10)	SB-96-5	BLDI	06/11/96	8-10	Sand	X	X	X		
SB-96-5 (18-20)	SB-96-5	BLDI	06/11/96	18-20	Silt	X	X	X		
SB-96-5 (22-24)	SB-96-5	BLDI	06/12/96	22-24	Silt			X		
SB-96-6 (6-8)	SB-96-6	BLDI	06/12/96	6-8	Sand	X	X	X		
SB-96-6 (24-26)	SB-96-6	BLDI	06/12/96	24-26	Silt	X	X	X		
SB-96-7 (6-8)	SB-96-7	BLDI	06/10/96	6-8	Sand	X	X	X		
SB-96-7 (16-18)	SB-96-7	BLDI	06/10/96	16-18	Sand	X	X	X		
SB-96-8 (?)	SB-96-8	BLDI	06/14/96	?	?	X	X	X		
SB-96-9 (?)	SB-96-9	BLDI	06/14/96	?	?	X	X	X		
S-1	S-1	E & E	05/04/88	0-.5	Sand	X	X	X		X
S-2	S-2	E & E	05/04/88	0-.5	Sand	X	X	X		X
S-3	S-3	E & E	05/04/88	0-.5	Waste	X	X	X		X
S-4	S-4	E & E	05/04/88	0-.5	Sand	X	X	X		X
S-5	S-5	E & E	05/04/88	0-.5	Waste	X	X	X		X
SB-1 (15)	SB-1	EWA	07/28/85	15	Sand			X		
SB-1B (15)	SB-1B	EWA	11/09/85	15	Sand	X		X		
SB-2B (15)	SB-2B	EWA	11/09/85	15	Sand	X		X		
SB-3 (52)	SB-3	EWA	07/26/85	52	Sludge	X		X		
SB-3 (54)	SB-3	EWA	07/26/85	54	Sludge	X		X		
SB-4 (54)	SB-4	EWA	07/24/85	54	Sludge	X		X		
SB-4 (56)	SB-4	EWA	07/24/85	56	Sludge	X		X		
SB-5 (5)	SB-5	EWA	06/18/85	5	Sand	X		X		
SB-5 (10)	SB-5	EWA	06/18/85	10	Sand	X		X		
SB-5 (15)	SB-5	EWA	06/18/85	15	Sand	X		X		

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	Location	Source	Date	Depth*	Media	VOC	SVOC	Inorganic	TOC	Pest/ PCB's
SB-5 (20)	SB-5	EWA	06/18/85	20	Sand	X		X		
SB-5 (25)	SB-5	EWA	06/18/85	25	Sand	X		X		
SB-5 (30)	SB-5	EWA	06/18/85	30	Sludge	X		X		
SB-5 (35)	SB-5	EWA	06/18/85	35	Sludge	X		X		
SB-6 (15)	SB-6	EWA	07/28/85	15	Sand			X		
SB-6 (16.5)	SB-6	EWA	11/08/85	16.5	Sand	X		X		
SB-7 (45)	SB-7	EWA	07/24/85	45	Sludge	X		X		
SB-7 (54)	SB-7	EWA	07/24/85	54	Sand	X		X		
SB-8 (35)	SB-8	EWA	07/26/85	35	Sludge			X		
SB-8 (49)	SB-8	EWA	07/26/85	49	Sand/Sludge			X		
SB-9 (30)	SB-9	EWA	07/23/85	30	Sand/Sludge			X		
SB-9 (35)	SB-9	EWA	07/23/85	35	Sand/Sludge			X		
SB-22 (40)	SB-22	EWA	6/1/86	40	Sand	X		X		
SB-22 (50)	SB-22	EWA	6/1/86	50	Silt	X		X		
SB-22 (60)	SB-22	EWA	6/1/86	60	Silt	X		X		
SB-22 (75)	SB-22	EWA	6/1/86	75	Sand	X		X		
SB-22 (90)	SB-22	EWA	6/1/86	90	Sand	X		X		
SB-22 (105)	SB-23	EWA	06/01/86	105	Sand	X		X		
SB-22 (120)	SB-22	EWA	6/1/86	120	Sand	X		X		
SB-23 (40)	SB-23	EWA	6/1/86	40	Sand	X		X		
SB-23 (45)	SB-23	EWA	6/1/86	45	Sand	X		X		
SB-23 (55)	SB-23	EWA	6/1/86	55	Sand	X		X		
SB-23 (70)	SB-23	EWA	6/1/86	70	Sand	X		X		
SB-23 (85)	SB-23	EWA	6/1/86	85	Sand	X		X		

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	Location	Source	Date	Depth*	Media	VOC	SVOC	Inorganic	TOC	Pest/ PCB's
SB-23 (105)	SB-23	EWA	6/1/86	105	Silt	X		X		
SB-23 (120)	SB-23	EWA	6/1/86	120	Sand	X		X		
SSNE-1	SSNE-1	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-2	SSNE-2	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-4	SSNE-4	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-5	SSNE-5	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-6	SSNE-6	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-7	SSNE-7	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-8	SSNE-8	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-9	SSNE-9	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-10	SSNE-10	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-11	SSNE-11	AG&M	08/05/99	0.5-1	Sand	X	X			X
SSNE-12	SSNE-12	AG&M	08/05/99	0.5-1	Sand	X	X			X

Note:	S-1 through S-5 and SSNE-1 through SSNE-12 are surface soil samples
*	Depth is in feet below land surface.
SPLP	Synthetic Precipitation Leaching Procedure.
SVOCs	Semi-volatile Organic Compounds.
TCLP	Toxic Characteristic Leaching Procedure.
TOC	Total Organic Carbon.
VOCs	Volatile Organic Compounds.

Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	TCLP Extraction	SPLP Extraction	Alcohols	Aldehydes	Organic Volatile Acids	Uranium/ Radium
GMSB-1/Composite	X					
GMSB-1/35-45	X					
GMSB-1/65	X					
GMSB-1/90	X					
GMSB-1/115	X					
GMSB-1/140	X					
GMSB-1/170	X					
GMSB-1/202						
GMSB-1/237	X					
GMSB-1/262						
GMSB-1/287						
GMSB-1/312	X					
GMSB-34/6	X	X	X	X	X	
GMSB-35/22	X	X	X	X	X	X
GMSB-36/12	X	X	X	X	X	X
GMSB-37/10	X	X	X	X	X	X
GMSB-38/7	X	X	X	X	X	X
GMSB-40/12	X	X	X	X	X	X
GMSB-40/22						X
GMSB-41/8	X	X	X	X	X	
TP-10/12	X	X	X	X		
TP-5A/2	X	X	X	X		
Test Pit # 3	X					
Test Pit # 5	X					
Shingle Pile	X					

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	TCLP Extraction	SPLP Extraction	Alcohols	Aldehydes	Organic Volatile Acids	Uranium/ Radium
SB1-SS1						
SB1-SS2						
SB1-SS3						
SB1-SS4						
SB1-SS5						
SB1-SS6						
SB1-SS7						
SB1-SS8						
SB1-SS9						
SS-3						
SS-4						
SS-5						
SS-12						
SS-13						
MW-96-3 (4-6)						
MW-96-3 (20-22)						
SB-96-1 (6-8)						
SB-96-1 (14-16)						
SB-96-2 (6-8)						
SB-96-2 (18-20)						
SB-96-3 (8-10)						
SB-96-3 (18-20)						
SB-96-4 (6-8)						
SB-96-4 (22-24)						
SB-96-5 (6-8)						

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	TCLP Extraction	SPLP Extraction	Alcohols	Aldehydes	Organic Volatile Acids	Uranium/ Radium
SB-96-5 (8-10)						
SB-96-5 (18-20)						
SB-96-5 (22-24)						
SB-96-6 (6-8)						
SB-96-6 (24-26)						
SB-96-7 (6-8)						
SB-96-7 (16-18)						
SB-96-8 (?)						
SB-96-9 (?)						
S-1						
S-2						
S-3						
S-4						
S-5						
SB-1 (15)						
SB-1B (15)						
SB-2B (15)						
SB-3 (52)						
SB-3 (54)						
SB-4 (54)						
SB-4 (56)						
SB-5 (5)						
SB-5 (10)						
SB-5 (15)						

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	TCLP Extraction	SPLP Extraction	Alcohols	Aldehydes	Organic Volatile Acids	Uranium/ Radium
SB-5 (20)						
SB-5 (25)						
SB-5 (30)						
SB-5 (35)						
SB-6 (15)						
SB-6 (16.5)						
SB-7 (45)						
SB-7 (54)						
SB-8 (35)						
SB-8 (49)						
SB-9 (30)						
SB-9 (35)						
SB-22 (40)						
SB-22 (50)						
SB-22 (60)						
SB-22 (75)						
SB-22 (90)						
SB-22 (105)						
SB-22 (120)						
SB-23 (40)						
SB-23 (45)						
SB-23 (55)						
SB-23 (70)						
SB-23 (85)						

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Table 2. Summary of Soil and Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Sample I.D.	TCLP Extraction	SPLP Extraction	Alcohols	Aldehydes	Organic Volatile Acids	Uranium/ Radium
SB-23 (105)						
SB-23 (120)						
SSNE-1			X			
SSNE-2			X			
SSNE-4			X			
SSNE-5			X			
SSNE-6			X			
SSNE-7			X			
SSNE-8			X			
SSNE-9			X			
SSNE-10			X			
SSNE-11			X			
SSNE-12			X			

Note:	S-1 through S-5 and SSNE-1 through SSNE-12 are surface soil samples
*	Depth is in feet below land surface.
SPLP	Synthetic Precipitation Leaching Procedure.
SVOCs	Semi-volatile Organic Compounds.
TCLP	Toxic Characteristic Leaching Procedure.
TOC	Total Organic Carbon.
VOCs	Volatile Organic Compounds.

Table 3. Summary of Groundwater Grab and Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/ Boring	Sample I.D.	Date	Depth*	VOCs	SVOCs	TOC	COD	Sulfide	BOD	Dissolved Gases	Specific Gravity
Groundwater Grab											
GMSB-1	GBGMSB-1/85	05/16/97	85	X	X	X	X		X	X	
GMSB-1	GBGMSB-1/135	05/17/97	135	X	X	X	X		X	X	
GMSB-1	GBGMSB-1/215	05/18/97	215	X	X	X	X		X	X	
GMSB-1	GBGMSB-1/275	05/19/97	275	X	X	X	X		X	X	
GMSB-1	GBGMSB-1/325	06/12/97	325	X	X	X	X		X	X	X
BR-5A	GWBR-5A	7/1/97	88	X	X	X	X	X		X	X
Groundwater											
MW-96-1	MW-96-1	06/14/96	65	X	X			X		X	
MW-96-2	MW-96-2	06/14/96	60	X	X			X		X	
MW-96-3	MW-96-3	06/14/96	66	X	X			X		X	
MW-96-4	MW-96-4	06/14/96	60	X	X			X		X	
GM-70	GWGM-70	08/17/00	42	X	X	X	X	X	X	X	
GM-71	GWGM-71	08/21/00	39	X	X	X	X	X	X	X	
GM-72	GWGM-72	08/22/00	43	X	X	X	X	X	X	X	
BR-5B	GWBR-5B	7/1/97	188	X	X	X	X	X		X	X
BR-5B	GWGM-98	7/1/97	188	X	X	X	X	X		X	X

*	Depth is in feet below land surface.
BOD	Biochemical oxygen demand.
COD	Chemical oxygen demand.
SVOCs	Semi-volatile organic compounds.
TOC	Total organic carbon.
VOCs	Volatile organic compounds.
X	Submitted for analysis.

Table 3. Summary of Groundwater Grab and Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/ Boring	(Metals) Inorganic	Alcohols	Aldehydes	Organic Volatile Acids	Biogeochemical Parameters
Groundwater Grab					
GMSB-1					
GMSB-1					
GMSB-1					
GMSB-1					
GMSB-1					
BR-5A	X				
Groundwater					
MW-96-1	X				
MW-96-2	X				
MW-96-3	X				
MW-96-4	X				
GM-70	X	X	X	X	X
GM-71	X	X	X	X	X
GM-72	X	X	X	X	X
BR-5B	X				
BR-5B	X				

*	Depth is in feet below land surface.
BOD	Biochemical oxygen demand.
COD	Chemical oxygen demand.
SVOCs	Semi-volatile organic compounds.
TOC	Total organic carbon.
VOCs	Volatile organic compounds.
X	Submitted for analysis.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface soil	Surface soil	Surface soil	Surface soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	0.5'	0.5'	0.5'	0.5'	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	05/04/88	05/04/88	05/04/88	05/04/88	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	S-1	S-1 RE	S-2	S-4	SSNE-1	SSNE-2	SSNE-3	SSNE-4	SSNE-5
VOC									
2-Butanone (MEK)	170	NA	160	33 J	<2,600	<2,600	<2,600	<2,700	<2,600
4-Methyl-2-pentanone (MIBK)	<10	NA	5 J	<1,000	<2,600 J	<2,600 J	<2,600 J	<2,700 J	<2,600 J
Acetone	<39	NA	<48	11 J	<5,300	<5,200	<5,200	<5,400	<5,200
Chloroform	13	NA	12	<500	<53	<52	<52	<54	<52
Methylene chloride	96 B	NA	110 B	<500	<260	<260	<260	<270	<260
Toluene	4 J	NA	6	<500	<100	<100	<100	<110	<100
Xylenes (total)	<5	NA	5	<500	<160	<160	<160	<160	<160
SVOC									
2,4-Dimethylphenol	NA	<340	<340	3,500	<340	<340	<340	<350	<340
2-Methylnaphthalene	NA	<340	<340	760 J	<340	<340	<340	<350	<340
2-Methylphenol	NA	<340	<340	1,600	<340	<340	<340	<350	<340
bis(2-Ethylhexyl)phthalate	NA	62 J	66 J	<1,400	<340	<340	<340	<350	<340
Naphthalene	NA	<340	<340	1,900	<340	<340	<340	<350	<340
Pentachlorophenol	NA	<1,600	27 J	<6,700	<1,800	<1,800	<1,800	<1,800	<1,800
Metals									
Aluminum	2,680,000	NA	2,810,000	4,430,000	NA	NA	NA	NA	NA
Antimony	<2,900 N	NA	<2,900 N	45,00 BN	NA	NA	NA	NA	NA
Arsenic	3,300 N+	NA	3,200 NS	2,400 N+	NA	NA	NA	NA	NA
Barium	25,400 B	NA	17,400 B	33,100 B	NA	NA	NA	NA	NA
Beryllium	110 B	NA	100 B	110 B	NA	NA	NA	NA	NA
Calcium	910,000 B	NA	1,130,000	1,420,000	NA	NA	NA	NA	NA

Footnotes on Page 7.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Surface soil 0.5' 05/04/88 S-1	Surface soil 0.5' 05/04/88 S-1 RE	Surface soil 0.5' 05/04/88 S-2	Surface soil 0.5' 05/04/88 S-4	Surface Soil 6"-12" 08/05/99 SSNE-1	Surface Soil 6"-12" 08/05/99 SSNE-2	Surface Soil 6"-12" 08/05/99 SSNE-3	Surface Soil 6"-12" 08/05/99 SSNE-4	Surface Soil 6"-12" 08/05/99 SSNE-5
Metals (continued)									
Chromium	8,400	NA	7,000	10,100	NA	NA	NA	NA	NA
Cobalt	3,700 B	NA	2,200 B	3,300 B	NA	NA	NA	NA	NA
Copper	23,500 *	NA	11,100 *	23,500 *	NA	NA	NA	NA	NA
Iron	5,170,000	NA	4,630,000	5,540,000	NA	NA	NA	NA	NA
Lead	2,000 +	NA	3,000 S	6,300 S	NA	NA	NA	NA	NA
Magnesium	1,880,000	NA	1,210,000	1,750,000	NA	NA	NA	NA	NA
Manganese	188,000 *	NA	108,000 *	112,000 *	NA	NA	NA	NA	NA
Nickel	7,500 B	NA	6,200 B	3,700	NA	NA	NA	NA	NA
Potassium	315,000 B	NA	232,000 B	1,140,000	NA	NA	NA	NA	NA
Selenium	<450 W	NA	<450 W	470 BW	NA	NA	NA	NA	NA
Silver	<860 N	NA	<850 N	1,200 BN	NA	NA	NA	NA	NA
Sodium	55,000 B	NA	47,000 B	92,000 B	NA	NA	NA	NA	NA
Vanadium	12,200	NA	7,500 B	12,900	NA	NA	NA	NA	NA
Zinc	44,700 *E	NA	23,200 *E	18,900 *E	NA	NA	NA	NA	NA
Alcohols									
1-Propanol	NA	NA	NA	NA	<1,000	<1,000	<1,000	<1,000	<1,000
Pest/PCB									
Aroclor 1242	<160	NA	1,200 D	2,300 D	<34	<34	<34	<35 J	<34

Footnotes on Page 7.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	SSNE-6	SSNE-7	SSNE-8	SSNE-98	SSNE-9	SSNE-10	SSNE-11	SSNE-12
VOC								
2-Butanone (MEK)	<2,600	<2,600	<2,600	<2,600	<2,700	<2,600	<2,600	<2,600
4-Methyl-2-pentanone (MIBK)	<2,600 J	<2,600 J	<2,600 J	<2,600 J	<2,700 J	<2,600 J	<2,600 J	<2,600 J
Acetone	<5,300	<5,300	<5,300	<5,300	<5,400	<5,200	<5,300	<5,300
Chloroform	<53	<53	<53	<53	<54	<52	<53	<53
Methylene chloride	<260	<260	<260	<260	<270	<260	<260	<260
Toluene	<110	<100	<110	<110	<110	<100	<100	<110
Xylenes (total)	<160	<160	<160	<160	<160	<150	<160	<160
SVOC								
2,4-Dimethylphenol	<350	<350	<350	<350	<360	<340	<340	<350
2-Methylnaphthalene	<350	<350	<350	<350	<360	<340	<340	<350
2-Methylphenol	<350	<350	<350	<350	<360	<340	<340	<350
bis(2-Ethylhexyl)phthalate	<350	<350	<350	<350	<360	<340	<340	<350
Naphthalene	<350	<350	<350	<350	<360	<340	<340	<350
Pentachlorophenol	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800	<1,800
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA

Footnotes on Page 7.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
Depth	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"	6"-12"
Sample Date	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99
Sample I.D.	SSNE-6	SSNE-7	SSNE-8	SSNE-98	SSNE-9	SSNE-10	SSNE-11	SSNE-12
Metals (continued)								
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Alcohols								
1-Propanol	<1,000	<1,000	<1,100	<1,100	<1,100	550 J	<1,000	<1,100
Pest/PCB								
Aroclor 1242	<35 J	<34 J	<35 J	<35	<36	<34	<35 J	<35

Footnotes on Page 7.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former NE Pit Area, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Criteria				
	Industrial Direct Contact	Residential Drinking Water Protection	Industrial Indoor Inhalation	Industrial Ambient Air Particulate Inhalation	Groundwater Surface Water Interface Protection
VOC					
2-Butanone (MEK)	27,000,000 C, I, AD	260,000 I	27,000,000 C, I	29,000,000,000 I	44,000 I
4-Methyl-2-pentanone (MIBK)	2,700,000 C, I	36,000 I	2,700,000 C, I	60,000,000,000 I	ID
Acetone	110,000,000 I	15,000 I	110,000,000 C, I	170,000,000,000 I	34,000 I
Chloroform	1,500,000 C	2000 W	38,000	1,600,000,000	3,400 X
Methylene chloride	2,300,000 C	100	240,000	8,300,000,000	19,000 X
Toluene	250,000 C, I	16,000 I	250,000 C, I	12,000,000,000 I	2,800 I
Xylenes (total)	150,000 C, I	5,600 I	150,000 C, I	130,000,000,000	700 I
SVOC					
2,4-Dimethylphenol	56,000,000	7,400	NLV	2,100,000,000	7,600
2-Methylnaphthalene	40,000,000	57,000	ID	ID	ID
2-Methylphenol	56,000,000 J	7,400 J	NLV	2,900,000,000 J	1,400 J
bis(2-Ethylhexyl)phthalate	10,000,000 C	NLL	NLV	890,000,000	NLL
Naphthalene	80,000,000	35,000	470,000	88,000,000	870
Pentachlorophenol	390,000	22	NLV	130,000,000	G, X
Metals					
Aluminum	660,000,000 B, AD	1,000 B	NLV	ID	NA
Antimony	1,200,000	500 M	NLV	5,900,000	ID
Arsenic	61000 B	23,000 B	NLV	910,000 B	70,000 B, X
Barium	250,000,000	1,300,000	NLV	150,000,000	G,X
Beryllium	3,100,000	51,000	NLV	590,000	G
Calcium	NA	NA	NA	NA	NA

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Table 4. Summary of Constituents Detected in Surface Soil Samples, Former NE Pit Area, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Criteria Industrial Direct Contact	 Residential Drinking Water Protection	 Industrial Indoor Inhalation	 Industrial Ambient Air Particulate Inhalation	 Groundwater Surface Water Interface Protection
Metals (continued)					
Chromium	17,000,000 Hexavalent	30,000 Hexavalent	NLV	240,000 Hexavalent	3,300 Hexavalent
Cobalt	18,000,000	800	NLV	5,900,000	2,000
Copper	140,000,000	5,800,000	NLV	59,000,000	G
Iron	1,000,000,000 B, D	6,000 B	NLV	ID	NA
Lead	900,000 DRAFT	700,000	NLV	44,000,000	G, M, X
Magnesium	1,000,000,000 B, D	8,000,000 B	NLV	2,900,000,000 B	NA
Manganese	170,000,000 B	1,000 B	NLV	1,500,000 B	B, G, X
Nickel	270,000,000 B	100,000 B	NLV	16,000,000 B	B, G
Potassium	NA	NA	NA	NA	NA
Selenium	18,000,000 B	4,000 B	NLV	59,000,000 B	400 B
Silver	17,000,000 B	4,500 B	NLV	2,900,000 B	500 B, M
Sodium	1,000,000,000 D	2,500,000	NLV	ID	NA
Vanadium	10,000,000	72,000	NLV	ID	190,000
Zinc	1,000,000,000 B, D	2,400,000 B	NLV	ID	B, G
Alcohols					
1-Propanol	NA	NA	NA	NA	NA
Pest/PCB					
Aroclor 1242	T	NLL, J, T	16,000,000 J,T	6,500,000 J, T	NLL

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Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

All results are in micrograms per kilogram (µg/kg).

Bold	Value above the Industrial Direct Contact Criteria (Operational Memorandum #18, June 7, 2000).
Italics	Value above the Industrial Indoor Inhalation Criteria (Operational Memorandum #18, June 7, 2000).
▨	Value above the Residential Drinking Water Protection Criteria (Operational Memorandum #18, June 7, 2000).
☐	Value above the Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, June 7, 2000).
<u>underline</u>	Value above the Groundwater/Surface Water Interface Protection Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
+	+ Correlation coefficient for method of standard addition was not within control limits.
B	Constituent was also detected in laboratory blank.
D	Dilution.
DUP	Duplicate sample.
E	Interference, result is estimated.
J	Estimated result.
N	Presumptive evidence of compound was identified (TICs only).
NA	Not analyzed.
S	Value was determined by the Method of Standard Additions.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile Organic Compounds.
W	Post-digestion spike for furnace A-A analysis is out of control limits.

Criteria Footnotes:

AD	Hazardous substance causes developmental effects. Residential and Commercial I Direct Contact Criteria are protective of both prenatal and postnatal exposure.
B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, therefore it is reduced to 100%.

Table 4. Summary of Constituents Detected in Surface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

I	Hazardous substance may exhibit the characteristic of ignitability as defined in 40 CFR 261.21.
NA	Criterion or value is not available.
NE	Not established.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
NLV	Chemical is not likely to volatilize under most soil conditions.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
T	Refer to Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as amended.
W	Concentrations of trihalomethanes must be added together.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
VOC					
1,1,2,2-Tetrachloroethane	<4,300	<13	<25 J	<32 J	4,900 J
1,2,4-Trimethylbenzene	NA	86 J	92 J	55,000 DJ	55,000 J
1,2-Dichloroethane	<4,300	<13	<25 J	<32 J	<3,800 J
1,3,5-Trimethylbenzene	NA	<13 J	<25 J	13,000 DJ	13,000 J
2-Butanone (MEK)	10,000 J	120 J	180 J	140,000 DBJ	140,000 J
2-Hexanone	<43,000	<66 J	<130 J	23,000 DJ	23,000 J
4-Methyl-2-pentanone (MIBK)	<43,000	<66 J	<130 J	3,800 J	<19,000 J
Acetone	12000 J	500 J	370 J	95,000 DJ	95,000 J
Benzene	<4,300	35	21 J	3,000 DJ	3,000 J
Carbon disulfide	<4,300	63 J	50 J	<32 J	<3,800 J
Chlorobenzene	<4,300	<13	<25 J	<32 J	<3,800 J
Ethylbenzene	2,300 J	15	15 J	8,300 DJ	8,300 J
Isopropylbenzene	NA	<13	<25 J	1,200 J	<3,800 J
Methylene chloride	<4,300	<13 J	<25 J	<32 J	<3,800 J
Naphthalene	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA
n-Propylbenzene	NA	<13 J	<25 J	8,800 DJ	8,800 J
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA
Styrene	<4,300	<13	<25 J	<32 J	6,100 J
Toluene	3,300 J	50	42 J	14,000 DJ	14,000 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
VOC (continued)					
Trichloroethene	<4,300	<13	<25 J	<32 J	<3,800 J
Xylene, o	NA	NA	NA	NA	NA
Xylenes (total)	7,600	72 J	78 J	58,000 DJ	58,000 J
Xylenes, m+p	NA	NA	NA	NA	NA
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	15,000	<4,900	NA	76,000	NA
2-Methylnaphthalene	3,900	<4,900	NA	56,000	NA
2-Methylphenol	14,000	<4,900	NA	77,000	NA
2-Nitrophenol	<1,400	<10,000	NA	<58,000	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	<4,900	NA	62,000	NA
4-Methylphenol	18,000	NA	NA	NA	NA
4-Nitrophenol	<6,900	<25,000	NA	<150,000	NA
Acenaphthene	<1,400	<4,900	NA	<29,000	NA
Anthracene	<1,400	<4,900	NA	<29,000	NA
Benzo(a)anthracene	<1,400	<4,900	NA	<29,000	NA
Benzoic acid	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	<1,400	<4,900	NA	<29,000	NA
Chrysene	<1,400	<4,900	NA	<29,000	NA
Dibenzofuran	<1,400	<4,900	NA	<29,000	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
SVOC (continued)					
Diethylphthalate	<1,400	<4,900	NA	<29,000	NA
Di-n-butylphthalate	<1,400	<4,900	NA	99,000	NA
Fluoranthene	<1,400	<4,900	NA	<29,000	NA
Fluorene	880 J	<4,900 J	NA	<29,000 J	NA
Naphthalene	4,200	<4,900	NA	220,000	NA
Phenanthrene	<1,400	<4,900	NA	<29,000	NA
Phenol	15,000	<4,900	NA	40,000	NA
Pyrene	<1,400	<4,900 J	NA	<29,000 J	NA
Metals					
Aluminum	3,340,000	1,600,000 J	NA	830,000 J	NA
Aluminum in Oil	NA	NA	NA	NA	NA
Antimony	804	1,400 BJ	NA	<3,800 J	NA
Arsenic	884	2,500 J	NA	900 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA
Barium	104,000	240,000	NA	48,000	NA
Barium in Oil	NA	NA	NA	NA	NA
Beryllium	<866	120 B	NA	39 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA
Cadmium	120	180 J	NA	R	NA
Cadmium in Oil	NA	NA	NA	NA	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Metals					
Calcium	42,600,000	40,000,000	NA	52,000,000	NA
Chromium	8,270	22,000	NA	2,400	NA
Chromium in Oil	NA	NA	NA	NA	NA
Cobalt	<8,660	780 B	NA	230 B	NA
Cobalt in Oil	NA	NA	NA	NA	NA
Copper	463,000	410,000	NA	460,000	NA
Copper in Oil	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Iron	5,530,000 MBB	2,700,000	NA	1,700,000	NA
Iron in Oil	NA	NA	NA	NA	NA
Lead	37,100	68,000	NA	12,000	NA
Lead in Oil	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA
Magnesium	3,400,000	2,300,000	NA	3,000,000	NA
Manganese	129,000	140,000	NA	360,000	NA
Manganese in Oil	NA	NA	NA	NA	NA
Mercury	167	120 B	NA	20 B	NA
Mercury in Oil	NA	NA	NA	NA	NA
Molybdenum	NA	1,200 B	NA	<7,600	NA
Molybdenum in Oil	NA	NA	NA	NA	NA
Nickel	5,930	2,200 B	NA	1,600	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Metals (continued)					
Nickel in Oil	NA	NA	NA	NA	NA
Potassium	<866,000	310,000	NA	45,000	NA
Selenium	<433	4,100 J	NA	R	NA
Silver	<433	270 B	NA	120 B	NA
Sodium	1,160,000	68,000	NA	3,900,000	NA
Thallium	<433	<2,400	NA	<1,500	NA
Titanium	NA	340,000	NA	59,000	NA
Titanium in Oil	NA	NA	NA	NA	NA
Vanadium	11,100	6,000	NA	1,800	NA
Vanadium in Oil	NA	NA	NA	NA	NA
Zinc	22,800 MBD	68,000	NA	27,000	NA
Zinc in Oil	NA	NA	NA	NA	NA
Alcohols					
1-Propanol	NA	<2,600	NA	8,800	NA
Ethanol	NA	1,600 J	NA	66,000	NA
Ethylacetate	NA	<13,000	NA	<38,000	NA
Isobutanol	NA	<12,000	NA	1,000 J	NA
Isopropanol	NA	<12,000	NA	1,500 J	NA
Methanol	NA	19,000 B	NA	610,000 B	NA
n-Butanol	NA	<12,000	NA	4,300 J	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35	
Depth	0-31.5	6	6	22	22
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE	GMSB-34/6	GMSB-34/6 - DL	GMSB-35/22	GMSB-35/22 - DL
Type	Wood/Char	Wood	Wood	Sludge	Sludge
Aldehydes					
Acetaldehyde	NA	<4,800	NA	25,000	NA
Formaldehyde	NA	<4,800	NA	<4,000	NA
Hexanal	NA	<4,800	NA	<4,000	NA
m-Tolualdehyde	NA	<4,800	NA	<4,000	NA
Paraldehyde	NA	<60	NA	1,100	NA
Pentanal	NA	<4,800	NA	<4,000	NA
Propanal	NA	<4,800	NA	<4,000	NA
Pest/PCB					
Aldrin	<14	NA	NA	NA	NA
Aroclor 1242	<140	NA	NA	NA	NA
BHC (Lindane) (gamma)	<14	NA	NA	NA	NA
Chlordane (alpha)	<14	NA	NA	NA	NA
Chlordane (gamma)	<14	NA	NA	NA	NA
Endrin	<29	NA	NA	NA	NA
Heptachlor epoxide	<14	NA	NA	NA	NA
Methoxychlor	<140	NA	NA	NA	NA
Acetic Acid	NA	13,000	NA	12,000,000	NA
Total Organic Carbon	24,000,000	220,000,000	NA	460,000,000	NA
Total Solids	NA	NA	NA	NA	NA
Percent Solids	NA	42	NA	65	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
VOC					
1,1,2,2-Tetrachloroethane	<6.5	<1,300	<5,000	<510 J	<510 J
1,2,4-Trimethylbenzene	**20,000 D**	**20,000 D**	**88,000**	310 J	300 J
1,2-Dichloroethane	<6.5	<1,300	<5,000	<510 J	<510 J
1,3,5-Trimethylbenzene	**4,600 D**	**4,600 D**	**23,000**	<510 J	<510 J
2-Butanone (MEK)	55,000 DB	55,000 BD	<110,000	<2,600 J	<2,600 J
2-Hexanone	1,100	7,800 D	**32,000**	<2,600 J	<2,600 J
4-Methyl-2-pentanone (MIBK)	540	6,000 JD	<25000	<2,600 J	<2,600 J
Acetone	**46,000 D**	**46,000 D**	**100,000**	<5,100 J	<5,100 J
Benzene	***8,500 D***	***8,500 D***	***21,000***	<510 J	<510 J
Carbon disulfide	<6.5	<1,300	<5,000	<510 J	<510 J
Chlorobenzene	<6.5	<1,300	<5,000	<510 J	<510 J
Ethylbenzene	**8,800 D**	**8,800 D**	**40,000**	<510 J	<510 J
Isopropylbenzene	100	650 JD	2,900 J	<510 J	<510 J
Methylene chloride	<6.5 J	<1,300	<5,000	<510 J	<510 J
Naphthalene	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA
n-Propylbenzene	**3,600 D**	**3,600 D**	**19,000**	<510 J	<510 J
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA
Styrene	<6.5	<1,300	**16,000**	<510 J	<510 J
Toluene	16,000 D	16,000 D	**110,000**	310 J	300 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
VOC (continued)					
Trichloroethene	48	<1,300	<5,000	<510 J	<510 J
Xylene, o	NA	NA	NA	NA	NA
Xylenes (total)	48,000 D	48,000 D	*220,000*	390 J	210 J
Xylenes, m+p	NA	NA	NA	NA	NA
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	900,000	NA	960,000	<4,900	NA
2-Methylnaphthalene	370,000	NA	220,000	<4,900	NA
2-Methylphenol	810,000	NA	1,000,000	<4,900	NA
2-Nitrophenol	<100,000	NA	<130,000	<9,900	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	850,000	NA	1,400,000	<4,900	NA
4-Methylphenol	NA	NA	NA	NA	NA
4-Nitrophenol	<260,000	NA	470,000	<25,000	NA
Acenaphthene	<51,000	NA	<64,000	<4,900	NA
Anthracene	<51,000	NA	<64,000	<4,900	NA
Benzo(a)anthracene	<51,000	NA	<64,000	<4,900	NA
Benzoic acid	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	<51,000	NA	<64,000	<4,900	NA
Chrysene	<51,000	NA	<64,000	<4,900	NA
Dibenzofuran	140,000	NA	240,000	<4,900	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
SVOC (continued)					
Diethylphthalate	<51,000	NA	<64,000	<4,900	NA
Di-n-butylphthalate	<51,000	NA	<64,000	<4,900	NA
Fluoranthene	<51,000	NA	<64,000	<4,900	NA
Fluorene	62,000	NA	76,000	<4,900 J	NA
Naphthalene	370,000	NA	160,000	<4,900	NA
Phenanthrene	<51,000	NA	<64,000	<4,900	NA
Phenol	660,000	NA	1,100,000	<4,900	NA
Pyrene	<51,000	NA	<64,000	<4,900 J	NA
Metals					
Aluminum	220,000 J	NA	150,000 J	640,000 J	NA
Aluminum in Oil	NA	NA	NA	NA	NA
Antimony	640 BJ	NA	<2,300 J	1,500 BJ	NA
Arsenic	790 J	NA	470 J	1,600 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA
Barium	78,000	NA	19,000	260,000	NA
Barium in Oil	NA	NA	NA	NA	NA
Beryllium	13 B	NA	<450	73 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA
Cadmium	110 J	NA	98 J	290 J	NA
Cadmium in Oil	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Metals					
Calcium	28,000,000	NA	9,100,000	10,000,000	NA
Chromium	1,600	NA	810	13,000	NA
Chromium in Oil	NA	NA	NA	NA	NA
Cobalt	100 B	NA	<450	420 B	NA
Cobalt in Oil	NA	NA	NA	NA	NA
Copper	430,000	NA	290,000	570,000	NA
Copper in Oil	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Iron	1,200,000	NA	360,000	2,700,000	NA
Iron in Oil	NA	NA	NA	NA	NA
Lead	11,000	NA	4,800	67,000	NA
Lead in Oil	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA
Magnesium	860,000	NA	310,000	700,000	NA
Manganese	61,000	NA	15,000	310,000	NA
Manganese in Oil	NA	NA	NA	NA	NA
Mercury	8.3 B	NA	15 B	120 B	NA
Mercury in Oil	NA	NA	NA	NA	NA
Molybdenum	260 B	NA	150 B	770 B	NA
Molybdenum in Oil	NA	NA	NA	NA	NA
Nickel	1,000 B	NA	590 B	1,600 B	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Metals (continued)					
Nickel in Oil	NA	NA	NA	NA	NA
Potassium	15,000	NA	9,200	1,100,000	NA
Selenium	R	NA	R	1,400 BJ	NA
Silver	93 B	NA	83 B	300 B	NA
Sodium	420,000	NA	360,000	82,000	NA
Thallium	<1,200	NA	<910	<2,300	NA
Titanium	23,000	NA	18,000	230,000	NA
Titanium in Oil	NA	NA	NA	NA	NA
Vanadium	1,300	NA	1,000	3,300	NA
Vanadium in Oil	NA	NA	NA	NA	NA
Zinc	35,000	NA	11,000	55,000	NA
Zinc in Oil	NA	NA	NA	NA	NA
Alcohols					
1-Propanol	<1,300	6,100 J	<1,000	<2,600	NA
Ethanol	370,000	380,000 J	5,800	1,300 J	NA
Ethylacetate	<6,500	6,000 J	1,200 J	<13,000	NA
Isobutanol	<5,700	810 J	<4,400	<11,000	NA
Isopropanol	<5,700	2,000 J	<4,400	<11,000	NA
Methanol	440,000	420,000 J	54,000 B	<11,000	NA
n-Butanol	<5,700	400,000 J	<4,400	<11,000	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-36		GMSB-37	GMSB-38	
Depth	12	12	10	7	7
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-36/12	GMSB-36/12 - DL	GMSB-37/10	GMSB-38/7	GMSB-38/7-RE
Type	Sludge	Sludge	Tar	Wood	Wood
Aldehydes					
Acetaldehyde	50,000	NA	2,900	<4,000	NA
Formaldehyde	<4,000	NA	3,300	4,900	NA
Hexanal	<4,000	NA	2,400	<4,000	NA
m-Tolualdehyde	<4,000	NA	5,200	<4,000	NA
Paraldehyde	610	NA	730	<55	NA
Pentanal	<4,000	NA	8,000	<4,000	NA
Propanal	<4,000	NA	5,300	<4,000	NA
Pest/PCB					
Aldrin	NA	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA	NA
BHC (Lindane) (gamma)	NA	NA	NA	NA	NA
Chlordane (alpha)	NA	NA	NA	NA	NA
Chlordane (gamma)	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA
Acetic Acid	12,000,000	NA	10,400,000	5,000	NA
Total Organic Carbon	400,000,000	NA	930,000,000 J	200,000,000	NA
Total Solids	NA	NA	NA	NA	NA
Percent Solids	79	NA	85	45	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
VOC							
1,1,2,2-Tetrachloroethane	NA	<2,000	NA	<350	<12	<7,400	<170
1,2,4-Trimethylbenzene	NA	30,000	NA	1,600	NA	NA	NA
1,2-Dichloroethane	NA	<2,000	NA	<350	6 J	<7,400	17 J
1,3,5-Trimethylbenzene	NA	6,300	NA	470	NA	NA	NA
2-Butanone (MEK)	NA	75,000	NA	<1,800	12,000	120,000	1,100
2-Hexanone	NA	16,000	NA	<1,800	1,200	33,000	390
4-Methyl-2-pentanone (MIBK)	NA	<10,000	NA	<1,800	260	<7,400	370
Acetone	NA	56,000	NA	<3,500	7,700 J	88,000 J	1,300 J
Benzene	NA	3,200	NA	<350	340	3,200 J	1,100
Carbon disulfide	NA	<2,000	NA	<350	<12 J	<7,400	<170 J
Chlorobenzene	NA	<2,000	NA	<350	<12	2,000 J	<170
Ethylbenzene	NA	7,500	NA	320 J	170 J	6,200 J	820
Isopropylbenzene	NA	<2,000	NA	<350	NA	NA	NA
Methylene chloride	NA	<2,000	NA	<350	<12 J	<7,400	<170 J
Naphthalene	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NA	4,600	NA	230 J	NA	NA	NA
p-Isopropyltoluene	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	<2,000	NA	<350	97	4,000 J	<170
Toluene	NA	19,000	NA	360	590 J	12,000	2,800

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
VOC (continued)							
Trichloroethene	NA	<2,000	NA	<350	60	830 J	<170
Xylene, o	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	NA	48,000	NA	2,500	1,200	46,000	4,700
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA
SVOC							
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	230,000	NA	17,000	110,000	110,000	230,000
2-Methylnaphthalene	NA	150,000 J	NA	45,000	78,000	82,000	41,000
2-Methylphenol	NA	240,000	NA	3,500	140,000	140,000	270,000
2-Nitrophenol	NA	<320,000	NA	<6,900	<17,000	<52,000	<19,000
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	230,000	NA	4,100	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	180,000	180,000	370,000
4-Nitrophenol	NA	<800,000	NA	<18,000	<43,000	<130,000	<48,000
Acenaphthene	NA	<160,000	NA	2,800 J	4,800 J	<52,000	3,600 J
Anthracene	NA	<160,000	NA	<3,400	2,200 J	<52,000	3,900 J
Benzo(a)anthracene	NA	<160,000	NA	<3,400	<17,000	<52,000	1,100 J
Benzoic acid	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	<160,000	NA	<3,400	<17,000	<52,000	<19,000
Chrysene	NA	<160,000	NA	<3,400	<17,000	<52,000	1,500 J
Dibenzofuran	NA	<160,000	NA	18,000	7,800 J	8,300 J	13,000 J

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
SVOC (continued)							
Diethylphthalate	NA	<160,000	NA	<3,400	<17,000	<52,000	**1,200,000**
Di-n-butylphthalate	NA	200,000	NA	<3,400	14,000 J	14,000 J	1,000 J
Fluoranthene	NA	<160,000	NA	<3,400	<17,000	<52,000	2,300 J
Fluorene	NA	<160,000	NA	16,000	9,000 J	5,900 J	17,000 J
Naphthalene	NA	260,000	NA	16,000	58,000	60,000	25,000
Phenanthrene	NA	<160,000	NA	4,200	1,600 J	<52,000	11,000 J
Phenol	NA	200,000	NA	<3,400	160,000	160,000	240,000
Pyrene	NA	<160,000	NA	<3,400	<17,000	<52,000	2,800 J
Metals							
Aluminum	NA	4,200,000 J	8,900,000 J	1,100,000 J	1,900,000 J	NA	669,000 J
Aluminum in Oil	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	35,000 J	<4,500 J	840 BJ	R	NA	2,900 J
Arsenic	NA	4,600 J	7,500 J	1,500 J	<1,000	NA	900
Arsenic in Oil	NA	NA	NA	NA	NA	NA	NA
Barium	NA	130,000	210,000	53,000	32,000	NA	276,000
Barium in Oil	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	130 B	620 B	89 B	100	NA	50
Beryllium in Oil	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	45 BJ	81 J	220 J	<600	NA	<400
Cadmium in Oil	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
Metals							
Calcium	NA	86,000,000	46,000,000	6,000,000	34,100,000	NA	96,400,000
Chromium	NA	21,000	16,000	15,000	5,200	NA	8,300
Chromium in Oil	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	420 B	1,400	340 B	1300	NA	<500
Cobalt in Oil	NA	NA	NA	NA	NA	NA	NA
Copper	NA	1,400,000	2,400,000	260,000	186000 J	NA	1,050,000 J
Copper in Oil	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	1500 J	NA	1,500 J
Iron	NA	3,500,000	7,800,000	2,800,000	2,400,000	NA	353,000
Iron in Oil	NA	NA	NA	NA	NA	NA	NA
Lead	NA	30,000	150,000	20,000	9500 J	NA	78,200 J
Lead in Oil	NA	NA	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	6,300,000	8,000,000	300,000	911000 J	NA	187000 J
Manganese	NA	690,000	81,000	320,000	58,200	NA	44,400
Manganese in Oil	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	380	380 B	100 B	<100	NA	100
Mercury in Oil	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	410 B	210 B	1,200 B	NA	NA	NA
Molybdenum in Oil	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	2,800	9,500	1,100 B	3,600	NA	<1,500

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
Metals (continued)							
Nickel in Oil	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	51,000	46,000	300,000	260000 J	NA	204,000 J
Selenium	NA	3,400 BJ	1,400 BJ	730 J	1,500	NA	<700
Silver	NA	530 B	950	180 B	<400	NA	300
Sodium	NA	4,100,000	2,300,000	58,000	2,640,000	NA	186,000
Thallium	NA	<2,000	<1,800	<1,600	<1100	NA	<700
Titanium	NA	310,000	510,000	310,000	NA	NA	NA
Titanium in Oil	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	5,100	5,400	8,100	8,900	NA	4,500
Vanadium in Oil	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	57,000	220,000	23,000	17,900	NA	23,300
Zinc in Oil	NA	NA	NA	NA	NA	NA	NA
Alcohols							
1-Propanol	NA	21,000	NA	<1,800	NA	NA	NA
Ethanol	NA	320,000	NA	890 J	NA	NA	NA
Ethylacetate	NA	16,000 J	NA	<8,800	NA	NA	NA
Isobutanol	NA	1,600 J	NA	<7,700	NA	NA	NA
Isopropanol	NA	<90,000	NA	<7,700	NA	NA	NA
Methanol	NA	830,000 B	NA	<7,700	NA	NA	NA
n-Butanol	NA	3,700 J	NA	<7,700	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40			GMSB-41	GMSB-1		
Depth	12	12	23	8	12.5-13'	12.5-13'	23-23.5'
Sample Date	10/20/99	10/21/99	10/21/99	10/21/99	06/01/97	06/01/97	06/01/97
Sample I.D.	GMSB-40/12	GMSB-40/12	GMSB-40/23	GMSB-41/8	SB1-SS1	SB1-SS1-RE	SB1-SS2
Type	Sludge	Sludge	Sludge	Wood			
Aldehydes							
Acetaldehyde	**100,000**	NA	NA	8,400	NA	NA	NA
Formaldehyde	<20,000	NA	NA	4,200	NA	NA	NA
Hexanal	<20,000	NA	NA	<4,000	NA	NA	NA
m-Tolualdehyde	<20,000	NA	NA	<4,000	NA	NA	NA
Paraldehyde	980	NA	NA	<45	NA	NA	NA
Pentanal	<20,000	NA	NA	<4,000	NA	NA	NA
Propanal	<20,000	NA	NA	<4,000	NA	NA	NA
Pest/PCB							
Aldrin	NA	NA	NA	NA	<23 J	NA	43 J
Aroclor 1242	NA	NA	NA	NA	<460	NA	<320
BHC (Lindane) (gamma)	NA	NA	NA	NA	120 J	NA	<16
Chlordane (alpha)	NA	NA	NA	NA	11 J	NA	<16 J
Chlordane (gamma)	NA	NA	NA	NA	50 J	NA	8.0 J
Endrin	NA	NA	NA	NA	<46	NA	57 J
Heptachlor epoxide	NA	NA	NA	NA	25 J	NA	<16 J
Methoxychlor	NA	NA	NA	NA	29 J	NA	<160
Acetic Acid	NA	18,000,000	NA	11,000	NA	NA	NA
Total Organic Carbon	NA	520,000,000	NA	110,000,000	NA	NA	NA
Total Solids	NA	NA	NA	NA	NA	NA	NA
Percent Solids	58	NA	NA	55	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
VOC							
1,1,2,2-Tetrachloroethane	NA	<25	NA	<1,000	NA	NA	<5
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	<25	<25	<500	NA	NA	<5
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	<25	<25	45 J	NA	NA	52
2-Hexanone	NA	<25	<25	<1,000	NA	NA	6 J
4-Methyl-2-pentanone (MIBK)	NA	<25	<25	<1,000	NA	NA	<10
Acetone	NA	230	220	<1,000	NA	NA	66
Benzene	NA	17 J	28	<500	NA	NA	<5
Carbon disulfide	NA	16 J	<25	<500	NA	NA	<5
Chlorobenzene	NA	<25	<25	<500	NA	NA	<5
Ethylbenzene	NA	<25	<25	<500	NA	NA	<5
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	<130 B	120	<500	NA	NA	18
Naphthalene	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	<25	<25	<500	NA	NA	<5
Toluene	NA	17 J	25	<500	NA	NA	<5

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
VOC (continued)							
Trichloroethene	NA	<25	<25	<500	NA	NA	<5
Xylene, o	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	NA	35	79	<500	NA	NA	<5
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA
SVOC							
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	240,000 J	2,400 J	NA	NA	<340	<380	NA
2-Methylnaphthalene	42,000 J	2,200 J	NA	NA	1,300	<380	NA
2-Methylphenol	310,000 J	<12,000	NA	NA	<340	<380	NA
2-Nitrophenol	<380,000	<12,000	NA	NA	<340	<380	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	400,000	1,300 J	NA	NA	1,300	<380	NA
4-Nitrophenol	<960,000	<31,000	NA	NA	<1,700	<1,800	NA
Acenaphthene	<380,000	<12,000	NA	NA	<340	<380	NA
Anthracene	<380,000	<12,000	NA	NA	<340	<380	NA
Benzo(a)anthracene	<380,000	<12,000	NA	NA	<340	<380	NA
Benzoic acid	NA	NA	NA	NA	<1,700	850 J	NA
bis(2-Ethylhexyl)phthalate	<380,000	<12,000	NA	NA	<340	1,800	NA
Chrysene	<380,000	<12,000	NA	NA	<340	<380	NA
Dibenzofuran	<380,000	<12,000	NA	NA	<340	<380	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
SVOC (continued)							
Diethylphthalate	**2,000,000**	<12,000	NA	NA	<340	<380	NA
Di-n-butylphthalate	<380,000	<12,000	NA	NA	3,200	<380	NA
Fluoranthene	<380,000	<12,000	NA	NA	<340	<380	NA
Fluorene	<380,000	<12,000	NA	NA	<340	<380	NA
Naphthalene	26,000 J	2,000 J	NA	NA	3,700	<380	NA
Phenanthrene	<380,000	<12,000	NA	NA	<340	<380	NA
Phenol	280,000 J	1,400 J	NA	NA	<340	<380	NA
Pyrene	<380,000	<12,000	NA	NA	<340	<380	NA
Metals							
Aluminum	NA	860,000	NA	3,890,000	NA	4,100,000	NA
Aluminum in Oil	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	6,200 B	NA	3,100 BN	NA	3,600 BN	NA
Arsenic	NA	2,500 B	NA	2,500 NS	NA	1,200 BN	NA
Arsenic in Oil	NA	NA	NA	NA	NA	NA	NA
Barium	NA	291,000	NA	18,100 NS	NA	42,600 B	NA
Barium in Oil	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	<290	NA	<40	NA	120 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	540 B	NA	<30	NA	<340	NA
Cadmium in Oil	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
Metals							
Calcium	NA	98,300,000	NA	904,000 B	NA	2,080,000	NA
Chromium	NA	10,700	NA	10,300	NA	17,200	NA
Chromium in Oil	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	2,600 B	NA	3,800 B	NA	3,900 B	NA
Cobalt in Oil	NA	NA	NA	NA	NA	NA	NA
Copper	NA	546,000	NA	16,100 *	NA	54,800 *	NA
Copper in Oil	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	<280	NA	<1,000	NA	<1,100	NA
Iron	NA	6,320,000	NA	6,760,000	NA	7,600,000	NA
Iron in Oil	NA	NA	NA	NA	NA	NA	NA
Lead	NA	125,000	NA	2,000 S	NA	7,200	NA
Lead in Oil	NA	NA	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	287,000 B	NA	1,620,000	NA	2,060,000	NA
Manganese	NA	210,000 N	NA	111,000	NA	104,000 *	NA
Manganese in Oil	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	210 B	NA	<100	NA	<110	NA
Mercury in Oil	NA	NA	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Molybdenum in Oil	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	13,300 B	NA	8,400	NA	9,600	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
Metals (continued)							
Nickel in Oil	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	262000 B	NA	254,000 B	NA	453,000 B	NA
Selenium	NA	2,700	NA	500 BS	NA	<520	NA
Silver	NA	<1,700	NA	1,400 BN	NA	<960 N	NA
Sodium	NA	253,000 B	NA	59,300 B	NA	60,000 B	NA
Thallium	NA	<1,600	NA	<200 W	NA	<240	NA
Titanium	NA	NA	NA	NA	NA	NA	NA
Titanium in Oil	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	4,100 B	NA	13,600	NA	14,800	NA
Vanadium in Oil	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	96,900	NA	11,700 *E	NA	22,200 *E	NA
Zinc in Oil	NA	NA	NA	NA	NA	NA	NA
Alcohols							
1-Propanol	NA	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA
Ethylacetate	NA	NA	NA	NA	NA	NA	NA
Isobutanol	NA	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA
n-Butanol	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)	PB5		Surface Waste			
Depth	23-23.5'	8-12'	8-12'	0.5'	0.5'	0.5'	0.5'
Sample Date	06/01/97	05/16/96	05/16/96	05/04/88	05/04/88	05/04/88	05/04/88
Sample I.D.	SB1-SS2-RE	SS-12	SS-12RE	S-3	S-3 RE	S-5	S-5 RE
Type							
Aldehydes							
Acetaldehyde	NA	NA	NA	NA	NA	NA	NA
Formaldehyde	NA	NA	NA	NA	NA	NA	NA
Hexanal	NA	NA	NA	NA	NA	NA	NA
m-Tolualdehyde	NA	NA	NA	NA	NA	NA	NA
Paraldehyde	NA	NA	NA	NA	NA	NA	NA
Pentanal	NA	NA	NA	NA	NA	NA	NA
Propanal	NA	NA	NA	NA	NA	NA	NA
Pest/PCB							
Aldrin	NA	<3	NA	<82	NA	<1,800	NA
Aroclor 1242	NA	<58	NA	7,300 D	NA	48,000 D	NA
BHC (Lindane) (gamma)	NA	<5.5 P	NA	<82	NA	<1,800	NA
Chlordane (alpha)	NA	<3	NA	<820	NA	<18,000	NA
Chlordane (gamma)	NA	32	NA	<820	NA	<18,000	NA
Endrin	NA	<5.8	NA	<160	NA	<3,600	NA
Heptachlor epoxide	NA	<3	NA	<82	NA	<1,800	NA
Methoxychlor	NA	<30	NA	<820	NA	<18,000	NA
Acetic Acid	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA
Total Solids	NA	NA	NA	NA	NA	NA	NA
Percent Solids	NA	NA	NA	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
VOC					
1,1,2,2-Tetrachloroethane	<5,000	<5,000	<5,000	<130	<1,300
1,2,4-Trimethylbenzene	***160,000***	***150,000***	***210,000***	54,000 D	54,000 D
1,2-Dichloroethane	<5,000	<5,000	<5,000	<63	<630
1,3,5-Trimethylbenzene	57,000	48,000	55,000	7,000	9,900 D
2-Butanone (MEK)	NA	NA	NA	25,000	32,000 D
2-Hexanone	NA	NA	NA	12,000	<32,000
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	<3,200	<32,000
Acetone	NA	NA	NA	13,000	<63,000
Benzene	*16,000*	*16,000*	*18,000*	1,900	3,000 D
Carbon disulfide	NA	NA	NA	<320	<3,200
Chlorobenzene	<5,000	<5,000	<5,000	<63	<630
Ethylbenzene	46,000	36,000	39,000	3,300	6,000 D
Isopropylbenzene	<5,000	<5,000	<5,000	590	<1,300
Methylene chloride	<5,000	<5,000	<5,000	<320	<3,200
Naphthalene	320,000	390,000	440,000	NA	NA
n-Butylbenzene	220,000	230,000	370,000	NA	NA
n-Propylbenzene	88,000	65,000	92,000	4,400	6,400 D
p-Isopropyltoluene	140,000	170,000	250,000	NA	NA
sec-Butylbenzene	74,000	90,000	130,000	NA	NA
Styrene	NA	NA	NA	2,100	4,000 D
Toluene	64,000	38,000	42,000	6,800	12,000 D

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
VOC (continued)					
Trichloroethene	*110,000*	17,000	46,000	4,700	7,900 D
Xylene, o	***150,000***	***100,000***	***120,000***	NA	NA
Xylenes (total)	NA	NA	NA	23,000	43,000 D
Xylenes, m+p	***150,000***	***78,000***	***100,000***	NA	NA
SVOC					
1-Methylnaphthalene	100,000	65,000	56,000	NA	NA
2,4-Dimethylphenol	870,000	230,000	220,000	2,300	NA
2-Methylnaphthalene	150,000	98,000	86,000	2,200 J	NA
2-Methylphenol	1,000,000	280,000	210,000	1,800 J	NA
2-Nitrophenol	<45,000	<45,000	310,000	<8,400	NA
3-Methylphenol/4-Methylphenol(m&p-cresol)	1,100,000	310,000	230,000	1,800 J	NA
4-Methylphenol	NA	NA	NA	NA	NA
4-Nitrophenol	<48,000	<48,000	<48,000	<21,000	NA
Acenaphthene	<21,000	<21,000	<21,000	<4,100	NA
Anthracene	<36,000	<36,000	<36,000	<4,100	NA
Benzo(a)anthracene	<23,000	<23,000	<23,000	<4,100	NA
Benzoic acid	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	<36,000	<36,000	<36,000	<4,100	NA
Chrysene	<42,000	<42,000	<42,000	<4,100	NA
Dibenzofuran	NA	NA	NA	<4,100	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
SVOC (continued)					
Diethylphthalate	<34,000	<34,000	<34,000	<4,100	NA
Di-n-butylphthalate	400,000	320,000	440,000	7,600	NA
Fluoranthene	<38,000	<38,000	<38,000	<4,100	NA
Fluorene	<47,000	<47,000	<47,000	<4,100	NA
Naphthalene	270,000	290,000	260,000	5,600	NA
Phenanthrene	<35,000	<35,000	<35,000	<4,100	NA
Phenol	880,000	22,000	190,000	1,300 J	NA
Pyrene	<45,000	<45,000	<45,000	<4,100	NA
Metals					
Aluminum	NA	NA	NA	2,600,000 J	NA
Aluminum in Oil	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	560 B	NA
Arsenic	NA	NA	NA	570 J	NA
Arsenic in Oil	NA	NA	NA	NA	NA
Barium	NA	NA	NA	16,000	NA
Barium in Oil	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	100 B	NA
Beryllium in Oil	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	<32 J	NA
Cadmium in Oil	NA	NA	NA	NA	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
Metals					
Calcium	NA	NA	NA	3,300,000	NA
Chromium	NA	NA	NA	5,400	NA
Chromium in Oil	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	2,100	NA
Cobalt in Oil	NA	NA	NA	NA	NA
Copper	NA	NA	NA	160,000	NA
Copper in Oil	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA
Iron	NA	NA	NA	4,400,000	NA
Iron in Oil	NA	NA	NA	NA	NA
Lead	NA	NA	NA	4,200	NA
Lead in Oil	NA	NA	NA	NA	NA
Lithium in Oil	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	1,400,000 J	NA
Manganese	NA	NA	NA	110,000	NA
Manganese in Oil	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	11 B	NA
Mercury in Oil	NA	NA	NA	NA	NA
Molybdenum	NA	NA	NA	<6,300	NA
Molybdenum in Oil	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	5,600	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
Metals (continued)					
Nickel in Oil	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	160,000	NA
Selenium	NA	NA	NA	<250 J	NA
Silver	NA	NA	NA	<630	NA
Sodium	NA	NA	NA	260,000	NA
Thallium	NA	NA	NA	<1,300	NA
Titanium	NA	NA	NA	200,000 J	NA
Titanium in Oil	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	9,900	NA
Vanadium in Oil	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	13,000 J	NA
Zinc in Oil	NA	NA	NA	NA	NA
Alcohols					
1-Propanol	NA	NA	NA	2,200	NA
Ethanol	NA	NA	NA	2,700 J	NA
Ethylacetate	NA	NA	NA	5,800 J	NA
Isobutanol	NA	NA	NA	<5,600	NA
Isopropanol	NA	NA	NA	<5,600	NA
Methanol	NA	NA	NA	30,000 J	NA
n-Butanol	NA	NA	NA	<5,600	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Depth	2'	3'	2'	2	2
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile	Test Pit #3	Test Pit #5	TP-5A/2	TP-5A/2 - DL
Type	Tar	Tar	Tar	Tar	Tar
Aldehydes					
Acetaldehyde	NA	NA	NA	33,000	NA
Formaldehyde	NA	NA	NA	<8,000	NA
Hexanal	NA	NA	NA	17,000	NA
m-Tolualdehyde	NA	NA	NA	17,000	NA
Paraldehyde	NA	NA	NA	79	NA
Pentanal	NA	NA	NA	<8,000	NA
Propanal	NA	NA	NA	10,000	NA
Pest/PCB					
Aldrin	NA	NA	NA	NA	NA
Aroclor 1242	NA	NA	NA	NA	NA
BHC (Lindane) (gamma)	NA	NA	NA	NA	NA
Chlordane (alpha)	NA	NA	NA	NA	NA
Chlordane (gamma)	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA
Acetic Acid	NA	NA	NA	NA	NA
Total Organic Carbon	650,000,000	19,000,000	57,000,000	590,000,000	NA
Total Solids	77.4	80.9	78.8	NA	NA
Percent Solids	NA	NA	NA	86	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97	Criteria	
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Resdiential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
VOC					
1,1,2,2-Tetrachloroethane	<140	<710	<18	370,000	170
1,2,4-Trimethylbenzene	24.000 D	24,000 D	530	110,000 C, I	2,100 I
1,2-Dichloroethane	<71	<360	<18	640,000 I	100 I
1,3,5-Trimethylbenzene	5,900	5,500 D	130	94,000 C	1,800
2-Butanone (MEK)	8,700	<18,000	80,000	27,000,000 C, I, AD	260,000 I
2-Hexanone	<3,600	<18,000	1,600	2,500,000 C	20,000
4-Methyl-2-pentanone (MIBK)	<3,600	<18,000	220	2,700,000 C, I	36,000 I
Acetone	5,800 J	<36,000	63,000	110,000,000 I	15,000 I
Benzene	2,500	3,000 D	190	400,000 C, I	100 I
Carbon disulfide	<360	<1,800	<100	280,000 C, I, R, A	16,000 I, R
Chlorobenzene	<71	<360	<18	260,000 C, I	2,000 I
Ethylbenzene	7,800	9,300 D	140	140,000 C, I	1,500 I
Isopropylbenzene	660	580 JD	<18	390,000 C	91,000
Methylene chloride	<360	<1,800	<18	2,300,000 C	100
Naphthalene	NA	NA	790	80,000,000	35,000
n-Butylbenzene	NA	NA	NA	10,000,000 C	1,600
n-Propylbenzene	4,100	3,700 D	65	10,000,000 C, I	1,600 I
p-Isopropyltoluene	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	10,000,000 C	1,600
Styrene	2,500	3,000 D	120	520,000 C	2,700
Toluene	17,000 D	17,000 D	480	250,000 C, I	16,000 I

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97	Criteria	
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial Direct Contact	Resdiential Drinking Water Protection
Type	Organic/Wood	Organic/Wood	Tar		
VOC (continued)					
Trichloroethene	22,000 D	22,000 D	89,000	500,000 C	100
Xylene, o	NA	NA	NA	150,000 C, I, J	5,600 I, J
Xylenes (total)	47,000 D	47,000 D	950	150,000 C, I	5,600 I
Xylenes, m+p	NA	NA	NA	150,000 C, I, J	5,600 I, J
SVOC					
1-Methylnaphthalene	NA	NA	NA	NA	NA
2,4-Dimethylphenol	590,000	NA	490,000	56,000,000	7,400
2-Methylnaphthalene	150,000	NA	200	40,000,000	57,000
2-Methylphenol	560,000	NA	450,000	56,000,000 J	7,400 J
2-Nitrophenol	<90,000	NA	<71,000	3,100,000	400
3-Methylphenol/4-Methylphenol(m&p-cresol)	580,000	NA	480,000	56,000,000 J	7,400 J
4-Methylphenol	NA	NA	NA	56,000,000 J	7,400 J
4-Nitrophenol	<230,000	NA	<290,000	NA	NA
Acenaphthene	<44,000	NA	<15,000	200,000,000	300,000
Anthracene	<44,000	NA	<15,000	1,000,000,000 D	41,000
Benzo(a)anthracene	<44,000	NA	<15,000	100,000 Q	NLL
Benzoic acid	NA	NA	NA	1,000,000,000 D	640,000
bis(2-Ethylhexyl)phthalate	<44,000	NA	<71,000	10,000,000 C	NLL
Chrysene	<44,000	NA	<15,000	10,000,000 Q	NLL
Dibenzofuran	56,000	NA	NA	ID	ID

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97	Criteria	
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Resdiential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
SVOC (continued)					
Diethylphthalate	<44,000	NA	<71,000	740,000 C	110,000
Di-n-butylphthalate	<44,000	NA	270,000	760,000 C	760,000 C
Fluoranthene	<44,000	NA	<15,000	180,000,000	730,000
Fluorene	<44,000	NA	22,000	130,000,000	390,000
Naphthalene	77,000	NA	320,000	80,000,000	35,000
Phenanthrene	<44,000	NA	<15,000	8,000,000	56,000
Phenol	300,000	NA	480,000	12,000,000 C, AD	88,000
Pyrene	<44,000	NA	<15,000	110,000,000	480,000
Metals					
Aluminum	2,400,000	NA	NA	660,000,000 B, AD	1,000 B
Aluminum in Oil	NA	NA	430,000	660,000,000 B, AD	1,000 B
Antimony	690 B	NA	NA	1,200,000	500 M
Arsenic	830 J	NA	NA	61,000 B	23,000 B
Arsenic in Oil	NA	NA	560	61,000 B	23,000 B
Barium	34,000	NA	NA	250,000,000	1,300,000
Barium in Oil	NA	NA	14,000	250,000,000	1,300,000
Beryllium	77 B	NA	NA	3,100,000	51,000
Beryllium in Oil	NA	NA	K200	3,100,000	51,000
Cadmium	110 J	NA	NA	4,100,000 B	6,000 B
Cadmium in Oil	NA	NA	K4,000	4,100,000 B	6,000 B

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97	Criteria	
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Resdiential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
Metals					
Calcium	6,400,000	NA	NA	NA	NA
Chromium	8,900	NA	NA	17,000,000 Hexavalent	30,000 Hexavalent
Chromium in Oil	NA	NA	K2,000	17,000,000 Hexavalent	30,000 Hexavalent
Cobalt	2,000	NA	NA	18,000,000	800
Cobalt in Oil	NA	NA	K10,000	18,000,000	800
Copper	240,000	NA	NA	140,000,000	5,800,000
Copper in Oil	NA	NA	303,000	140,000,000	5,800,000
Cyanide	NA	NA	6,000	250,000 P, R	4,000 P, R
Iron	5,800,000	NA	NA	1,000,000,000 B, D	6,000 B
Iron in Oil	NA	NA	940,000	1,000,000,000 B, D	6,000 B
Lead	17,000	NA	NA	900,000 DRAFT	700,000
Lead in Oil	NA	NA	K10,000	900,000 DRAFT	700,000
Lithium in Oil	NA	NA	K4,000	56,000,000 B, AD	3,400 B
Magnesium	1,400,000 J	NA	NA	1,000,000,000 B, D	8,000,000 B
Manganese	160,000	NA	NA	170,000,000 B	1,000 B
Manganese in Oil	NA	NA	78,000	170,000,000 B	1,000 B
Mercury	45 B	NA	NA	1,100,000 INO	1,700 INO
Mercury in Oil	NA	NA	K1,000 DM	1,100,000 INO	1,700 INO
Molybdenum	370 B	NA	NA	18,000,000 B	740 B
Molybdenum in Oil	NA	NA	K5,000	18,000,000 B	740 B
Nickel	5,100	NA	NA	270,000,000 B	100,000 B

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste	Criteria	
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97		
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial	Resdiential Drinking
Type	Organic/Wood	Organic/Wood	Tar	Direct Contact	Water Protection
Metals (continued)					
Nickel in Oil	NA	NA	K10,000	270,000,000 B	100,000 B
Potassium	180,000	NA	NA	NA	NA
Selenium	<1,400 J	NA	NA	18,000,000 B	4,000 B
Silver	<650	NA	NA	17,000,000 B	4,500 B
Sodium	210,000	NA	NA	1,000,000,000 D	2,500,000
Thallium	580 B	NA	NA	240,000 B	2,300 B
Titanium	270,000 N	NA	NA	NA	NA
Titanium in Oil	NA	NA	34,000	NA	NA
Vanadium	14,000	NA	NA	10,000,000	72,000
Vanadium in Oil	NA	NA	2,400	10,000,000	72,000
Zinc	39,000 J	NA	NA	1,000,000,000 B, D	2,400,000 B
Zinc in Oil	NA	NA	20,000	1,000,000,000 B, D	2,400,000 B
Alcohols					
1-Propanol	<1,400	NA	NA	NA	NA
Ethanol	<6,300	NA	NA	110,000,000 C, I, AD	38,000,000 I
Ethylacetate	1,200 J	NA	NA	7,500,000 C, I	130,000 I
Isobutanol	<6,300	NA	NA	8,900,000 C, I	46,000 I
Isopropanol	<6,300	NA	NA	72,000,000 I	9,400 I
Methanol	5,400 J	NA	NA	3,100,000 C	74,000
n-Butanol	<6,300	NA	NA	8,700,000 C, I	19,000 I

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		Surface Waste		
Depth	12	12			
Sample Date	11/03/99	11/03/99	05/17/97	Criteria	
Sample I.D.	TP-10/12	TP-10/12 - DL	Waste 1	Industrial Direct Contact	Resdiential Drinking Water Protection
Type	Organic/Wood	Organic/Wood	Tar		
Aldehydes					
Acetaldehyde	29,000	NA	NA	110,000,000 C, I	19,000 I
Formaldehyde	<8,000	NA	NA	60,000,000 C	26,000
Hexanal	<8,000	NA	NA	NA	NA
m-Tolualdehyde	<8,000	NA	NA	NA	NA
Paraldehyde	<25	NA	NA	NA	NA
Pentanal	<8,000	NA	NA	NA	NA
Propanal	<8,000	NA	NA	NA	NA
Pest/PCB					
Aldrin	NA	NA	NA	5,900	NLL
Aroclor 1242	NA	NA	<0.33	T	NLL, J, T
BHC (Lindane) (gamma)	NA	NA	NA	73,000	20 M
Chlordane (alpha)	NA	NA	NA	240,000 J	NLL
Chlordane (gamma)	NA	NA	NA	240,000 J	NLL
Endrin	NA	NA	NA	260,000	NLL
Heptachlor epoxide	NA	NA	NA	13,000	NLL
Methoxychlor	NA	NA	NA	7,700,000	16,000
Acetic Acid	NA	NA	NA	640,000,000	900,000 M
Total Organic Carbon	760,000,000	NA	NA	NA	NA
Total Solids	NA	NA	57	NA	NA
Percent Solids	75	NA	NA	NA	NA

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface water Interface Protection
VOC			
1,1,2,2-Tetrachloroethane	23,000	34,000	1,600 X
1,2,4-Trimethylbenzene	110,000 C, I	25,000,000 I	ID
1,2-Dichloroethane	11,000 I	21,000 I	7,200 I, X
1,3,5-Trimethylbenzene	94,000 C	19,000,000 I	ID
2-Butanone (MEK)	27,000,000 C, I	35,000,000 I	44,000 I
2-Hexanone	1,800,000	1,300,000	NA
4-Methyl-2-pentanone (MIBK)	2,700,000 C, I	53,000,000 I	ID
Acetone	110,000,000 C, I	160,000,000 I	34,000 I
Benzene	8,400 I	45,000 I	4,000 I, X
Carbon disulfide	140,000 I, R	1,600,000 I, R	ID
Chlorobenzene	220,000 I	920,000 I	940 I
Ethylbenzene	140,000 C, I	11,000,000 I	360 I
Isopropylbenzene	390,000 C	2,000,000	ID
Methylene chloride	240,000	700,000	19,000 X
Naphthalene	470,000	350,000	870
n-Butylbenzene	ID	ID	NA
n-Propylbenzene	ID	ID	NA
p-Isopropyltoluene	NA	NA	NA
sec-Butylbenzene	ID	ID	NA
Styrene	520,000 C	3,300,000	2,200
Toluene	250,000 C, I	3,300,000 I	2,800 I

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface water Interface Protection
VOC (continued)			
Trichloroethene	37,000	260,000	4,000 X
Xylene, o	150,000 C, I, J	54,000,000 I, J	700 I, J
Xylenes (total)	150,000 C, I	54,000,000	700 I
Xylenes, m+p	150,000 C, I, J	54,000,000 I, J	700 I, J
SVOC			
1-Methylnaphthalene	NA	NA	NA
2,4-Dimethylphenol	NLV	NLV	7,600
2-Methylnaphthalene	ID	ID	ID
2-Methylphenol	NLV	NLV	1,400 J
2-Nitrophenol	NLV	NLV	ID
3-Methylphenol/4-Methylphenol(m&p-cresol)	NLV	NLV	1,400 J
4-Methylphenol	NLV	NLV	1,400 J
4-Nitrophenol	NA	NA	NA
Acenaphthene	350,000,000	97,000,000	4,400
Anthracene	1,000,000,000 D	1,600,000,000	ID
Benzo(a)anthracene	NLV	NLV	NLL
Benzoic acid	NLV	NLV	NA
bis(2-Ethylhexyl)phthalate	NLV	NLV	NLL
Chrysene	ID	ID	NLL
Dibenzofuran	ID	ID	1,700

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Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface water Interface Protection
SVOC (continued)			
Diethylphthalate	NLV	NLV	NA
Di-n-butylphthalate	NLV	NLV	11,000
Fluoranthene	1,000,000,000 D	890,000,000	5,500
Fluorene	1,000,000,000 D	150,000,000	5,300
Naphthalene	470,000	350,000	870
Phenanthrene	3,300,000	11,000	2,300
Phenol	NLV	NLV	4,200
Pyrene	1,000,000,000 D	780,000,000	ID
Metals			
Aluminum	NLV	NLV	NA
Aluminum in Oil	NLV	NLV	NA
Antimony	NLV	NLV	ID
Arsenic	NLV	NLV	70,000 B, X
Arsenic in Oil	NLV	NLV	70,000 B, X
Barium	NLV	NLV	G,X
Barium in Oil	NLV	NLV	G,X
Beryllium	NLV	NLV	G
Beryllium in Oil	NLV	NLV	G
Cadmium	NLV	NLV	B, GX
Cadmium in Oil	NLV	NLV	B, GX

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface water Interface Protection
Metals			
Calcium	NA	NA	NA
Chromium	NLV	NLV	3,300 Hexavalent
Chromium in Oil	NLV	NLV	3,300 Hexavalent
Cobalt	NLV	NLV	2,000
Cobalt in Oil	NLV	NLV	2,000
Copper	NLV	NLV	G
Copper in Oil	NLV	NLV	G
Cyanide	NLV	NLV	400 P, R
Iron	NLV	NLV	NA
Iron in Oil	NLV	NLV	NA
Lead	NLV	NLV	G, M, X
Lead in Oil	NLV	NLV	G, M, X
Lithium in Oil	NLV	NLV	500 B
Magnesium	NLV	NLV	NA
Manganese	NLV	NLV	B, G, X
Manganese in Oil	NLV	NLV	B, G, X
Mercury	NLV	NLV	100 M, INO
Mercury in Oil	NLV	NLV	100 M, INO
Molybdenum	NLV	NLV	16,000 B, X
Molybdenum in Oil	NLV	NLV	16,000 B, X
Nickel	NLV	NLV	B, G

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued)		
	Industrial Indoor-Inhalation	Industrial Ambient Air Source VSIC	Groundwater Surface water Interface Protection
Metals (continued)			
Nickel in Oil	NLV	NLV	B, G
Potassium	NA	NA	NA
Selenium	NLV	NLV	400 B
Silver	NLV	NLV	500 B, M
Sodium	NLV	NLV	NA
Thallium	NLV	NLV	4,200 B, X
Titanium	NA	NA	NA
Titanium in Oil	NA	NA	NA
Vanadium	NLV	NLV	190,000
Vanadium in Oil	NLV	NLV	190,000
Zinc	NLV	NLV	B, G
Zinc in Oil	NLV	NLV	B, G
Alcohols			
1-Propanol	NA	NA	NA
Ethanol	NLV	NLV	IP
Ethylacetate	7,500,000 C, I	59,000,000 I	NA
Isobutanol	8,900,000 C, I	95,000,000 I	NA
Isopropanol	NLV	NLV	NA
Methanol	1,200,000	37,000,000	9,600
n-Butanol	NLV	NLV	NA

Footnotes on Page 43.

Table 5. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D. Type	Criteria (continued) Industrial Indoor-Inhalation	 Industrial Ambient Air Source VSIC	 Groundwater Surface water Interface Protection
Aldehydes			
Acetaldehyde	400,000 I	210,000 I	NA
Formaldehyde	65,000	43,000	2,400
Hexanal	NA	NA	NA
m-Tolualdehyde	NA	NA	NA
Paraldehyde	NA	NA	NA
Pentanal	NA	NA	NA
Propanal	NA	NA	NA
Pest/PCB			
Aldrin	7,100,000	200,000	NLL
Aroclor 1242	16,000,000 J,T	810,000 J, T	NLL
BHC (Lindane) (gamma)	ID	ID	20 M
Chlordane (alpha)	59,000,000 J	4,200,000 J	NLL
Chlordane (gamma)	59,000,000 J	4,200,000 J	NLL
Endrin	NLV	NLV	NLL
Heptachlor epoxide	NLV	NLV	NLL
Methoxychlor	ID	ID	NA
Acetic Acid	NLV	NLV	900,000 M
Total Organic Carbon	NA	NA	NA
Total Solids	NA	NA	NA
Percent Solids	NA	NA	NA

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All results are in micrograms per kilogram (µg/kg).

Bold	Value above Commercial Direct Contact Criteria (Operational Memorandum #18, June 6, 2000).
Italics	Value above Commercial Indoor Inhalation Criteria (Operational Memorandum #18, June 6, 2000).
▨	Value above Residential Drinking Water Protection Criteria (Operational Memorandum #18, June 6, 2000).
□	Value above Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, June 6, 2000).
underline	Value above Groundwater Surface Water Interface Protection Criteria (Operational Memorandum #18, June 6, 2000).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
+	"+ Correlation coefficient for method of standard addition was not within control limits.
B	Constituent was also detected in laboratory blank.
D	Result was obtained from analysis of a dilution.
DL	Dilution.
E	Analyte was detected at a concentration greater than the calibration range, and is therefore estimated.
J	Estimated result.
MBB	This analyte is present at a reportable level in the associated method blank but is less than 5 percent of the sample amount.
MBD	This analyte is present in the associated method blank at an amount that is less than two times the reporting limit.
N	Spike sample recovery is not within control limits.
NA	Not analyzed.
P	Greater than 25% RPD between two columns for pesticide or PCB
R	Rejected result.
RE	Re-extraction.
S	Value was determined by the Method of Standard Additions.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile organic compounds.
W	Post-digestion spike for furnace A-A analysis is out of control limits while sample absorbance is less than 50% of spike absorbance.

Criteria Footnotes:

AD	Substance causes developmental effects. Residential and Commercial I direct contact criteria are protective of both prenatal and

Table 6. Summary of Constituents Detected in Waste Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	postnatal exposure.
B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
G	GSI criterion is hardness dependent.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
INO	Inorgranic.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
NE	Not established.
NLL	Chemical is not likely to leach under most soil conditions.
NLV	Chemical is not likely to volatilize under most soil conditions.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
Q	Criterion for carcinogenic polycyclic aromatic hydrocarbons (PAHs) were developed using "relative potential potenicies" (RPPs) to benzo(a)pyrene.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
P	Amenable or Method OIA-1677 analysis are used to quanitfy cyanide concentrations for compliance with all groundwater criteria.
T	Refer to Toxic Substances Control Act (TSCA), 40 CFR 761, Subparts D and G, as ammended
X	The GSI criterion is not protective for surface water that is used as a drinking water source.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Depth	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Date	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Sample I.D.	35-45'	65'	90'	115'	140'	170'	202'	237'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	24 J	NA	67	190	<56	9.3 J	NA	8.1 J
2-Hexanone	<55	NA	<55	<120	<56	<62	NA	<58
4-Methyl-2-pentanone (MIBK)	<55	NA	<55	<120	<56	<62	NA	<58
Acetone	19 J	NA	56	220	<56	<62	NA	8.5 J
Benzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Carbon disulfide	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Chlorobenzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Ethylbenzene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Methylene chloride	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Toluene	<5.5	NA	<5.5	10 J	<5.6	<6.2	NA	<5.8
Trichloroethene	<5.5	NA	<5.5	<12	<5.6	<6.2	NA	<5.8
Xylenes (total)	<5.5	NA	2.3 J	8.5 J	<5.6	<6.2	NA	<5.8
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	1,600	440	400	670	<180	<200	NA	<190
2-Methylnaphthalene	170 J	<200	72 J	<390	<180	<200	NA	<190
2-Methylphenol	970	400	320	2,000	<180	<200	NA	<190
4-Methylphenol	1,800	2,400	1,400	3,400	<180	<200	NA	<190

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Depth	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Date	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Sample I.D.	35-45'	65'	90'	115'	140'	170'	202'	237'
SVOC (continued)								
bis(2-Ethylhexyl)phthalate	<180	<200	<180	<390	52 J	<200	NA	<190
Butylbenzylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Dibenzofuran	<180	<200	<180	<390	<180	<200	NA	<190
Diethylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Di-n-butylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Di-n-octylphthalate	<180	<200	<180	<390	<180	<200	NA	<190
Fluoranthene	<180	<200	<180	<390	<180	<200	NA	<190
Fluorene	<180	<200	<180	<390	<180	<200	NA	<190
Naphthalene	110 J	97 J	330	<390	<180	<200	NA	<190
Phenanthrene	<180	<200	<180	<390	<180	<200	NA	<190
Phenol	1,100	1,000	570	5,500	<180	<200	NA	<190
Pyrene	<180	<200	<180	<390	<180	<200	NA	<190
Metals								
Aluminum	2,660,000	NA	NA	NA	NA	NA	NA	NA
Antimony	497	NA	NA	NA	NA	NA	NA	NA
Arsenic	727	NA	NA	NA	NA	NA	NA	NA
Barium	31,300	NA	NA	NA	NA	NA	NA	NA
Beryllium	<551	NA	NA	NA	NA	NA	NA	NA
Cadmium	<27.5 Wa	NA	NA	NA	NA	NA	NA	NA
Calcium	1,700,000	NA	NA	NA	NA	NA	NA	NA
Chromium	6,490	NA	NA	NA	NA	NA	NA	NA
Cobalt	<5,510	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1							
Depth	05/16/97	05/16/97	05/16/97	05/17/97	05/17/97	05/17/97	05/18/97	05/19/97
Sample Date	GMSB-1/35-45	GMSB-1/65	GMSB-1/90	GMSB-1/115	GMSB-1/140	GMSB-1/170	GMSB-1/202	GMSB-1/237
Sample I.D.	35-45'	65'	90'	115'	140'	170'	202'	237'
Metals (continued)								
Copper	139,000	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA
Iron	4,150,000	NA	NA	NA	NA	NA	NA	NA
Lead	6,900	NA	NA	NA	NA	NA	NA	NA
Magnesium	1,470,000	NA	NA	NA	NA	NA	NA	NA
Manganese	40,500	NA	NA	NA	NA	NA	NA	NA
Mercury	<55.1	NA	NA	NA	NA	NA	NA	NA
Nickel	5,660	NA	NA	NA	NA	NA	NA	NA
Potassium	<551,000	NA	NA	NA	NA	NA	NA	NA
Selenium	<275	NA	NA	NA	NA	NA	NA	NA
Silver	<275	NA	NA	NA	NA	NA	NA	NA
Sodium	<551,000	NA	NA	NA	NA	NA	NA	NA
Vanadium	10,300	NA	NA	NA	NA	NA	NA	NA
Zinc	8,600 MBD	NA	NA	NA	NA	NA	NA	NA
Pest/PCB								
Chlordane (gamma)	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	<3.6 J	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	<1.9 J	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	1,200,000	910,000	1,400,000	3,900,000	860,000	5,100,000	840,000	580,000

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Depth	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Date	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Sample I.D.	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	<12	<11	3 J	<56
2-Butanone (MEK)	NA	NA	<55	NA	100	22	12	600
2-Hexanone	NA	NA	<55	NA	17	<11	<12	74
4-Methyl-2-pentanone (MIBK)	NA	NA	<55	NA	5 J	<11	<12	<56
Acetone	NA	NA	<55	NA	<85 J	<61 J	<58 J	<570 J
Benzene	NA	NA	<5.5	NA	5 J	<11	2 J	<56
Carbon disulfide	NA	NA	<5.5	NA	<12 J	<11	17	<56
Chlorobenzene	NA	NA	<5.5	NA	<12	<11	<12	<56
Ethylbenzene	NA	NA	<5.5	NA	4 J	<11	4 J	<56
Methylene chloride	NA	NA	<5.5	NA	<12 J	<11 J	<12 J	<56 J
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	<5.5	NA	<12	11	<12	<56
Toluene	NA	NA	<5.5	NA	<12 J	<11	<12	<56
Trichloroethene	NA	NA	<5.5	NA	<12	<11	<12	<56
Xylenes (total)	NA	NA	<5.5	NA	24	<11	22	<56
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	NA	NA	<180	NA	1,300	220 J	670	1,200
2-Methylnaphthalene	NA	NA	<180	NA	160 J	220 J	76 J	68 J
2-Methylphenol	NA	NA	<180	NA	700	<370	86 J	290 J
4-Methylphenol	NA	NA	<180	NA	1,300	120 J	410	3,200

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Depth	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Date	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Sample I.D.	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
SVOC (continued)								
bis(2-Ethylhexyl)phthalate	NA	NA	<180	NA	20 J	510	24 J	<370
Butylbenzylphthalate	NA	NA	<180	NA	<380	<370	<400	<370
Dibenzofuran	NA	NA	<180	NA	<380	<370	<400	<370
Diethylphthalate	NA	NA	<180	NA	<380	<370	<400	<370
Di-n-butylphthalate	NA	NA	<180	NA	21 J	21 J	21 J	25 J
Di-n-octylphthalate	NA	NA	<180	NA	42 J	220 J	33 J	<370
Fluoranthene	NA	NA	<180	NA	<380	<370	<400	<370
Fluorene	NA	NA	<180	NA	<380	<370	21 J	<370
Naphthalene	NA	NA	<180	NA	100 J	46 J	110 J	160 J
Phenanthrene	NA	NA	<180	NA	<380	<370	<400	<370
Phenol	NA	NA	<180	NA	780	24 J	56 J	1400
Pyrene	NA	NA	<180	NA	<380	<370	<400	<370
Metals								
Aluminum	NA	NA	NA	NA	1,560,000 J	2,540,000 J	1,570,000 J	3,230,000 J
Antimony	NA	NA	NA	NA	R	R	R	R
Arsenic	NA	NA	NA	NA	<500	800	<500	2,600
Barium	NA	NA	NA	NA	33,200	11,000	10,500	14,500
Beryllium	NA	NA	NA	NA	40	70	70	200
Cadmium	NA	NA	NA	NA	<300	1000	<300	<300
Calcium	NA	NA	NA	NA	823,000	932,000	685,000	16,800,000
Chromium	NA	NA	NA	NA	4,500	7,500	3,600	7,000
Cobalt	NA	NA	NA	NA	1,500	5,300	1,500	5,400

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)							
Depth	05/19/97	05/20/97	05/20/97	05/16/97	06/01/97	06/01/97	06/01/97	06/01/97
Sample Date	GMSB-1/262	GMSB-1/287	GMSB-1/312	GMSB-1/65 DUP	SB1-SS3	SB1-SS4	SB1-SS5	SB1-SS6
Sample I.D.	262'	287'	312'	65'	35-37'	47-48'	54-55'	80-81'
Metals (continued)								
Copper	NA	NA	NA	NA	99,900 J	178,000 J	22,400 J	11,000 J
Cyanide	NA	NA	NA	NA	100 J	80 J	80 J	100 J
Iron	NA	NA	NA	NA	2,390,000	4,380,000	3,630,000	8,670,000
Lead	NA	NA	NA	NA	5,700 J	16,400 J	2,300 J	3,000 J
Magnesium	NA	NA	NA	NA	903,000 J	1,500,000 J	813,000 J	9,920,000 J
Manganese	NA	NA	NA	NA	26,400	42,600	34,900	160,000
Mercury	NA	NA	NA	NA	<60	<60	<60	<50
Nickel	NA	NA	NA	NA	3,500	12,800	4,700	7,800
Potassium	NA	NA	NA	NA	315,000 J	385,000 J	323,000 J	484,000 J
Selenium	NA	NA	NA	NA	<500	<500	<600	<500
Silver	NA	NA	NA	NA	<200	<200	<200	<200
Sodium	NA	NA	NA	NA	99,100	100,000	78,100	162,000
Vanadium	NA	NA	NA	NA	5,400	6,200	5,800	14,600
Zinc	NA	NA	NA	NA	9,500	18,700	11,100	13,000
Pest/PCB								
Chlordane (gamma)	NA	NA	NA	NA	<1.9 J	<1.9 J	1.5 J	<16 J
Endosulfan I	NA	NA	NA	NA	<1.9	<1.9	<2.0	<16
Endosulfan II	NA	NA	NA	NA	<3.8 J	<3.7 J	1.0 J	<30 J
Heptachlor epoxide	NA	NA	NA	NA	<1.9 J	<1.9 J	0.860 J	<16 J
Total Organic Carbon	390,000	730,000	640,000	910,000	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Depth	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Date	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Sample I.D.	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	<10	<10	NA	NA
1,2-Dichloroethene (total)	<62	NA	<12	<11	<10	<10	<11	<11
2-Butanone (MEK)	740	NA	38	76	<100	<100	<11	<11
2-Hexanone	86	NA	<12	9 J	<100	<100	<11	<11
4-Methyl-2-pentanone (MIBK)	<62	NA	<12	<11	<100	<100	<11	<11
Acetone	1,200 J	NA	<72 J	<84 J	<100	<100	9 J	21
Benzene	<62	NA	<12	<11	<10	<10	<11	<11
Carbon disulfide	<62 J	NA	<12	<11	<100	<100	<11	<11
Chlorobenzene	<62	NA	<12	<11	<10	<10	<11	<11
Ethylbenzene	13 J	NA	<12	<11	<10	58	<11	<11
Methylene chloride	<62 J	NA	<12 J	<23 J	R	R	<29 B	<30 B
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	8 J	NA	<12	<11	<10	<10	<11	<11
Toluene	<62	NA	<12	<11	<10	80	<11	<11
Trichloroethene	<62	NA	<12	<11	<10	<10	<11	<11
Xylenes (total)	<62	NA	<12	<11	<30	400	<11	<11
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	1,100	1,100 J	150 J	84 J	<330	12,000	<350	<350
2-Methylnaphthalene	22 J	<1,200	<410	<360	<330	<7,300 *	<350	<350
2-Methylphenol	1,900	2,000	100 J	86 J	<330	8,000	<350	<350
4-Methylphenol	3,500	3,500	440	500	<330	9,400	<350	<350

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Depth	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Date	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Sample I.D.	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
SVOC (continued)								
bis(2-Ethylhexyl)phthalate	<410	<1,200	<410	<360	<330	<7,300 *	670 B	<350
Butylbenzylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Dibenzofuran	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Diethylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Di-n-butylphthalate	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Di-n-octylphthalate	<410	<1,200	<410	<360	<330	<18,000 *	<350	<350
Fluoranthene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Fluorene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Naphthalene	<410	<1,200	43 J	<360	<330	12,000	<350	<350
Phenanthrene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Phenol	4,100	4,400	150 J	230 J	<330	<7,300 *	<350	<350
Pyrene	<410	<1,200	<410	<360	<330	<7,300 *	<350	<350
Metals								
Aluminum	14,300,000 J	NA	13,200,000 J	1,980,000 J	NA	NA	3,450,000	NA
Antimony	R	NA	R	R	NA	NA	<2,500	NA
Arsenic	2,600	NA	3,000	5800 J	NA	NA	1,100 B	NA
Barium	73,800	NA	83,000	9,000	17,000	27,000	11,100 B	NA
Beryllium	600	NA	600	90	NA	NA	<120	NA
Cadmium	<300	NA	<300	<200	NA	NA	<180	NA
Calcium	28,700,000	NA	28,200,000	20,900,000	NA	NA	1,540,000	NA
Chromium	23,500	NA	23,000	4,000	3,100	8,900	10,800	NA
Cobalt	8,600	NA	9,600	2,400	NA	NA	4,200 B	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1 (continued)				MW-96-3		PB2	
Depth	06/01/97	06/01/97	06/01/97	06/01/97	06/12/96	06/12/96	05/16/96	05/15/96
Sample Date	SB1-SS7	SB1-SS7-RE	SB1-SS8	SB1-SS9	MW-96-3 (20-22')	MW-96-3 (4-6')	SS-3	SS-4
Sample I.D.	122-123'	122-123'	172-173'	235-236'	20-22'	04-6'	8-12'	12-16'
Metals (continued)								
Copper	32,200 J	NA	30,900 J	10,900	15,000	28,000	18,200	NA
Cyanide	100 J	NA	<40	100 J	NA	NA	180 B	NA
Iron	20,500,000	NA	20,500,000	6,010,000	NA	NA	7,240,000	NA
Lead	5,200 J	NA	6,000 J	1,600 J	4,200	8,200	2,100	NA
Magnesium	17200000 J	NA	15,400,000 J	11,100,000	NA	NA	2,160,000	NA
Manganese	368,000	NA	635,000	143,000	NA	NA	76,200 N	NA
Mercury	<60	NA	<60	<50	NA	NA	60 B	NA
Nickel	21,500	NA	23,000	6,600	NA	NA	121,000	NA
Potassium	2,310,000 J	NA	2,340,000 J	221,000	NA	NA	309,000 B	NA
Selenium	<600	NA	<600	<500 J	NA	NA	<610	NA
Silver	200	NA	400	<200	NA	NA	<670	NA
Sodium	509,000	NA	329,000	92,300	NA	NA	65,300 B	NA
Vanadium	41,500	NA	39,700	11,700	NA	NA	13,800	NA
Zinc	34,600	NA	38,700	11,200	2,500	30,000	12,200	NA
Pest/PCB								
Chlordane (gamma)	<2.1 J	NA	<2.1 J	<1.8 J	NA	NA	<1.8	<1.8
Endosulfan I	<2.1	NA	<2.1	<1.8	NA	NA	<1.8	<1.8
Endosulfan II	<4.1 J	NA	<4.1 J	<3.6 J	NA	NA	<3.5	<3.5
Heptachlor epoxide	<2.1 J	NA	<2.1 J	<1.8 J	NA	NA	<1.8	<1.8
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB-22				
Depth	05/16/96	05/16/96	05/16/96	05/16/96	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SS-4	SS-5	PB2	SS-13	SB-22 (40')	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')
Sample I.D.	12-16'	24-28'	24-28'	12-16'	40'	50'	60'	75'	90'
VOC									
1,2,4-Trimethylbenzene	NA	NA	<1.1	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	<11	NA	<12	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	<11	8.9	<12	NA	NA	NA	NA	NA
2-Hexanone	NA	<11	1.2 J	<12	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	<11	<2.2	<12	NA	NA	NA	NA	NA
Acetone	NA	37	25	15	NA	NA	NA	NA	NA
Benzene	NA	<11	<1.1	<12	ND	ND	ND	ND	ND
Carbon disulfide	NA	4 J	29	1 J	NA	NA	NA	NA	NA
Chlorobenzene	NA	<11	<1.1	<12	ND	ND	ND	ND	ND
Ethylbenzene	NA	<11	<1.1	<12	ND	ND	ND	ND	ND
Methylene chloride	NA	<39 B	<1.1	<34 B	ND	ND	ND	ND	ND
Naphthalene	NA	NA	8.1	NA	NA	NA	NA	NA	NA
Styrene	NA	<11	<1.1	<12	NA	NA	NA	NA	NA
Toluene	NA	<11	<1.1	2 J	ND	ND	ND	ND	ND
Trichloroethene	NA	<11	<1.1	<12	ND	ND	ND	ND	ND
Xylenes (total)	NA	<11	NA	7 J	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	0.4 J	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	<350	<360	560 J	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	<350	98 J	880 J	NA	NA	NA	NA	NA
2-Methylphenol	NA	<350	<360	<1,900	NA	NA	NA	NA	NA
4-Methylphenol	NA	<350	<360	430 J	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB-22				
Depth	05/16/96	05/16/96	05/16/96	05/16/96	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SS-4	SS-5	PB2	SS-13	SB-22 (40')	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')
Sample I.D.	12-16'	24-28'	24-28'	12-16'	40'	50'	60'	75'	90'
SVOC (continued)									
bis(2-Ethylhexyl)phthalate	NA	<350	65 JB	<1900	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	<350	150 J	<1900	NA	NA	NA	NA	NA
Dibenzofuran	NA	<350	34 J	250 J	NA	NA	NA	NA	NA
Diethylphthalate	NA	<350	200 JB	<1900	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	<350	1400 B	<1900	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	<350	<360	<1900	NA	NA	NA	NA	NA
Fluoranthene	NA	<350	<360	<1900	NA	NA	NA	NA	NA
Fluorene	NA	<350	<360	250 J	NA	NA	NA	NA	NA
Naphthalene	NA	<350	58 J	450 J	NA	NA	NA	NA	NA
Phenanthrene	NA	<350	<360	<1900	NA	NA	NA	NA	NA
Phenol	NA	<350	<360	<1900	NA	NA	NA	NA	NA
Pyrene	NA	<350	<360	<1900	NA	NA	NA	NA	NA
Metals									
Aluminum	1,420,000	2,760,000	NA	861,000	NA	NA	NA	NA	NA
Antimony	<2,700	<2,500	NA	<2,600	NA	NA	NA	NA	NA
Arsenic	<810	1,400 B	NA	2,300	NA	NA	NA	NA	NA
Barium	11,300 B	5,800 B	NA	206,000	14,000	2,900	20,000	14,000	ND
Beryllium	<130	<120	NA	<130	NA	NA	NA	NA	NA
Cadmium	<200	<180	NA	280 B	NA	NA	NA	NA	NA
Calcium	731,000 B	1,060,000	NA	5,250,000	NA	NA	NA	NA	NA
Chromium	4,700	5,000	NA	5,100	12,000	19,000	14,000	19,000	9,000
Cobalt	2,700 B	5,100 B	NA	2,400 B	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	PB2 (continued)			PB5	SB-22				
Depth	05/16/96	05/16/96	05/16/96	05/16/96	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SS-4	SS-5	PB2	SS-13	SB-22 (40')	SB-22 (50')	SB-22 (60')	SB-22 (75')	SB-22 (90')
Sample I.D.	12-16'	24-28'	24-28'	12-16'	40'	50'	60'	75'	90'
Metals (continued)									
Copper	9,000	21,900	NA	62,600	10,000	15,000	25,000	9,600	6,700
Cyanide	<120	<120	NA	<120	NA	NA	NA	NA	NA
Iron	3,140,000	7,630,000	NA	11,200,000	NA	NA	NA	NA	NA
Lead	4,800	2,700	NA	92,200	ND	ND	ND	ND	ND
Magnesium	842,000 B	1,170,000	NA	1,580,000	NA	NA	NA	NA	NA
Manganese	34,700 N	36,300 N	NA	71,200 N	NA	NA	NA	NA	NA
Mercury	<50	60 B	NA	90 B	NA	NA	NA	NA	NA
Nickel	15,100	34,900	NA	7,300 B	NA	NA	NA	NA	NA
Potassium	214,000 B	296,000 B	NA	169,000 B	NA	NA	NA	NA	NA
Selenium	<680	<640	NA	<660	NA	NA	NA	NA	NA
Silver	<740	<700	NA	<720	NA	NA	NA	NA	NA
Sodium	51,000 B	68,300 B	NA	57,400 B	NA	NA	NA	NA	NA
Vanadium	7,900 B	9,900 B	NA	4,600 B	NA	NA	NA	NA	NA
Zinc	4,700	13,800	NA	99,900	NA	NA	NA	NA	NA
Pest/PCB									
Chlordane (gamma)	NA	<1.8	NA	<3.4 P	NA	NA	NA	NA	NA
Endosulfan I	NA	2.8 P	NA	<2	NA	NA	NA	NA	NA
Endosulfan II	NA	<3.5	NA	<3.9	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	<1.8	NA	<2	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)		SB-23					
Depth	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')
Sample I.D.	105'	120'	40'	45'	55'	70'	85'	105'
VOC								
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ND	ND	7	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA
SVOC								
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)		SB-23					
Depth	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')
Sample I.D.	105'	120'	40'	45'	55'	70'	85'	105'
SVOC (continued)								
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	17,000	18,000	14,000	14,000	16,000	24,000	26,000	140,000
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	22,000	12,000	7,000	8,200	9,300	7,000	8,200	40,000
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-22 (continued)		SB-23					
Depth	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86	06/01/86
Sample Date	SB-22 (105')	SB-22 (120')	SB-23 (40')	SB-23 (45')	SB-23 (55')	SB-23 (70')	SB-23 (85')	SB-23 (105')
Sample I.D.	105'	120'	40'	45'	55'	70'	85'	105'
Metals (continued)								
Copper	7,600	8,000	90,000	24,000	14,000	12,000	10,000	34,000
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Pest/PCB								
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)	SB-96-1		SB-96-2		SB-96-3
Depth	06/01/86	06/11/96	06/11/96	06/11/96	06/11/96	06/12/96
Sample Date	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')
Sample I.D.	120'	6-8'	14-16'	6-8'	18-20'	8-10'
VOC						
1,2,4-Trimethylbenzene	NA	<10	17	<10	<10	<10
1,2-Dichloroethene (total)	NA	<10	<10	<10	<10	<10
2-Butanone (MEK)	NA	<100	<100	<100	<100	<100
2-Hexanone	NA	<100	<100	<100	<100	<100
4-Methyl-2-pentanone (MIBK)	NA	<100	<100,000	<100,000	<100	<100
Acetone	NA	<100	<100	<100	<100	<100
Benzene	ND	<10	<10	<10	<10	<10
Carbon disulfide	NA	<100	<100	<100	<100	<100
Chlorobenzene	ND	<10	<10	<10	<10	<10
Ethylbenzene	ND	<10	<10	<10	<10	<10
Methylene chloride	ND	11	11	<10	<10	R
Naphthalene	NA	NA	NA	NA	NA	NA
Styrene	NA	<10	<10	<10	<10	<10
Toluene	ND	15	20	<10	<10	<10
Trichloroethene	ND	<10	<10	<10	<10	<10
Xylenes (total)	NA	<30	<30	<30	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA
SVOC						
2,4-Dimethylphenol	NA	<330	7,200	<330	<330	<330
2-Methylnaphthalene	NA	<330	610	<330	<330	<330
2-Methylphenol	NA	<330	2,000	<330	<330	<330
4-Methylphenol	NA	<330	6,300	<330	<330	<330

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)	SB-96-1		SB-96-2		SB-96-3
Depth	06/01/86	06/11/96	06/11/96	06/11/96	06/11/96	06/12/96
Sample Date	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')
Sample I.D.	120'	6-8'	14-16'	6-8'	18-20'	8-10'
SVOC (continued)						
bis(2-Ethylhexyl)phthalate	NA	<330	<410 *	<330	<330	<330
Butylbenzylphthalate	NA	<330	<410 *	<330	<330	<330
Dibenzofuran	NA	<330	<410 *	<330	<330	<330
Diethylphthalate	NA	<330	<410 *	<330	<330	<330
Di-n-butylphthalate	NA	<330	<410 *	<330	<330	<330
Di-n-octylphthalate	NA	<330	<4100 *	<330	<330	<330
Fluoranthene	NA	<330	620	<330	<330	<330
Fluorene	NA	<330	<410 *	<330	<330	<330
Naphthalene	NA	<330	820	<330	<330	<330
Phenanthrene	NA	<330	880	<330	<330	<330
Phenol	NA	<330	4,000	<330	<330	<330
Pyrene	NA	<330	770 *	<330	<330	<330
Metals						
Aluminum	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA
Barium	18,000	14,000	61,000	11,000	14,000	12,000
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	6,900	13,000	6,100	9,400	7,400	8,200
Cobalt	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-23 (continued)	SB-96-1		SB-96-2		SB-96-3
Depth	06/01/86	06/11/96	06/11/96	06/11/96	06/11/96	06/12/96
Sample Date	SB-23 (120')	SB-96-1 (6-8')	SB-96-1 (14-16')	SB-96-2 (6-8')	SB-96-2 (18-20')	SB-96-3 (8-10')
Sample I.D.	120'	6-8'	14-16'	6-8'	18-20'	8-10'
Metals (continued)						
Copper	5,200	22,000	117,000	14,000	9,100	12,000
Cyanide	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA
Lead	ND	7,500	31,000	4,800	5,600	1,600
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	NA	25,000	22,000	14,000	12,000	9,500
Pest/PCB						
Chlordane (gamma)	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-3 (continued)	SB-96-4		SB-96-5		
Depth	06/12/96	06/12/96	06/12/96	06/12/96	06/11/96	06/11/96
Sample Date	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')
Sample I.D.	18-20'	6-8'	22-24'	6-8'	8-10'	18-20'
VOC						
1,2,4-Trimethylbenzene	<10	<10	<10	NA	<10	<10
1,2-Dichloroethene (total)	<10	<10	<10	NA	<10	<10
2-Butanone (MEK)	<100	<100	<100	NA	<100	<100
2-Hexanone	<100	<100	<100	NA	<100	<100
4-Methyl-2-pentanone (MIBK)	<100	<100	<100	NA	<100	<100
Acetone	<100	<100	<100	NA	<100	<100
Benzene	<10	<10	<10	NA	<10	<10
Carbon disulfide	<100	<100	<100	NA	<100	<100
Chlorobenzene	<10	<10	<10	NA	<10	<10
Ethylbenzene	<10	<10	<10	NA	<10	<10
Methylene chloride	R	R	R	NA	<10	<10
Naphthalene	NA	NA	NA	NA	NA	NA
Styrene	<10	<10	<10	NA	<10	<10
Toluene	<10	<10	<10	NA	<10	20
Trichloroethene	<10	<10	<10	NA	<10	<10
Xylenes (total)	<30	<30	<30	NA	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA
SVOC						
2,4-Dimethylphenol	<330	<330	<330	NA	<330	<330
2-Methylnaphthalene	<330	<330	<330	NA	<330	<330
2-Methylphenol	<330	<330	<330	NA	<330	<330
4-Methylphenol	<330	<330	<330	NA	<330	<330

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-3 (continued)	SB-96-4		SB-96-5		
Depth	06/12/96	06/12/96	06/12/96	06/12/96	06/11/96	06/11/96
Sample Date	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')
Sample I.D.	18-20'	6-8'	22-24'	6-8'	8-10'	18-20'
SVOC (continued)						
bis(2-Ethylhexyl)phthalate	<330	<330	<330	NA	<330	<330
Butylbenzylphthalate	<330	<330	<330	NA	<330	<330
Dibenzofuran	<330	<330	<330	NA	<330	<330
Diethylphthalate	<330	<330	<330	NA	<330	<330
Di-n-butylphthalate	<330	<330	<330	NA	<330	<330
Di-n-octylphthalate	<330	<330	<330	NA	<330	<330
Fluoranthene	<330	<330	<330	NA	<330	<330
Fluorene	<330	<330	<330	NA	<330	<330
Naphthalene	<330	<330	<330	NA	<330	<330
Phenanthrene	<330	<330	<330	NA	<330	<330
Phenol	<330	<330	<330	NA	<330	<330
Pyrene	<330	<330	<330	NA	<330	<330
Metals						
Aluminum	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA
Barium	21,000	NA	NA	7,600	9,100	16,000
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA
Chromium	5,100	NA	NA	9,000	9,000	8,100
Cobalt	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-3 (continued)	SB-96-4		SB-96-5		
Depth	06/12/96	06/12/96	06/12/96	06/12/96	06/11/96	06/11/96
Sample Date	SB-96-3 (18-20')	SB-96-4 (6-8')	SB-96-4 (22-24')	SB-96-5 (6-8')	SB-96-5 (8-10')	SB-96-5 (18-20')
Sample I.D.	18-20'	6-8'	22-24'	6-8'	8-10'	18-20'
Metals (continued)						
Copper	18,000	NA	NA	12,000	16,000	11,000
Cyanide	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA
Lead	5,300	NA	NA	1,400	2,900	5,600
Magnesium	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	4,500	NA	NA	12,000	13,000	12,000
Pest/PCB						
Chlordane (gamma)	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5 (continued)	SB-96-6		SB-96-7		SB-96-8	SB-96-9
Depth	06/12/96	06/12/96	06/12/96	06/10/96	06/10/96	06/14/96	06/14/96
Sample Date	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9
Sample I.D.	22-24'	6-8'	24-26'	6-8'	16-18'	NA	NA
VOC							
1,2,4-Trimethylbenzene	NA	<10	<10	<10	28	<10	<10
1,2-Dichloroethene (total)	NA	<10	<10	<10	<10	<10	<10
2-Butanone (MEK)	NA	<100	<100	<100	<100	<100	<100
2-Hexanone	NA	<100	<100	<100	<100	<100	<100
4-Methyl-2-pentanone (MIBK)	NA	<100	<100	<100	<100	<100	<100
Acetone	NA	<100	<100	<100	<100	<100	<100
Benzene	NA	<10	<10	<10	<10	<10	<10
Carbon disulfide	NA	<100	<100	<100	<100	<100	<100
Chlorobenzene	NA	<10	<10	<10	<10	<10	<10
Ethylbenzene	NA	<10	<10	<10	<10	<10	<10
Methylene chloride	NA	R	R	<10	44	<10	R
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	<10	<10	<10	<10	<10	<10
Toluene	NA	11	<10	<10	<10	<10	<10
Trichloroethene	NA	<10	<10	<10	<10	<10	<10
Xylenes (total)	NA	<30	<30	<30	<30	<30	<30
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA
SVOC							
2,4-Dimethylphenol	NA	<1,800 *	<330	<330	<330	<330	<330
2-Methylnaphthalene	NA	<1,800 *	<330	<330	<330	<330	<330
2-Methylphenol	NA	<1,800 *	<330	<330	<330	<330	<330
4-Methylphenol	NA	<1,800 *	<330	<330	<330	<330	<330

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5 (continued)	SB-96-6		SB-96-7		SB-96-8	SB-96-9
Depth	06/12/96	06/12/96	06/12/96	06/10/96	06/10/96	06/14/96	06/14/96
Sample Date	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9
Sample I.D.	22-24'	6-8'	24-26'	6-8'	16-18'	NA	NA
SVOC (continued)							
bis(2-Ethylhexyl)phthalate	NA	<1,800 *	<330	<330	630	<330	<330
Butylbenzylphthalate	NA	<1,800 *	<330	<330	<330	<330	<330
Dibenzofuran	NA	<1,800 *	<330	<330	<330	<330	<330
Diethylphthalate	NA	<1,800 *	<330	<330	<330	<330	<330
Di-n-butylphthalate	NA	<1,800 *	<330	<330	<330	<330	<330
Di-n-octylphthalate	NA	<1,800 *	<330	<330	<330	<330	<330
Fluoranthene	NA	<1,800 *	<330	<330	<330	<330	<330
Fluorene	NA	<1,800 *	<330	<330	<330	<330	<330
Naphthalene	NA	<1,800 *	<330	<330	<330	<330	<330
Phenanthrene	NA	<1,800 *	<330	<330	<330	<330	<330
Phenol	NA	<1,800 *	<330	<330	<330	<330	<330
Pyrene	NA	<1,800 *	<330	<330	<330	<330	<330
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Barium	11,000	12,000	23,000	21,000	8,300	15,000	88,000
Beryllium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Chromium	6,700	9,600	10,000	9,000	7,700	12,000	28,000
Cobalt	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB-96-5 (continued)	SB-96-6		SB-96-7		SB-96-8	SB-96-9
Depth	06/12/96	06/12/96	06/12/96	06/10/96	06/10/96	06/14/96	06/14/96
Sample Date	SB-96-5 (22-24')	SB-96-6 (6-8')	SB-96-6 (24-26')	SB-96-7 (6-8')	SB-96-7 (16-18')	SB-96-8	SB-96-9
Sample I.D.	22-24'	6-8'	24-26'	6-8'	16-18'	NA	NA
Metals (continued)							
Copper	12,000	17,000	17,000	12,000	10,000	18,000	36,000
Cyanide	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	6,600	1,900	4,500	9,200	1,500	2,600	9,700
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	6,600	14,000	19,000	14,000	10,000	20,000	46,000
Pest/PCB							
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB1	SB1-B	SB2-B	SB3		SB4		SB5	
Depth	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85	07/24/85	07/24/85	06/18/85	06/18/85
Sample Date	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')
Sample I.D.	15'	15'	15'	52'	54'	54'	56'	05'	10'
VOC									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA	NA	NA	NA	97	70
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	31	89
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	NA	NA	NA	10	16
Acetone	NA	NA	NA	NA	NA	NA	NA	16,000	3,000
Benzene	NA	NA	NA	NA	NA	NA	NA	ND	ND
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	ND	ND
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	ND	11
Ethylbenzene	NA	ND	ND	ND	ND	7	ND	ND	11
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	ND	ND	ND	ND	8	ND	ND	24
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	ND	ND
Xylenes (total)	NA	ND	ND	ND	ND	55	ND	ND	82
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB1	SB1-B	SB2-B	SB3		SB4		SB5	
Depth	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85	07/24/85	07/24/85	06/18/85	06/18/85
Sample Date	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')
Sample I.D.	15'	15'	15'	52'	54'	54'	56'	05'	10'
SVOC (continued)									
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	<12,000	<12,000
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	29,000	<10000	35,000	18,000	16,000	12,000	11,000	39,000	20,000
Beryllium	NA	NA	NA	NA	NA	NA	NA	<2,400	<2,400
Cadmium	NA	NA	NA	NA	NA	NA	NA	<2,400	<2,400
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	16,000	15,000	10,000	11,000	26,000	5,000	7,900	12,000	9,800
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB1	SB1-B	SB2-B	SB3		SB4		SB5	
Depth	07/28/85	11/09/85	11/09/85	07/26/85	07/26/85	07/24/85	07/24/85	06/18/85	06/18/85
Sample Date	SB1 (15')	SB1-B (15')	SB2-B (15')	SB3 (52')	SB3 (54')	SB4 (54')	SB4 (56')	SB5 (05')	SB5 (10')
Sample I.D.	15'	15'	15'	52'	54'	54'	56'	05'	10'
Metals (continued)									
Copper	14,000	16,000	17,000	9,800	11,000	7,800	5,700	6,000	7,300
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	<9,100	<5,300	<5,400	<2,700	<1,200	<8,800	<9,600	<2,400	<2,400
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	ND	ND
Nickel	NA	NA	NA	NA	NA	NA	NA	3,600	3,600
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	710	<490
Silver	NA	NA	NA	NA	NA	NA	NA	<1,200	<1,200
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	11,000	7,300
Pest/PCB									
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB5 (continued)					SB6		SB7	
Depth	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	07/28/85	11/08/85	07/24/85	07/24/85
Sample Date	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')
Sample I.D.	15'	20'	25'	30'	35'	15'	16.5'	45'	54'
VOC									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	1,800	6,400	1,600	1,300	23,000	NA	NA	NA	NA
2-Hexanone	370	ND	ND	ND	1,500	NA	NA	NA	NA
4-Methyl-2-pentanone (MIBK)	ND	89	93	ND	500	NA	NA	NA	NA
Acetone	3,500	11,000	36,000	7,600	68,000	NA	NA	NA	NA
Benzene	230	50	170	17	470	NA	NA	NA	NA
Carbon disulfide	ND	ND	19	ND	79	NA	NA	NA	NA
Chlorobenzene	ND	31	120	28	ND	NA	NA	NA	NA
Ethylbenzene	550	66	360	90	1,600	NA	ND	ND	ND
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	1,100	140	520	120	1,900	NA	ND	ND	ND
Trichloroethene	100	15	ND	ND	19	NA	NA	NA	NA
Xylenes (total)	2,700	520	3,300	750	10,000	NA	ND	ND	ND
Xylenes, m+p	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOC									
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB5 (continued)					SB6		SB7	
Depth	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	07/28/85	11/08/85	07/24/85	07/24/85
Sample Date	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')
Sample I.D.	15'	20'	25'	30'	35'	15'	16.5'	45'	54'
SVOC (continued)									
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	<12,000	<11,000	<16,000	<12,000	<12,000	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	22,000	100,000	36,000	130,000	21,000	18,000	<11,000	39,000	24,000
Beryllium	<2,400	<2,200	<3,200	<2,400	<2,300	NA	NA	NA	NA
Cadmium	<2,400	<2,200	<3,200	<2,400	<2,300	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	12,000	11,000	9,500	4,900	8,100	9,200	7,600	13,000	31,000
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB5 (continued)					SB6		SB7	
Depth	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	07/28/85	11/08/85	07/24/85	07/24/85
Sample Date	SB5 (15')	SB5 (20')	SB5 (25')	SB5 (30')	SB5 (35')	SB6 (15')	SB6 (16.5')	SB7 (45')	SB7 (54')
Sample I.D.	15'	20'	25'	30'	35'	15'	16.5'	45'	54'
Metals (continued)									
Copper	29,000	<2,200	320,000	56,000	85,000	9,400	9,400	11,000	16,000
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	<2,400	<2,200	11,000	13,000	3,500	<9,400	<5,500	<6,300	<810
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	ND	<420	<600	<460	ND	NA	NA	NA	NA
Nickel	13,000	4,400	6,300	<2,400	3,500	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	<490	<440	950	<490	<460	NA	NA	NA	NA
Silver	<1,200	<1,100	<1,600	<1,200	<1,200	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	12,000	23,000	48,000	35,000	12,000	NA	NA	NA	NA
Pest/PCB									
Chlordane (gamma)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB8		SB9			
Depth	07/26/85	07/26/85	07/23/85	07/23/85	Criteria	
Sample Date	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	Industrial Direct Contact	Residential Drinking Water Protection
Sample I.D.	35'	49'	30'	35'		
VOC						
1,2,4-Trimethylbenzene	NA	NA	NA	NA	110,000 C, I	2,100 I
1,2-Dichloroethene (total)	NA	NA	NA	NA	640,000 C, (iso)	1,400 (iso)
2-Butanone (MEK)	NA	NA	NA	NA	27,000,000 C, I, AD	260,000 I
2-Hexanone	NA	NA	NA	NA	2,500,000 C	20,000
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	NA	2,700,000 C, I	36,000 I
Acetone	NA	NA	NA	NA	110,000,000 I	15,000 I
Benzene	NA	NA	NA	NA	400,000 C, I	100 I
Carbon disulfide	NA	NA	NA	NA	280,000 C, I, R, A	16,000 I, R
Chlorobenzene	NA	NA	NA	NA	260,000 C, I	2,000 I
Ethylbenzene	NA	NA	NA	NA	140,000 C, I	1,500 I
Methylene chloride	NA	NA	NA	NA	2,300,000 C	100
Naphthalene	NA	NA	NA	NA	80,000,000	35,000
Styrene	NA	NA	NA	NA	520,000 C	2,700
Toluene	NA	NA	NA	NA	250,000 C, I	16,000 I
Trichloroethene	NA	NA	NA	NA	500,000 C	100
Xylenes (total)	NA	NA	NA	NA	150,000 C, I	5,600 I
Xylenes, m+p	NA	NA	NA	NA	150,000 C, I, J	5,600 I, J
SVOC						
2,4-Dimethylphenol	NA	NA	NA	NA	56,000,000	7,400
2-Methylnaphthalene	NA	NA	NA	NA	40,000,000	57,000
2-Methylphenol	NA	NA	NA	NA	56,000,000 J	7,400 J
4-Methylphenol	NA	NA	NA	NA	56,000,000 J	7,400 J

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB8		SB9			
Depth	07/26/85	07/26/85	07/23/85	07/23/85	Criteria	
Sample Date	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	Industrial Direct Contact	Residential Drinking Water Protection
Sample I.D.	35'	49'	30'	35'		
SVOC (continued)						
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	10,000,000 C	NLL
Butylbenzylphthalate	NA	NA	NA	NA	310,000 C	310,000 C
Dibenzofuran	NA	NA	NA	NA	ID	ID
Diethylphthalate	NA	NA	NA	NA	740,000 C	110,000
Di-n-butylphthalate	NA	NA	NA	NA	760,000 C	760,000 C
Di-n-octylphthalate	NA	NA	NA	NA	28,000,000	100,000,000
Fluoranthene	NA	NA	NA	NA	180,000,000	730,000
Fluorene	NA	NA	NA	NA	130,000,000	390,000
Naphthalene	NA	NA	NA	NA	80,000,000	35,000
Phenanthrene	NA	NA	NA	NA	8,000,000	56,000
Phenol	NA	NA	NA	NA	12,000,000 C, AD	88,000
Pyrene	NA	NA	NA	NA	110,000,000	480,000
Metals						
Aluminum	NA	NA	NA	NA	660,000,000 B, AD	1,000 B
Antimony	NA	NA	NA	NA	1,200,000	500 M
Arsenic	NA	NA	NA	NA	61,000 B	23,000 B
Barium	22,000	16,000	16,000	1,000	250,000,000	1,300,000
Beryllium	NA	NA	NA	NA	3,100,000	51,000
Cadmium	NA	NA	NA	NA	4,100,000 B	6,000 B
Calcium	NA	NA	NA	NA	NA	NA
Chromium	12,000	7,100	11,000	9,000	17,000,000 Hexavalent	30,000 Hexavalent
Cobalt	NA	NA	NA	NA	18,000,000	800

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Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	SB8		SB9			
Depth	07/26/85	07/26/85	07/23/85	07/23/85	Criteria	
Sample Date	SB8 (35')	SB8 (49')	SB9 (30')	SB9 (35')	Industrial Direct Contact	Residential Drinking Water Protection
Sample I.D.	35'	49'	30'	35'		
Metals (continued)						
Copper	11,000	7,600	27,000	8,400	140,000,000	5,800,000
Cyanide	NA	NA	NA	NA	250,000 P, R	4,000 P, R
Iron	NA	NA	NA	NA	1,000,000,000 B, D	6,000 B
Lead	<2,000	<2,000	<7,500	<10,000	900,000 DRAFT	700,000
Magnesium	NA	NA	NA	NA	1,000,000,000 B, D	8,000,000 B
Manganese	NA	NA	NA	NA	170,000,000 B	1,000 B
Mercury	NA	NA	NA	NA	1,100,000 INO	1,700 INO
Nickel	NA	NA	NA	NA	270,000,000 B	100,000 B
Potassium	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	18,000,000 B	4,000 B
Silver	NA	NA	NA	NA	17,000,000 B	4,500 B
Sodium	NA	NA	NA	NA	1,000,000,000 D	2,500,000
Vanadium	NA	NA	NA	NA	10,000,000	72,000
Zinc	NA	NA	NA	NA	1,000,000,000 B, D	2,400,000 B
Pest/PCB						
Chlordane (gamma)	NA	NA	NA	NA	240,000 J	NLL
Endosulfan I	NA	NA	NA	NA	6,700,000 J	NLL
Endosulfan II	NA	NA	NA	NA	6,700,000 J	NLL
Heptachlor epoxide	NA	NA	NA	NA	13,000	NLL
Total Organic Carbon	NA	NA	NA	NA	NA	NA

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Criteria		
Depth		Industrial Ambient	Groundwater
Sample Date	Industrial	Air Source	Surface Water
Sample I.D.	Indoor-Inhalation	VSIC	Interface Protection
VOC			
1,2,4-Trimethylbenzene	110,000 C, I	25,000,000 I	ID
1,2-Dichloroethene (total)	640,000 C, (iso)	3,700 I	ID
2-Butanone (MEK)	27,000,000 C, I	35,000,000 I	44,000 I
2-Hexanone	1,800,000	1,300,000	NA
4-Methyl-2-pentanone (MIBK)	2,700,000 C, I	53,000,000 I	ID
Acetone	110,000,000 C, I	160,000,000 I	34,000 I
Benzene	8,400 I	45,000 I	4,000 I, X
Carbon disulfide	140,000 I, R	1,600,000 I, R	ID
Chlorobenzene	220,000 I	920,000 I	940 I
Ethylbenzene	140,000 C, I	11,000,000 I	360 I
Methylene chloride	240,000	700,000	19,000 X
Naphthalene	470,000	350,000	870
Styrene	520,000 C	3,300,000	2,200
Toluene	250,000 C, I	3,300,000 I	2,800 I
Trichloroethene	37,000	260,000	4,000 X
Xylenes (total)	150,000 C, I	54,000,000	700 I
Xylenes, m+p	150,000 C, I, J	54,000,000 I, J	700 I, J
SVOC			
2,4-Dimethylphenol	NLV	NLV	7,600
2-Methylnaphthalene	ID	ID	ID
2-Methylphenol	NLV	NLV	1,400 J
4-Methylphenol	NLV	NLV	1,400 J

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Criteria Industrial Indoor-Inhalation	 Industrial Ambient Air Source VSIC	 Groundwater Surface Water Interface Protection
SVOC (continued)			
bis(2-Ethylhexyl)phthalate	NLV	NLV	NLL
Butylbenzylphthalate	NLV	NLV	26,000 X
Dibenzofuran	ID	ID	1,700
Diethylphthalate	NLV	NLV	NA
Di-n-butylphthalate	NLV	NLV	11,000
Di-n-octylphthalate	NLV	NLV	ID
Fluoranthene	1,000,000,000 D	890,000,000	5,500
Fluorene	1,000,000,000 D	150,000,000	5,300
Naphthalene	470,000	350,000	870
Phenanthrene	3,300,000	11,000	2,300
Phenol	NLV	NLV	4,200
Pyrene	1,000,000,000 D	780,000,000	ID
Metals			
Aluminum	NLV	NLV	NA
Antimony	NLV	NLV	ID
Arsenic	NLV	NLV	70,000 B, X
Barium	NLV	NLV	G,X
Beryllium	NLV	NLV	G
Cadmium	NLV	NLV	B, GX
Calcium	NA	NA	NA
Chromium	NLV	NLV	3,300 Hexavalent
Cobalt	NLV	NLV	2,000

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Depth Sample Date Sample I.D.	Criteria Industrial Indoor-Inhalation	 Industrial Ambient Air Source VSIC	 Groundwater Surface Water Interface Protection
Metals (continued)			
Copper	NLV	NLV	G
Cyanide	NLV	NLV	400 P, R
Iron	NLV	NLV	NA
Lead	NLV	NLV	G, M, X
Magnesium	NLV	NLV	NA
Manganese	NLV	NLV	B, G, X
Mercury	NLV	NLV	100 M, INO
Nickel	NLV	NLV	B, G
Potassium	NA	NA	NA
Selenium	NLV	NLV	400 B
Silver	NLV	NLV	500 B, M
Sodium	NLV	NLV	NA
Vanadium	NLV	NLV	190,000
Zinc	NLV	NLV	B, G
Pest/PCB			
Chlordane (gamma)	59,000,000 J	4,200,000 J	NLL
Endosulfan I	ID	ID	NLL
Endosulfan II	ID	ID	NLL
Heptachlor epoxide	NLV	NLV	NLL
Total Organic Carbon	NA	NA	NA

Footnotes on Page 37.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

All results are in micrograms per kilogram (ug/kg).

Bold	Value above the Industrial Direct Contact Criteria (Operational Memorandum #18, June 7, 2000).
Italics	Value above the Industrial Indoor Inhalation Criteria (Operational Memorandum #18, June 7, 2000).
▨	Value above the Residential Drinking Water Protection Criteria (Operational Memorandum #18, June 7, 2000).
☐	Value above the Industrial Ambient Air Source Volatile Soil Inhalation Criteria (VSIC) (Operational Memorandum #18, June 7, 2000).
<u>underline</u>	Value above the Groundwater/Surface Water Interface Protection Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
*	Duplicate analysis was not within control limits.
B	Constituent was also detected in laboratory blank.
DUP	Duplicate sample.
J	Estimated result.
MBD	This analyte is present in the associated method blank at an amount that is less than two times the reporting limit.
N	Presumptive evidence of compound was identified (TICs only).
NA	Not analyzed.
ND	Not Detected.
P	Greater than 25% RPD between two columns for pesticide or PCB
R	Rejected data.
SVOCs	Semi volatile organic compounds.
VOCs	Volatile Organic Compounds.
Wa	Matrix interference reported by laboratory.

Criteria Footnotes:

AD	Hazardous substance causes developmental effects. Residential and Commercial I Direct Contact Criteria are protective of both prenatal and postnatal exposure.
B	Background may be substituted if higher than the calculated cleanup criteria.
C	Value presented is a screening level based on the chemical specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.
D	Calculated criterion exceeds 100%, therefore it is reduced to 100%.

Table 6. Summary of Constituents Detected in Subsurface Soil Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

G	GSI criterion is hardness dependent.
I	Hazardous substance may exhibit the characteristic of ignitability as defined in 40 CFR 261.21.
ID	Insufficient data.
NE	Not established.
INO	Inorgranic.
Iso	Isomer specific.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
M	Calculated criterion is below the target detection limit (TDL), therefore, the criterion defaults to the TDL.
NLL	Chemical is not likely to leach under most soil conditions.
NLV	Chemical is not likely to volatilize under most soil conditions.
P	Amenable or Method OIA-1677 analysis are used to quantify cyanide concentrations for compliance with all groundwter criteria.
R	Hazardous substance may exhibit the characteristic of reactivity as defined in 40 CFR 261.23.
X	The GSI criterion shown is not protective for surface water that is used as a drinking water source.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE (TCLP)	GMSB-34/6 (SPLP)	GMSB-34/6 (TCLP)	GMSB-35/22 (SPLP)
Depth (ft bls)	0-31.5	6	6	22
Type	Wood/Char	Wood	Wood	Sludge
VOCs				
1,2,4-Trimethylbenzene	NA	<1.0	<4	80
1,3,5-Trimethylbenzene	NA	<1.0	<4	<25
1,4-Dichlorobenzene	NA	<1.0	<4	<25
2-Butanone (MEK)	NA	26 J	<200	12,000
2-Hexanone	NA	<50	<200	1,100 J
4-Methyl-2-pentanone (MIBK)	NA	<50	<200	<1,200
Acetone	NA	<100	<400	6,400
Benzene	NA	<1.0	<4	43
Ethylbenzene	NA	<1.0	<4	37
Isopropylbenzene	NA	<1.0	<4	<25
Methylene chloride	NA	<1.0	<4	<25
n-Propylbenzene	NA	<1.0	<4	<25
Styrene	NA	<1.0	<4	28
Tetrachloroethene	NA	<1.0	<4	<25
Toluene	NA	<1	<4	150
Trichloroethene	NA	<1.0	<4	<25
Xylenes (total)	NA	<3.0	<12	260
SVOCs				
2,4-Dimethylphenol	NA	11	<25	190
2-Methylphenol	2,800	9.3	<25	240
2-Nitroaniline	NA	<20	<100	<100
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	<5.0	<25	280
4-Methylphenol	3,300	NA	NA	NA
Dibenzofuran	NA	<5.0	<25	<25

Footnotes on Page 3.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE (TCLP)	GMSB-34/6 (SPLP)	GMSB-34/6 (TCLP)	GMSB-35/22 (SPLP)
Depth (ft bls)	0-31.5	6	6	22
Type	Wood/Char	Wood	Wood	Sludge
SVOCs (continued)				
Methylphenols (total)	NA	NA	NA	NA
Phenol	NA	<5.0	<25	250
Metals				
Aluminum	NA	95 B	<2,000	120 B
Arsenic	NA	<10	<200	<10
Barium	NA	19	<1,000	46
Calcium	NA	91,000	290,000	1,300,000
Chromium	NA	<10	<200	<10
Copper	NA	7.7 B	<200	110
Iron	NA	58	570	42 B
Lead	NA	<5.0	<200	2.6 B
Magnesium	NA	810	17,000	40 B
Manganese	NA	53	740	6.6 B
Molybdenum	NA	6.2 B	<100	2.2 B
Nickel	NA	<40	<400	<40
Potassium	NA	550 B	<10,000	1,000
Sodium	NA	1,500	NA	100,000
Titanium	NA	6.6 B	<100	3.1 B
Vanadium	NA	1.4 B	<100	1.1 B
Zinc	NA	4.3 B	<200	5.1 B
Alcohols				
1-Propanol	NA	<1,000	<1,000	<1,000
Ethanol	NA	<1,000	<1,000	5,800

Footnotes on Page 3.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-34		GMSB-35
Sample Date	05/16/97	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-1 COMPOSITE (TCLP)	GMSB-34/6 (SPLP)	GMSB-34/6 (TCLP)	GMSB-35/22 (SPLP)
Depth (ft bls)	0-31.5	6	6	22
Type	Wood/Char	Wood	Wood	Sludge
Alcohols (continued)				
Ethylacetate	NA	<5,000	<5,000	<5,000
Methanol	NA	4,300 J	7,100 J	57,000 J
n-Butanol	NA	<1,000	R	1,400
Aldehydes				
Acetaldehyde	NA	<100	<100	950
Formaldehyde	NA	<100	<100	<200
Hexanal	NA	<100	<100	<200
m-Tolualdehyde	NA	<100	<100	<200
Pentanal	NA	<100	<100	<200
Propanal	NA	<100	<100	<200
Acetic Acid	NA	<2,500	NA	870,000
Chemical Oxygen Demand	800,000	NA	NA	NA
Total Organic Carbon	720,000	24,000	NA	1,800,000

Constituent concentrations are reported in micrograms per liter (µg/L) unless otherwise noted.

▨	Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.		
<	Constituent concentrations less than the detection limit, which is the value following the "<" sign.		
B	Constituent was also detected in laboratory blank.		
D	Result was obtained from analysis of a dilution.	R	Rejected results.
ft bls	Feet below land surface.	SPLP	Synthetic precipitation leaching procedure.
J	Estimated results.	SVOC	Semi-volatile organic compounds.
NA	Not analyzed.	TCLP	Toxic characteristic leaching procedure.
NE	Not established.	VOC	Volatile organic compounds.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-35 (continued)		GMSB-36	
Sample Date	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-35/22 (TCLP)	GMSB-35/22 - DL (TCLP)	GMSB-36/12 (SPLP)	GMSB-36/12 (TCLP)
Depth (ft bls)	22	22	12	12
Type	Sludge	Sludge	Sludge	Sludge
VOCs				
1,2,4-Trimethylbenzene	78	75 D	NA	34
1,3,5-Trimethylbenzene	17	16 D	NA	8
1,4-Dichlorobenzene	<4	<10	NA	<4
2-Butanone (MEK)	7,600 D	7,600 D	NA	2,100
2-Hexanone	950	1,100 D	NA	230
4-Methyl-2-pentanone (MIBK)	<200	<500	NA	200
Acetone	5,400 D	5,400 D	NA	1,800
Benzene	44	<10	NA	110
Ethylbenzene	35	34 D	NA	38
Isopropylbenzene	<4	<10	NA	<4
Methylene chloride	<4	<50	NA	<4
n-Propylbenzene	<4	<10	NA	<4
Styrene	25	<10	NA	<4
Tetrachloroethene	<4	<10	NA	<4
Toluene	140	150 D	NA	170
Trichloroethene	<4	<10	NA	<4
Xylenes (total)	260	250 D	NA	210
SVOCs				
2,4-Dimethylphenol	420	NA	NA	4,200
2-Methylphenol	930	NA	NA	6,800
2-Nitroaniline	3,100	NA	NA	2,100
3-Methylphenol/4-Methylphenol(m&p-cresol)	1,100	NA	NA	7,800
4-Methylphenol	NA	NA	NA	NA
Dibenzofuran	<250	NA	NA	<250

Footnotes on Page 6.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-35 (continued)		GMSB-36	
Sample Date	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-35/22 (TCLP)	GMSB-35/22 - DL (TCLP)	GMSB-36/12 (SPLP)	GMSB-36/12 (TCLP)
Depth (ft bls)	22	22	12	12
Type	Sludge	Sludge	Sludge	Sludge
SVOCs (continued)				
Methylphenols (total)	NA	NA	NA	NA
Phenol	1,600	NA	NA	9,300
Metals				
Aluminum	<2,000	NA	NA	<2,000
Arsenic	<200	NA	NA	<200
Barium	<1,000	NA	NA	<1,000
Calcium	1,400,000	NA	NA	1,100,000
Chromium	<200	NA	NA	<200
Copper	<200	NA	NA	<200
Iron	1,400	NA	NA	1,300
Lead	<200	NA	NA	<200
Magnesium	32,000	NA	NA	23,000
Manganese	3,300	NA	NA	1,900
Molybdenum	<100	NA	NA	<100
Nickel	<400	NA	NA	<400
Potassium	<10,000	NA	NA	<10,000
Sodium	NA	NA	NA	NA
Titanium	<100	NA	NA	<100
Vanadium	<100	NA	NA	<100
Zinc	<200	NA	NA	<200
Alcohols				
1-Propanol	2,600	NA	NA	870 J
Ethanol	5,400	NA	NA	32,000

Footnotes on Page 6.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-35 (continued)		GMSB-36	
Sample Date	10/20/99	10/20/99	10/20/99	10/20/99
Sample I.D.	GMSB-35/22 (TCLP)	GMSB-35/22 - DL (TCLP)	GMSB-36/12 (SPLP)	GMSB-36/12 (TCLP)
Depth (ft bls)	22	22	12	12
Type	Sludge	Sludge	Sludge	Sludge
Alcohols (continued)				
Ethylacetate	16,000	NA	NA	2,600 J
Methanol	55,000 J	NA	NA	33,000 J
n-Butanol	<1,000	NA	NA	R
Aldehydes				
Acetaldehyde	800	NA	NA	2,000
Formaldehyde	<200	NA	NA	<200
Hexanal	<200	NA	NA	<200
m-Tolualdehyde	<200	NA	NA	<200
Pentanal	<200	NA	NA	<200
Propanal	<200	NA	NA	<200
Acetic Acid	NA	NA	720,000	NA
Chemical Oxygen Demand	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA

Constituent concentrations are reported in micrograms per liter (μg/L) unless otherwise noted.

▨	Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.		
<	Constituent concentrations less than the detection limit, which is the value following the "<" sign.		
B	Constituent was also detected in laboratory blank.		
D	Result was obtained from analysis of a dilution.	R	Rejected results.
ft bls	Feet below land surface.	SPLP	Synthetic precipitation leaching procedure.
J	Estimated results.	SVOC	Semi-volatile organic compounds.
NA	Not analyzed.	TCLP	Toxic characteristic leaching procedure.
NE	Not established.	VOC	Volatile organic compounds.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-37		GMSB-38	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-37/10 (SPLP)	GMSB-37/10 (TCLP)	GMSB-38/7 (SPLP)	GMSB-38/7 (TCLP)
Depth (ft bls)	10	10	7	7
Type	Tar	Tar	Wood	Wood
VOCs				
1,2,4-Trimethylbenzene	13	12	<1.0	<4
1,3,5-Trimethylbenzene	<4.0	2.4 J	<1.0	<4
1,4-Dichlorobenzene	<4.0	<4	<1.0	<4
2-Butanone (MEK)	2,200	850	<50	<200
2-Hexanone	280	120 J	<50	<200
4-Methyl-2-pentanone (MIBK)	<200	<200	<50	<200
Acetone	2,000	910	<100	<400
Benzene	32	23	<1.0	<4
Ethylbenzene	9.6	9.7	<1.0	<4
Isopropylbenzene	<4.0	<4	<1.0	<4
Methylene chloride	28	<4	<1.0	<4
n-Propylbenzene	<4.0	<4	<1.0	<4
Styrene	<4.0	4.8	<1.0	<4
Tetrachloroethene	7.3	<4	<1.0	<4
Toluene	66	59	<1.0	<4
Trichloroethene	<4.0	<4	<1.0	<4
Xylenes (total)	58	55	<3.0	<12
SVOCs				
2,4-Dimethylphenol	780	5,300	<5.0	<25
2-Methylphenol	1,200	7,400	<5.0	<25
2-Nitroaniline	230	1,400	<20	<100
3-Methylphenol/4-Methylphenol(m&p-cresol)	1,900	11,000	<5.0	<25
4-Methylphenol	NA	NA	NA	NA
Dibenzofuran	190	<250	<5.0	<25

Footnotes on Page 9.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-37		GMSB-38	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-37/10 (SPLP)	GMSB-37/10 (TCLP)	GMSB-38/7 (SPLP)	GMSB-38/7 (TCLP)
Depth (ft bls)	10	10	7	7
Type	Tar	Tar	Wood	Wood
SVOCs (continued)				
Methylphenols (total)	NA	NA	NA	NA
Phenol	1,900	11,000	<5.0	170
Metals				
Aluminum	260	<2,000	67 B	<2,000
Arsenic	4.1 B	<200	<10	<200
Barium	50	<1,000	9.9 B	<1,000
Calcium	240,000	340,000	11,000	110,000
Chromium	0.87 B	<200	<10	<200
Copper	16 B	<200	9.7 B	<200
Iron	820	2,000	94	600
Lead	4.9 B	<200	<5.0	<200
Magnesium	8,400	12,000	1,400	7,900
Manganese	310	440	33	2,300
Molybdenum	<10	<100	3.7 B	<100
Nickel	4.9 B	<400	<40	<400
Potassium	120 B	<10,000	2,400	<10,000
Sodium	8,000	NA	2,000	NA
Titanium	0.55 B	<100	5.1 B	<100
Vanadium	<10	<100	<10	<100
Zinc	76	<200	5.4 B	<200
Alcohols				
1-Propanol	<1,000	<1,000	<1,000	<1,000
Ethanol	3,200	<1,000	<1,000	<1,000

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-37		GMSB-38	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-37/10 (SPLP)	GMSB-37/10 (TCLP)	GMSB-38/7 (SPLP)	GMSB-38/7 (TCLP)
Depth (ft bls)	10	10	7	7
Type	Tar	Tar	Wood	Wood
Alcohols (continued)				
Ethylacetate	1,000 J	<5,000	<5,000	<5,000
Methanol	33,000 J	17,000 J	<1,000 J	R
n-Butanol	<1,000	R	<1,000	R
Aldehydes				
Acetaldehyde	4,000	120	<100	<100
Formaldehyde	<1,000	140	<100	110
Hexanal	<1,000	100	<100	<100
m-Tolualdehyde	1,000	220	<100	<100
Pentanal	<1,000	340	<100	<100
Propanal	<1,000	230	<100	<100
Acetic Acid	120,000	NA	<2,500	NA
Chemical Oxygen Demand	NA	NA	NA	NA
Total Organic Carbon	2,000,000	NA	19,000	NA

Constituent concentrations are reported in micrograms per liter (µg/L) unless otherwise noted.

▨	Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.
<	Constituent concentrations less than the detection limit, which is the value following the "<" sign.
B	Constituent was also detected in laboratory blank.
D	Result was obtained from analysis of a dilution.
ft bls	Feet below land surface.
J	Estimated results.
NA	Not analyzed.
NE	Not established.
R	Rejected results.
SPLP	Synthetic precipitation leaching procedure.
SVOC	Semi-volatile organic compounds.
TCLP	Toxic characteristic leaching procedure.
VOC	Volatile organic compounds.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40		GMSB-41	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-40/12 (SPLP)	GMSB-40/12 (TCLP)	GMSB-41/8 (SPLP)	GMSB-41/8 (TCLP)
Depth (ft bls)	12	12	8	8
Type	Sludge	Sludge	Wood	Wood
VOCs				
1,2,4-Trimethylbenzene	NA	31	NA	5.1
1,3,5-Trimethylbenzene	NA	6.3	NA	<4
1,4-Dichlorobenzene	NA	<4	NA	<4
2-Butanone (MEK)	NA	1,700	NA	<200
2-Hexanone	NA	230	NA	<200
4-Methyl-2-pentanone (MIBK)	NA	<200	NA	<200
Acetone	NA	1,600	NA	<400
Benzene	NA	24	NA	<4
Ethylbenzene	NA	14	NA	<4
Isopropylbenzene	NA	<4	NA	<4
Methylene chloride	NA	<4	NA	<4
n-Propylbenzene	NA	<4	NA	<4
Styrene	NA	<4	NA	<4
Tetrachloroethene	NA	<4	NA	<4
Toluene	NA	66	NA	2.4 J
Trichloroethene	NA	<4	NA	<4
Xylenes (total)	NA	98	NA	13
SVOCs				
2,4-Dimethylphenol	NA	980	NA	210
2-Methylphenol	NA	1,500	NA	<25
2-Nitroaniline	NA	2,200	NA	<100
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	1,800	NA	<25
4-Methylphenol	NA	NA	NA	NA
Dibenzofuran	NA	<250	NA	<25

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40		GMSB-41	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-40/12 (SPLP)	GMSB-40/12 (TCLP)	GMSB-41/8 (SPLP)	GMSB-41/8 (TCLP)
Depth (ft bls)	12	12	8	8
Type	Sludge	Sludge	Wood	Wood
SVOCs (continued)				
Methylphenols (total)	NA	NA	NA	NA
Phenol	NA	2,300	NA	<25
Metals				
Aluminum	NA	<2,000	NA	<2,000
Arsenic	NA	<200	NA	<200
Barium	NA	<1,000	NA	<1,000
Calcium	NA	1,600,000	NA	100,000
Chromium	NA	<200	NA	<200
Copper	NA	<200	NA	<200
Iron	NA	3,400	NA	650
Lead	NA	<200	NA	<200
Magnesium	NA	46,000	NA	<5,000
Manganese	NA	1,700	NA	4,800
Molybdenum	NA	<100	NA	<100
Nickel	NA	<400	NA	<400
Potassium	NA	<10,000	NA	<10,000
Sodium	NA	NA	NA	NA
Titanium	NA	<100	NA	<100
Vanadium	NA	<100	NA	<100
Zinc	NA	<200	NA	<200
Alcohols				
1-Propanol	NA	1,200	NA	<1,000
Ethanol	NA	14,000	NA	<1,000

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-40		GMSB-41	
Sample Date	10/21/99	10/21/99	10/21/99	10/21/99
Sample I.D.	GMSB-40/12 (SPLP)	GMSB-40/12 (TCLP)	GMSB-41/8 (SPLP)	GMSB-41/8 (TCLP)
Depth (ft bls)	12	12	8	8
Type	Sludge	Sludge	Wood	Wood
Alcohols (continued)				
Ethylacetate	NA	1,400 J	NA	<5,000
Methanol	NA	39,000 J	NA	R
n-Butanol	NA	R	NA	R
Aldehydes				
Acetaldehyde	NA	2,500	NA	230
Formaldehyde	NA	<500	NA	110
Hexanal	NA	<500	NA	<100
m-Tolualdehyde	NA	<500	NA	<100
Pentanal	NA	<500	NA	<100
Propanal	NA	<500	NA	<100
Acetic Acid	22,000	NA	<2,500	NA
Chemical Oxygen Demand	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	NA

Constituent concentrations are reported in micrograms per liter (µg/L) unless otherwise noted.

▨ Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.

< Constituent concentrations less than the detection limit, which is the value following the "<" sign.

B	Constituent was also detected in laboratory blank.		
D	Result was obtained from analysis of a dilution.	R	Rejected results.
ft bls	Feet below land surface.	SPLP	Synthetic precipitation leaching procedure.
J	Estimated results.	SVOC	Semi-volatile organic compounds.
NA	Not analyzed.	TCLP	Toxic characteristic leaching procedure.
NE	Not established.	VOC	Volatile organic compounds.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile (TCLP)	Test Pit #3 (TCLP)	Test Pit #5 (TCLP)	TP-5A/2 (SPLP)	TP-5A/2 (TCLP)
Depth (ft bls)	2'	3'	2'	2	2
Type	Tar	Tar	Tar	Tar	Tar
VOCs					
1,2,4-Trimethylbenzene	NA	NA	NA	37	26
1,3,5-Trimethylbenzene	NA	NA	NA	6.4	4.4
1,4-Dichlorobenzene	<5.6	<5.6	<5.6	<1.0	<4
2-Butanone (MEK)	290	860	360	430	260
2-Hexanone	NA	NA	NA	110	<200
4-Methyl-2-pentanone (MIBK)	NA	NA	NA	<50	<200
Acetone	NA	NA	NA	220	150 J
Benzene	17	23	17	10	6.1
Ethylbenzene	NA	NA	NA	7.4	4.9
Isopropylbenzene	NA	NA	NA	0.54 J	<4
Methylene chloride	NA	NA	NA	<1.0	<7.8
n-Propylbenzene	NA	NA	NA	3.2	<4
Styrene	NA	NA	NA	5	3 J
Tetrachloroethene	<7	<7	<7	1.1	<4
Toluene	NA	NA	NA	25	16
Trichloroethene	89	86	45	18	9.8
Xylenes (total)	NA	NA	NA	53	35
SVOCs					
2,4-Dimethylphenol	NA	NA	NA	450	470
2-Methylphenol	NA	NA	NA	1,000	990
2-Nitroaniline	NA	NA	NA	<1,000	<1,000
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	980	990
4-Methylphenol	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	<250	<250

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile (TCLP)	Test Pit #3 (TCLP)	Test Pit #5 (TCLP)	TP-5A/2 (SPLP)	TP-5A/2 (TCLP)
Depth (ft bls)	2'	3'	2'	2	2
Type	Tar	Tar	Tar	Tar	Tar
SVOCs (continued)					
Methylphenols (total)	6,500	2,700	2,500	NA	NA
Phenol	3,200	1,500	1,300	1,000	1,000
Metals					
Aluminum	NA	NA	NA	990 J	<2,000
Arsenic	NA	NA	NA	<10	<200
Barium	NA	NA	NA	14	<1,000
Calcium	NA	NA	NA	32,000	50,000
Chromium	NA	NA	NA	1.7 B	<200
Copper	NA	NA	NA	18 B	<200
Iron	NA	NA	NA	1,000	1,200
Lead	NA	NA	NA	<5.0	<200
Magnesium	NA	NA	NA	910	<5,000
Manganese	NA	NA	NA	120	750
Molybdenum	NA	NA	NA	<10	<100
Nickel	NA	NA	NA	6.8 B	<400
Potassium	NA	NA	NA	340 B	<10,000
Sodium	NA	NA	NA	6,000	NA
Titanium	NA	NA	NA	39	<100
Vanadium	NA	NA	NA	3.9 B	<100
Zinc	NA	NA	NA	6.4 B	<200
Alcohols					
1-Propanol	NA	NA	NA	<1,000	<1,000
Ethanol	NA	NA	NA	<1,000	<1,000

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP Shingle (TP-7)	TP #3	TP #5	TP-5A	
Sample Date	12/17/98	12/17/98	12/17/98	11/02/99	11/02/99
Sample I.D.	Shingle Pile (TCLP)	Test Pit #3 (TCLP)	Test Pit #5 (TCLP)	TP-5A/2 (SPLP)	TP-5A/2 (TCLP)
Depth (ft bls)	2'	3'	2'	2	2
Type	Tar	Tar	Tar	Tar	Tar
Alcohols (continued)					
Ethylacetate	NA	NA	NA	<5,000	<5,000
Methanol	NA	NA	NA	<1,000 J	<1,000 J
n-Butanol	NA	NA	NA	<1,000	R
Aldehydes					
Acetaldehyde	NA	NA	NA	2,400	1,400
Formaldehyde	NA	NA	NA	<500	<400
Hexanal	NA	NA	NA	700	740
m-Tolualdehyde	NA	NA	NA	930	740
Pentanal	NA	NA	NA	<500	<400
Propanal	NA	NA	NA	1,800	430
Acetic Acid	NA	NA	NA	1,200,000	NA
Chemical Oxygen Demand	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	NA	620,000	NA

Constituent concentrations are reported in micrograms per liter (µg/L) unless otherwise noted.

▨ Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.

<	Constituent concentrations less than the detection limit, which is the value following the "<" sign.		
B	Constituent was also detected in laboratory blank.		
D	Result was obtained from analysis of a dilution.	R	Rejected results.
ft bls	Feet below land surface.	SPLP	Synthetic precipitation leaching procedure.
J	Estimated results.	SVOC	Semi-volatile organic compounds.
NA	Not analyzed.	TCLP	Toxic characteristic leaching procedure.
NE	Not established.	VOC	Volatile organic compounds.

Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		
Sample Date	11/03/99	11/03/99	40 CFR
Sample I.D.	TP-10/12 (SPLP)	TP-10/12 (TCLP)	Part 261
Depth (ft bls)	12	12	Criteria
Type	Organic/Wood	Organic/Wood	(µg/L)
VOCs			
1,2,4-Trimethylbenzene	NA	36	NE
1,3,5-Trimethylbenzene	NA	7.2	NE
1,4-Dichlorobenzene	NA	15	7,500
2-Butanone (MEK)	NA	160 J	200,000
2-Hexanone	NA	120 J	NE
4-Methyl-2-pentanone (MIBK)	NA	<200	NE
Acetone	NA	160 J	NE
Benzene	NA	25	500
Ethylbenzene	NA	41	NE
Isopropylbenzene	NA	<4	NE
Methylene chloride	NA	<11	NE
n-Propylbenzene	NA	<4	NE
Styrene	NA	<4	NE
Tetrachloroethene	NA	<4	700
Toluene	NA	110	NE
Trichloroethene	NA	82	500
Xylenes (total)	NA	190	NE
SVOCs			
2,4-Dimethylphenol	NA	3,500	NE
2-Methylphenol	NA	5,800	200,000
2-Nitroaniline	NA	<1,000	NE
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	7,500	200,000
4-Methylphenol	NA	NA	200,000
Dibenzofuran	NA	<250	NE

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		
Sample Date	11/03/99	11/03/99	40 CFR
Sample I.D.	TP-10/12 (SPLP)	TP-10/12 (TCLP)	Part 261
Depth (ft bls)	12	12	Criteria
Type	Organic/Wood	Organic/Wood	(µg/L)
SVOCs (continued)			
Methylphenols (total)	NA	NA	200,000
Phenol	NA	6,200	NE
Metals			
Aluminum	NA	<2,000	NE
Arsenic	NA	<200	5,000
Barium	NA	<1,000	100,000
Calcium	NA	160,000	NE
Chromium	NA	<200	5,000
Copper	NA	<200	NE
Iron	NA	2,800	NE
Lead	NA	<200	5,000
Magnesium	NA	<5,000	NE
Manganese	NA	880	NE
Molybdenum	NA	<100	NE
Nickel	NA	<400	NE
Potassium	NA	<10,000	NE
Sodium	NA	NA	NE
Titanium	NA	<100	NE
Vanadium	NA	<100	NE
Zinc	NA	<200	NE
Alcohols			
1-Propanol	NA	<1,000	NE
Ethanol	NA	<1,000	NE

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Table 7. Summary of Constituent Detected in Waste Sample TCLP/SPLP Extracts, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	TP-10		40 CFR Part 261 Criteria (µg/L)
Sample Date	11/03/99	11/03/99	
Sample I.D.	TP-10/12 (SPLP)	TP-10/12 (TCLP)	
Depth (ft bls)	12	12	
Type	Organic/Wood	Organic/Wood	
Alcohols (continued)			
Ethylacetate	NA	<5,000	NE
Methanol	NA	2,800 J	NE
n-Butanol	NA	R	NE
Aldehydes			
Acetaldehyde	NA	1,100	NE
Formaldehyde	NA	<400	NE
Hexanal	NA	<400	NE
m-Tolualdehyde	NA	<400	NE
Pentanal	NA	<400	NE
Propanal	NA	<400	NE
Acetic Acid	47,000	NA	NE
Chemical Oxygen Demand	NA	NA	NE
Total Organic Carbon	NA	NA	NE

Constituent concentrations are reported in micrograms per liter (µg/L) unless otherwise noted.

▨	Value above the 40 CFR Part 261 Criteria for TCLP/SPLP Extractions.
<	Constituent concentrations less than the detection limit, which is the value following the "<" sign.
B	Constituent was also detected in laboratory blank.
D	Result was obtained from analysis of a dilution.
ft bls	Feet below land surface.
J	Estimated results.
NA	Not analyzed.
NE	Not established.
R	Rejected results.
SPLP	Synthetic precipitation leaching procedure.
SVOC	Semi-volatile organic compounds.
TCLP	Toxic characteristic leaching procedure.
VOC	Volatile organic compounds.

Table 8. Summary of Radioactive Isotopes Detected in Waste Samples, Former Northeast IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Well/Boring	GMSB-35	GMSB-36	GMSB-37	GMSB-38	GMSB-40	GMSB-40
Depth (in feet)	22	12	10	7	12	22
Sample Date	10/20/99	10/20/99	10/21/99	10/21/99	10/21/99	10/21/99
Sample ID	GMSB-35/22	GMSB-36/12	GMSB-37/10	GMSB-38/7	GMSB-40/12	GMSB-40/23
Area	NE Pit	NE Pit	NE Pit	NE Pit	NE Pit	NE Pit
Ac-228	0.00	0.00	0.00	0.00	0.00	0.00
Ra-226	0.38	0.57	0.19	0.91	-0.03	1.18
U-234	0.31	0.29	0.30	0.29	0.15	0.41
U-235	0.02	0.07	0.03	0.00	-0.01	0.08
U-238	0.29	0.26	0.22	0.17	0.1	0.37

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Table 8. Summary of Radioactive Isotopes Detected in Waste Samples, Former Northeast IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Well/Boring Depth (in feet) Sample Date Sample ID Area	Range Background Levels EPA (1)	Range Background Levels Michigan (2)	Fernald Cincinnati (1)	Weldon Springs St Louis (2)
Ac-228	--	--	--	--
Ra-226	0.23-4.2 (1.0)	0.46-2.0	0.59-2.5	0.31-1.4
U-234	0.12-3.8 (0.96)	--	?-2.1	--
U-235	0.001-0.03 (0.007)	--	0.04-0.11	--
U-238	0.12-3.8 (0.96)	0.34-1.2	0.68-2.2	0.33-1.7

Results are in picrocuries per gram (pCi/g).

1 Environmental Protection Agency document "Radiation Site Cleanup Regulations: Technical Support Document For The Development of Radionuclide Cleanup Levels for Soil - Review Draft" September 1994 EPA 402-R-96-011A

2 Oak Ridge National Laboratory document "State Background Radiation Levels: Results of Measurements Taken During 1975-1979. ORNL/TM-7343

( ) Typical values.

? The question mark value is as provided from reference (1) above.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-1	GMSB-1	GMSB-1	GMSB-1
Sample Depth (ft bls)	85	135	215	275	325
Sample Date	05/16/97	05/17/97	05/18/97	05/19/97	06/02/97
Sample I.D.	GBGMSB-1/85	GBGMSB-1/135	GBGMSB-1/215	GBGMSB-1/275'	GBGMSB-1/325
VOCs					
1,1,2-Trichloroethane	<12	0.52 J	<3.1	<5 J	<1
2-Butanone (MEK)	1,600	<10	920	<50 J	<10
2-Hexanone	160	<10	210	<50 J	<10
4-Methyl-2-pentanone (MIBK)	<120	<10	32	<50 J	<10
Acetone	2,000	<10	1,100	<50 J	16
Benzene	11 J	<1	20	5.7 J	2.8
Carbon disulfide	8.1 J	<1	3.5	84 J	17
Carbon tetrachloride	<12	<1	<3.1	<5 J	0.12 J
cis-1,2-Dichloroethene	8.6 J	<1	4.8	<5 J	0.21 J
Ethylbenzene	<12	<1	6.3	<5 J	1.2
Tetrachloroethene	<12	<1	<3.1	2.8 J	<1
Toluene	12	0.69 J	30	5.0 J	2.7
Trichloroethene	6.2 J	<1	11	<5 J	0.70 J
Xylenes (total)	<12	<1	32	4.6 J	3.8
SVOC					
2,4-Dimethylphenol	1,100	2.3 J	2,500	130	100
2-Methylnaphthalene	<500	4.0 J	<1,000	<12	<10
2-Methylphenol	1,000	<5	2,800	<12	<10
4-Methylphenol	5,600	<5	11,000	<12	8.7 J

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Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GMSB-1	GMSB-1	GMSB-1	GMSB-1	GMSB-1
Sample Depth (ft bls)	85	135	215	275	325
Sample Date	05/16/97	05/17/97	05/18/97	05/19/97	06/02/97
Sample I.D.	GBGMSB-1/85	GBGMSB-1/135	GBGMSB-1/215	GBGMSB-1/275'	GBGMSB-1/325
SVOC (continued)					
bis(2-Ethylhexyl)phthalate	<500	3.2 J	<1,000	<12	14
Naphthalene	<500	4.2 J	<1,000	<12	<10
Phenol	2,000	<5	3,300 J	<12	<10
Methane	NA	7,400	87,200	NA	34,000
Biochemical Oxygen Demand	1,300,000 J	3,000 J	1,200,000	44,000 J	6,000
Chemical Oxygen Demand	3,100,000	33,000	2,700,000	180,000	73,000
Density	NA	NA	NA	NA	1,000
Total Organic Carbon	1,100,000	18,000	1,000,000	68,000	33,000

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Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Sample Depth (ft bls) Sample Date Sample I.D.	Criteria Residential Drinking Water Protection Criteria	Criteria Residential Indoor Air Inhalation Criteria	Criteria Industrial Groundwater Contact Criteria
VOCs			
1,1,2-Trichloroethane	5A	17,000	21,000
2-Butanone (MEK)	13,000 I	240,000,000 I, S	240,000,000 I, S
2-Hexanone	1,000	4,200,000	5,200,000
4-Methyl-2-pentanone (MIBK)	1,800 I	20,000,000 I, S	13,000,000 I
Acetone	730 I	1,000,000,000 D, I, S	31,000,000 I
Benzene	5 A, I	5,600 I	11,000 I
Carbon disulfide	800 I, R	250,000 I, R	1,200,000 I,R,S
Carbon tetrachloride	5A	370	4,600
cis-1,2-Dichloroethene	70 A	96,000	200,000
Ethylbenzene	74 E, I	170,000 I, S	170,000 I, S
Tetrachloroethene	5A	25,000	12,000
Toluene	790 E, I	530,000 I, S	530,000 I, S
Trichloroethene	5A	15,000	37,000
Xylenes (total)	280 E, I	190,000 I, S	190,000 I, S
SVOC			
2,4-Dimethylphenol	370	NLV	520,000
2-Methylnaphthalene	260	ID	25,000 S
2-Methylphenol	370 J	NLV	810,000 J
4-Methylphenol	370 J	NLV	810,000 J

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Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Sample Depth (ft bls) Sample Date Sample I.D.	Criteria Residential Drinking Water Protection Criteria	Criteria Residential Indoor Air Inhalation Criteria	Criteria Industrial Groundwater Contact Criteria
SVOC (continued)			
bis(2-Ethylhexyl)phthalate	6A	NLV	320 AA
Naphthalene	520	31,000 S	31,000 S
Phenol	4,400	NLV	29,000,000
Methane	ID	K	ID
Biochemical Oxygen Demand	NE	NE	NE
Chemical Oxygen Demand	NE	NE	NE
Density	NE	NE	NE
Total Organic Carbon	NE	NE	NE

Footnotes on Page 5.

Table 9. Summary of Constituents Detected in Groundwater Grab Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Results are reported in micrograms per liter (µg/L).

▨	Value above the Residential Drinking Water Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
ft bls	Feet below land surface.
J	Estimated result.
NA	Not analyzed.
VOC	Volatile organic compounds.
SVOC	Semi-volatile organic compounds.

Criteria Footnotes:

A	Criterion is the State of Michigan Drinking Water Standard, Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.
AA	Filtered groundwater samples must be collected for appropriate comparison.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
E	Criterion is the aesthetic drinking water value.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
K	Hazardous substance may be flammable and/or explosive.
NE	Not established.
NLV	Chemical is not likely to volatilize under most soil conditions.
R	Chemical may exhibit the characteristic of reactivity, as defined in 40 CFR 261.23.
S	Criterion defaults to the chemical-specific water solubility limit.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
VOC							
1,2,4-Trimethylbenzene	0.44	NA	<0.8	NA	NA	NA	1.4
1,3,5-Trimethylbenzene	<0.8	NA	<0.8	NA	NA	NA	<1.0
2-Butanone (MEK)	NA	<10	NA	NA	<10	<10	<50
Acetone	NA	<10	NA	NA	<10	<10	<100
Benzene	<0.8	0.56 J	1.1	NA	2.2	2.2	0.58 J
Carbon disulfide	NA	0.72 J	NA	NA	<1	<1	<5.0
Chloromethane	<0.8	<1	<.8	NA	<1	<1	<1.0
cis-1,2-Dichloroethene	<0.8	0.22 J	<.8	NA	<1	<1	<1.0
Ethylbenzene	<0.8	0.41 J	0.25 E	NA	0.48 J	0.52 J	0.58 J
Tetrachloroethene	<0.8	<1	<.8	NA	<1	<1	1.5
Toluene	<0.8	1.6	0.33 E	NA	0.62 J	0.63 J	0.94 J
Trichloroethene	<0.8	0.26 J	<.8	NA	<1	<1	<1.0
Xylenes (total)	<0.8	1.3	0.78	NA	1.4	1.5	3
SVOC							
2,4-Dimethylphenol	NA	R	NA	NA	<5	<5	<5.0
2-Methylnaphthalene	NA	<5	NA	NA	<5	<5	<5.0
2-Methylphenol	NA	R	NA	NA	<5	<5	<5.0
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	NA	NA	NA	<5.0
Benzo(a)anthracene	NA	<5	NA	NA	<5	<5	<5.0
Benzo(a)pyrene	NA	<5	NA	NA	<5	<5	<5.0
Benzo(b)fluoranthene	NA	<5	NA	NA	<5	<5	<5.0

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
SVOC (continued)							
Benzo(k)fluoranthene	NA	<5	NA	NA	<5	<5	<5.0
bis(2-Ethylhexyl)phthalate	NA	1.5 J	NA	NA	15	21	<5.0
Butylbenzylphthalate	NA	<5	NA	NA	<5	<5	<5.0
Chrysene	NA	<5	NA	NA	<5	<5	<5.0
Dibenzo(a,h)anthracene	NA	<5	NA	NA	<5	<5	<5.0
Fluoranthene	NA	<5	NA	NA	<5	<5	<5.0
Naphthalene	NA	<5	NA	NA	<5	<5	<5.0
Phenol	NA	R	NA	NA	<5	<5	<5.0
Pyrene	NA	<5	NA	NA	<5	<5	<5.0
Metals							
Arsenic	NA	NA	NA	NA	NA	NA	NA
Arsenic-DISS	NA	NA	NA	NA	NA	NA	7.0 B
Barium	NA	NA	NA	NA	NA	NA	NA
Barium-DISS	NA	NA	NA	NA	NA	NA	180
Boron	NA	NA	NA	29	NA	NA	NA
Calcium	236,920	270,000	NA	46,845	154,000	162,000	NA
Calcium-DISS	NA	NA	NA	NA	NA	NA	130,000
Chromium-DISS	NA	NA	NA	NA	NA	NA	<4.6
Cobalt-DISS	NA	NA	NA	NA	NA	NA	2.2 B
Iron	8,020	13,200	NA	ND	5,070	5,270	NA
Iron-DISS	NA	11,400	NA	NA	2,180	2,110	5,700

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
Metals (continued)							
Magnesium	109,630	107,000	NA	27,286	61,700	62,200	NA
Magnesium-DISS	NA	NA	NA	NA	NA	NA	35,000
Manganese	1,381	1,440	NA	47	691	713	NA
Manganese-DISS	NA	1,390	NA	NA	638	690	1,600
Mercury-DISS	NA	NA	NA	NA	NA	NA	<0.20
Molybdenum-DISS	NA	NA	NA	NA	NA	NA	6.2 B
Nickel-DISS	NA	NA	NA	NA	NA	NA	<25
Potassium	NA	5,350	NA	2,099	6,960	6,800	NA
Potassium-DISS	NA	NA	NA	NA	NA	NA	5,500
Sodium	8,446	6,880	NA	12,932	16,600	16,000	NA
Sodium-DISS	NA	NA	NA	NA	NA	NA	49,000 J
Titanium-DISS	NA	NA	NA	NA	NA	NA	4.3 B
Vanadium-DISS	NA	NA	NA	NA	NA	NA	<7.0
Zinc	NA	NA	NA	53	NA	NA	NA
Zinc-DISS	NA	NA	NA	NA	NA	NA	3.4 B
Inorganic							
Acetate	ND	NA	NA	128	NA	NA	NA
Alkalinity	510,000	460,000	NA	297,000	330,000	320,000	370,000
Ammonium	1,524	NA	NA	647	NA	NA	NA
Chloride	NA	40,000	NA	NA	35,000	35,000	5,200 J
Formate	108	NA	NA	98	NA	NA	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	BR-5A		BR-5B				GM-70
Top of Screen Depth (ft bls)	88	88	188	188	188	188	42
Sample Date	06/10/96	07/01/97	06/10/96	06/11/96	07/01/97	07/01/97	08/17/00
Sample I.D.	BR5A-696	GWBR-5A	BR5B-696	BR5B-696	GWBR-5B	GWGM-98	GWGM-70
Inorganic (continued)							
Hardness as CaCO3	NA	NA	NA	NA	NA	NA	480,000
Nitrogen, (Ammonia)	NA	1,000	NA	NA	900	1,200	150
Ortho-Phosphate	NA	NA	NA	NA	NA	NA	200
Phosphorus	NA	<100	NA	NA	<100	<100	NA
Propionate	ND	NA	NA	ND	NA	NA	NA
Silica	24,986	56,000	NA	7,269	26,000	41,000	NA
Silica, Dissolved	NA	NA	NA	NA	NA	NA	36,000
Sulfate	NA	320,000	NA	NA	2,600,000	390,000	160,000
Sulfide	380	2,000	NA	50	1,600	1,600	<100
Alcohols							
Methanol	NA	NA	NA	NA	NA	NA	41,000
Aldehydes							
Pentanal	NA	NA	NA	NA	NA	NA	<100 J
Propanal	NA	NA	NA	NA	NA	NA	<100 J
Methane	NA	820	NA	NA	15,800	17,100	16,300
Acetic Acid	NA	NA	NA	NA	NA	NA	1,700
Biochemical Oxygen Demand	NA	NA	NA	NA	NA	NA	<2,000 J
Chemical Oxygen Demand	NA	35,000	NA	NA	52,000	50,000	380,000
Total Organic Carbon	NA	6,000	NA	NA	12,000	13,000	120,000
Density	NA	1	NA	NA	1	1	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
VOC							
1,2,4-Trimethylbenzene	<1.0	17	NA	NA	<0.8	<1	<50
1,3,5-Trimethylbenzene	<1.0	4.6	NA	NA	<0.8	<1	<50
2-Butanone (MEK)	<50	200	NA	NA	NA	<50	<500
Acetone	<100	260	NA	NA	NA	<50	<500
Benzene	<1.0	15	<5	<5	<0.8	<1	<50
Carbon disulfide	<5.0	<5.0	NA	NA	NA	<10	<500
Chloromethane	<1.0	<1.0	<10	<10	<0.8	<1	<50
cis-1,2-Dichloroethene	<1.0	<1.0	NA	NA	<0.8	NA	NA
Ethylbenzene	<1.0	9.6	<5	<5	<0.8	<1	<50
Tetrachloroethene	6.8	1.8	<5	<5	<0.8	<1	<50
Toluene	<1.0	15	<5	<5	<0.8	<1	<50
Trichloroethene	<1.0	<1.0	<5	<5	<0.8	<1	<50
Xylenes (total)	<3.0	53	NA	NA	<0.8	<3	<50
SVOC							
2,4-Dimethylphenol	<5.0	2,000	<10	NA	NA	<5	<50
2-Methylnaphthalene	20	<50	NA	NA	NA	<5	<50
2-Methylphenol	<5.0	180	NA	NA	NA	<5	<50
3-Methylphenol/4-Methylphenol(m&p-cresol)	<5.0	630	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.73 J	<50	<10	NA	NA	<5	<50
Benzo(a)pyrene	1.2 J	<50	<10	NA	NA	<5	<50
Benzo(b)fluoranthene	1.0 J	<50	<10	NA	NA	<5	<50

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
SVOC (continued)							
Benzo(k)fluoranthene	0.99 J	<50	<10	NA	NA	<5	<50
bis(2-Ethylhexyl)phthalate	<5.0	<50	<10	NA	NA	<5	<50
Butylbenzylphthalate	0.75 J	<50	<10	NA	NA	<5	<50
Chrysene	0.95 J	<50	<10	NA	NA	<5	<50
Dibenzo(a,h)anthracene	0.94 J	<50	<10	NA	NA	<5	<50
Fluoranthene	0.64 J	<50	<10	NA	NA	<5	<50
Naphthalene	44	40 J	<10	NA	NA	<5	<50
Phenol	<5.0	180	<10	NA	NA	<5	<50
Pyrene	0.84 J	<50	<10	NA	NA	<5	<50
Metals							
Arsenic	NA	NA	<2	3.5	NA	NA	NA
Arsenic-DISS	11 B	40	NA	NA	NA	NA	NA
Barium	NA	NA	70	<20	NA	<200	<200
Barium-DISS	87 BJ	190 J	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	463,213	NA	NA
Calcium-DISS	120,000	680,000	NA	NA	NA	NA	NA
Chromium-DISS	<3.3	9.9	NA	NA	NA	NA	NA
Cobalt-DISS	14	1.2 B	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	18,862	15,400	6,470
Iron-DISS	34,000	1,300	NA	NA	NA	NA	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
Metals (continued)							
Magnesium	NA	NA	NA	NA	231,330	NA	NA
Magnesium-DISS	34,000	27,000	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	10,323	NA	NA
Manganese-DISS	2,000 J	1,800 J	NA	NA	NA	NA	NA
Mercury-DISS	<0.20	1.4	NA	NA	NA	NA	NA
Molybdenum-DISS	<10	3.0 B	NA	NA	NA	NA	NA
Nickel-DISS	5.8 B	2.8 B	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Potassium-DISS	5,400	12,000	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	9,732	NA	NA
Sodium-DISS	5,300	76,000	NA	NA	NA	NA	NA
Titanium-DISS	<0.49	45 B	NA	NA	NA	NA	NA
Vanadium-DISS	<2.4	27	NA	NA	NA	NA	NA
Zinc	NA	NA	30	80	332	NA	NA
Zinc-DISS	<5.3	<9.1	NA	NA	NA	NA	NA
Inorganic							
Acetate	NA	NA	NA	NA	2,141	1,012	NA
Alkalinity	140,000	1,000,000	NA	NA	395,000	307,000	650,000
Ammonium	NA	NA	NA	NA	1,112	1,149	494
Chloride	8,100 J	200,000	NA	30,000	NA	NA	NA
Formate	NA	NA	NA	NA	1,587	312	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	GM-71	GM-72	MW-3			MW-96-1	MW-96-2
Top of Screen Depth (ft bls)	39	43	42	42	42	65	60
Sample Date	08/21/00	08/22/00	06/30/85	11/25/87	06/10/96	06/14/96	06/14/96
Sample I.D.	GWGM-71	GWGM-72	MW-3	MW-3	MW-3	MW-96-1	MW-96-2
Inorganic (continued)							
Hardness as CaCO3	IS	1,700,000	NA	NA	NA	NA	NA
Nitrogen, (Ammonia)	140	62	NA	NA	NA	NA	NA
Ortho-Phosphate	NA	NA	NA	NA	NA	NA	NA
Phosphorus	<100	780	NA	NA	NA	NA	NA
Propionate	NA	NA	NA	NA	307	ND	NA
Silica	NA	NA	NA	NA	16,428	25,817	28,073
Silica, Dissolved	28,000	44,000	NA	NA	NA	NA	NA
Sulfate	220,000	360,000	NA	NA	NA	NA	NA
Sulfide	<100 J	7,800 J	NA	NA	20	590	460
Alcohols							
Methanol	<1,000	<1,000	NA	NA	NA	NA	NA
Aldehydes							
Pentanal	<100 J	160	NA	NA	NA	NA	NA
Propanal	<100 J	250	NA	NA	NA	NA	NA
Methane	2,630	13,600	NA	NA	NA	NA	NA
Acetic Acid	210	31,000	NA	NA	NA	NA	NA
Biochemical Oxygen Demand	<2,000	65,000	NA	NA	NA	NA	NA
Chemical Oxygen Demand	29,000	950,000	NA	NA	NA	NA	NA
Total Organic Carbon	8,900	270,000	NA	NA	NA	NA	NA
Density	NA	NA	NA	NA	NA	NA	NA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential	Residential
Sample Date	06/14/96	06/14/96	06/14/96	Drinking Water	Indoor Air
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4	Protection	Inhalation
VOC					
1,2,4-Trimethylbenzene	<1	<2	<1	63 E, I	56,000 I, S
1,3,5-Trimethylbenzene	<1	<2	<1	72 E, I	61,000 S, I
2-Butanone (MEK)	<50	NA	<50	13,000 I	240,000,000 I, S
Acetone	<50	NA	<50	730 I	1,000,000,000 D, I, S
Benzene	<1	<2	1.9	5 A, I	5,600 I
Carbon disulfide	<10	NA	<10	800 I, R	250,000 I, R
Chloromethane	<1	1.6	<1	260 I	8,600 I
cis-1,2-Dichloroethene	NA	<2	NA	70 A	96,000
Ethylbenzene	<1	<2	<1	74 E, I	170,000 I, S
Tetrachloroethene	<1	<2	<1	5 A	25,000
Toluene	<1	<2	1.8	790 E, I	530,000 I, S
Trichloroethene	<1	<2	<1	5 A	15,000
Xylenes (total)	<3	<2	<3	280 E, I	190,000 I, S
SVOC					
2,4-Dimethylphenol	<5	NA	<25 *	370	NLV
2-Methylnaphthalene	<5	NA	<25 *	260	ID
2-Methylphenol	<5	NA	<25 *	370 J	NLV
3-Methylphenol/4-Methylphenol(m&p-cresol)	NA	NA	NA	370 J	NLV
Benzo(a)anthracene	<5	NA	<25 *	2.1 Q	NLV
Benzo(a)pyrene	<5	NA	<25 *	5 A, M, Q	NLV
Benzo(b)fluoranthene	<5	NA	<25 *	2 M, Q	NLV

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Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential Drinking Water Protection	Residential Indoor Air Inhalation
Sample Date	06/14/96	06/14/96	06/14/96		
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4		
SVOC (continued)					
Benzo(k)fluoranthene	<5	NA	<25 *	5 M, Q	NLV
bis(2-Ethylhexyl)phthalate	<5	NA	<25 *	6 A	NLV
Butylbenzylphthalate	<5	NA	<25 *	1,200	NLV
Chrysene	<5	NA	<25 *	5 M, Q	ID
Dibenzo(a,h)anthracene	<5	NA	<25 *	5 M, Q	NLV
Fluoranthene	<5	NA	<25 *	210 S	210 S
Naphthalene	<5	NA	<25 *	520	31,000 S
Phenol	<5	NA	<25 *	4,400	NLV
Pyrene	<5	NA	<25 *	140 S	140 S
Metals					
Arsenic	NA	NA	NA	50 A, B	NLV
Arsenic-DISS	NA	NA	NA	50 A, B	NLV
Barium	<200	NA	<200	2,000 A	NLV
Barium-DISS	NA	NA	NA	2,000 A	NLV
Boron	NA	NA	NA	500 B, F	NLV
Calcium	NA	NA	NA	NE	NE
Calcium-DISS	NA	NA	NA	NE	NE
Chromium-DISS	NA	NA	NA	100 A	NLV
Cobalt-DISS	NA	NA	NA	40	NLV
Iron	**4,840**	NA	110	300 B, E	NLV
Iron-DISS	NA	NA	NA	300 B, E	NLV

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential Drinking Water Protection	Residential Indoor Air Inhalation
Sample Date	06/14/96	06/14/96	06/14/96		
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4		
Metals (continued)					
Magnesium	NA	NA	NA	400,000 B	NLV
Magnesium-DISS	NA	NA	NA	400,000 B	NLV
Manganese	NA	NA	NA	50 E,B	NLV
Manganese-DISS	NA	NA	NA	50 E,B	NLV
Mercury-DISS	NA	NA	NA	2 A, INO	NLV INO
Molybdenum-DISS	NA	NA	NA	37 B	NLV
Nickel-DISS	NA	NA	NA	100 A, B	NLV
Potassium	NA	NA	NA	NE	NE
Potassium-DISS	NA	NA	NA	NE	NE
Sodium	NA	NA	NA	120,000	NLV
Sodium-DISS	NA	NA	NA	120,000	NLV
Titanium-DISS	NA	NA	NA	NE	NE
Vanadium-DISS	NA	NA	NA	4.5	NLV
Zinc	NA	NA	NA	2,400 B	NLV
Zinc-DISS	NA	NA	NA	2,400 B	NLV
Inorganic					
Acetate	498	NA	98	NE	NE
Alkalinity	457,000	NA	395,000	NE	NE
Ammonium	836	NA	161	NE	NE
Chloride	NA	NA	NA	250,000 E	NLV
Formate	117	NA	69	NE	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	MW-96-3		MW-96-4	Criteria	
Top of Screen Depth (ft bls)	66	66	60	Residential Drinking Water Protection	Residential Indoor Air Inhalation
Sample Date	06/14/96	06/14/96	06/14/96		
Sample I.D.	MW-96-3	MW-96-3/EPA	MW-96-4		
Inorganic (continued)					
Hardness as CaCO3	NA	NA	NA	NE	NE
Nitrogen, (Ammonia)	NA	NA	NA	10,000 N	3,200,000
Ortho-Phosphate	NA	NA	NA	NE	NE
Phosphorus	NA	NA	NA	63,000 Total	NLV, TOTAL
Propionate	551	NA	282	NE	NE
Silica	22,541	NA	27,159	NE	NE
Silica, Dissolved	NA	NA	NA	NE	NE
Sulfate	NA	NA	NA	250,000 E	NLV
Sulfide	210	NA	240	NE	NE
Alcohols					
Methanol	NA	NA	NA	3,700	2,500,000
Aldehydes					
Pentanal	NA	NA	NA	NE	NE
Propanal	NA	NA	NA	NE	NE
Methane	NA	NA	NA	ID	K
Acetic Acid	NA	NA	NA	18,000 M	NLV
Biochemical Oxygen Demand	NA	NA	NA	NE	NE
Chemical Oxygen Demand	NA	NA	NA	NE	NE
Total Organic Carbon	NA	NA	NA	NE	NE
Density	NA	NA	NA	NE	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Criteria (continued)
Top of Screen Depth (ft bls)	
Sample Date	Groundwater
Sample I.D.	Contact
VOC	
1,2,4-Trimethylbenzene	56,000 I, S
1,3,5-Trimethylbenzene	61,000 S, I
2-Butanone (MEK)	240,000,000 I, S
Acetone	31,000,000 I
Benzene	11,000 I
Carbon disulfide	1,200,000 I,R,S
Chloromethane	490,000
cis-1,2-Dichloroethene	200,000
Ethylbenzene	170,000 I, S
Tetrachloroethene	12,000
Toluene	530,000 I, S
Trichloroethene	37,000
Xylenes (total)	190,000 I, S
SVOC	
2,4-Dimethylphenol	520,000
2-Methylnaphthalene	25,000 S
2-Methylphenol	810,000 J
3-Methylphenol/4-Methylphenol(m&p-cresol)	810,000 J
Benzo(a)anthracene	9.4 Q, S, AA
Benzo(a)pyrene	5 M,Q, AA
Benzo(b)fluoranthene	2 M,Q, AA

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Criteria (continued)
Top of Screen Depth (ft bls)	
Sample Date	Groundwater
Sample I.D.	Contact
SVOC (continued)	
Benzo(k)fluoranthene	5 M, Q, AA
bis(2-Ethylhexyl)phthalate	320 AA
Butylbenzylphthalate	2,700 S
Chrysene	5 M, Q, AA
Dibenzo(a,h)anthracene	5 M, Q, AA
Fluoranthene	210 S
Naphthalene	31,000 S
Phenol	29,000,000
Pyrene	140 S
Metals	
Arsenic	4,300 B
Arsenic-DISS	4,300 B
Barium	14,000,000
Barium-DISS	14,000,000
Boron	62,000,000 B
Calcium	NE
Calcium-DISS	NE
Chromium-DISS	460,000
Cobalt-DISS	2,400,000
Iron	58,000,000 B
Iron-DISS	58,000,000 B

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring Top of Screen Depth (ft bls) Sample Date Sample I.D.	Criteria (continued) Groundwater Contact
Metals (continued)	
Magnesium	1,000,000,000 B, D
Magnesium-DISS	1,000,000,000 B, D
Manganese	9,100,000 B
Manganese-DISS	9,100,000 B
Mercury-DISS	56 S, INO
Molybdenum-DISS	970,000 B
Nickel-DISS	74,000,000 B
Potassium	NE
Potassium-DISS	NE
Sodium	1,000,000,000 D
Sodium-DISS	1,000,000,000 D
Titanium-DISS	NE
Vanadium-DISS	970,000
Zinc	110,000,000 B
Zinc-DISS	110,000,000 B
Inorganic	
Acetate	NE
Alkalinity	NE
Ammonium	NE
Chloride	ID
Formate	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Well/Boring	Criteria (continued)
Top of Screen Depth (ft bls)	
Sample Date	Groundwater
Sample I.D.	Contact
Inorganic (continued)	
Hardness as CaCO3	NE
Nitrogen, (Ammonia)	ID
Ortho-Phosphate	NE
Phosphorus	ID, Total
Propionate	NE
Silica	NE
Silica, Dissolved	NE
Sulfate	ID
Sulfide	NE
Alcohols	
Methanol	29,000,000 S
Aldehydes	
Pentanal	NE
Propanal	NE
Methane	ID
Acetic Acid	180,000,000
Biochemical Oxygen Demand	NE
Chemical Oxygen Demand	NE
Total Organic Carbon	NE
Density	NE

Footnotes on Page 17.

Table 10. Summary of Constituents Detected in Groundwater Samples, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Results are reported in micrograms per liter (µg/L).

▨	Value above the Residential Drinking Water Criteria (Operational Memorandum #18, June 7, 2000).
<	Less than detection limit.
*	Duplicate analysis not within control limits.
E	Analyte was detected at concentration greater than the calibration range, and is therefore estimated.
ft bls	Feet below land surface.
J	Estimated result.
NA	Not analyzed.
VOC	Volatile organic compounds.
SVOC	Semi-volatile organic compounds.

Criteria Footnotes:

A	Criterion is the State of Michigan Drinking Water Standard, Section 5 of the Safe Drinking Water Act, Act no. 399 of the Public Acts of 1976.
AA	Filtered groundwater samples must be collected for appropriate comparison.
B	Background, as defined in Rule 299.57019(c), may be substituted if higher than the calculated cleanup criteria. Background levels may not exceed criteria for all inorganic compounds.
D	Calculated criterion exceeds 100%, hence it is reduced to 100%.
E	Criterion is the aesthetic drinking water value.
F	Criterion is based on impacts to plant life.
I	Chemical may exhibit the characteristic of ignitability, as defined in 40 CFR 261.21.
ID	Insufficient data.
INO	Inorganic.
J	Chemical may be present in several isomer forms. Isomer specific concentrations must be added together for comparison to criteria.
K	Hazardous substance may be flammable and/or explosive.
M	Calculated value is below the analytical Target Dectection Limit (TDL), therefore, the criterion defaults to the TDL.
N	Add all potential sources of nitrate-nitrogen.
NE	Not established.
NLV	Chemical is not likely to volatilize under most soil conditions.
Q	Criterion for carcinogenic polycyclic aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
R	Chemical may exhibit the characteristic of reactivity, as defined in 40 CFR 261.23.
S	Criterion defaults to the chemical-specific water solubility limit.

Table 11. Estimated Cost of a Permeable Cover System Response Action, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

CAPITAL COSTS

CAPITAL COST	Quantity	Unit	Cost per Unit	Total
DIRECT CAPITAL COST				
EQUIPMENT				
Land Acquisition	7	Acre	$28,000	$196,000
Construction Storm Water Controls	1	LS	$7,500	$7,500
Stormwater Mgt	4	Month	$3,130	$12,500
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	3,709	CY	$5.00	$18,500
Relocation of Waste	3,709	CY	$5.00	$18,500
Tar Stabilization	2,222	CY	$10.00	$22,200
Cover Soil Placement	23,027	CY	$4.00	$92,100
Topsoil (6" thick, 4 acres)	3,227	CY	$16.00	$51,600
Permanent Storm Water Controls	1	LS	$15,000	$15,000
Seed, Fertilizer, Mulch, Tack	4	Acre	$1,000	$4,000
Chain Link Fence	1,480	LF	$10.00	$14,800
Permanent Markers	1	Ea	$500	$500
SUBTOTAL EQUIPMENT COST				$545,300
LABOR AND INSTALLATION				
Mob/Demob	1	LS	$50,000	$50,000
Clearing & Grubbing	7	LS	$2,500	$17,500
Construction Storm Water Controls	1	LS	$12,500	$12,500
Stormwater Mgt	4	Month	$500	$2,000
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	3,709	CY	$5.50	$20,400
Relocation of Waste	3,709	CY	$5.50	$20,400
Tar Stabilization	2,222	CY	$20.00	$44,400
Cover Soil Placement	23,027	CY	$4.00	$92,100
Topsoil Placement	3,227	CY	$4.00	$12,900
Permanent Storm Water Controls	1	LS	$25,000	$25,000
Seed, Fertilizer, Mulch, Tack	4	Acre	$1,000	$4,000
Chain Link Fence	1,480	LF	$7.00	$10,400
Permanent Markers	1	Ea	$500	$500
Verification Sampling	25	LS	$1,405	$35,100

OPERATIONS AND MAINTENANCE COSTS

ANNUAL O&M COST	Quantity	Unit	Cost per Unit	Total
DIRECT ANNUAL O&M COST				
Long Term Maintenance	1	LS	$10,000	$10,000
Annual Inspection	1	LS	$2,500	$2,500
Vapor Monitoring	1	LS	$2,500	$2,500
Reporting	1	LS	$4,000	$4,000
SUBTOTAL ANNUAL O&M COST				*$19,000*
INDIRECT ANNUAL O&M COST				
Project Management	10%			$1,900
Contingency	0%			$0
SUBTOTAL INDIRECT ANNUAL O&M COST				*$1,900*
TOTAL ANNUAL O&M COST				***$20,900***
PRESENT WORTH OF NEXT 30 YEARS OF O&M				**$321,000**

Footnotes on Page 2

Table 11. Estimated Cost of a Permeable Cover System Response Action, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

CAPITAL COSTS					**OPERATIONS AND MAINTENANCE COSTS**				
CAPITAL COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**	*ANNUAL O&M COST*	**Quantity**	**Unit**	**Cost per Unit**	**Total**
Existing Soil Verification Sampling	25	LS	$1,405	$35,100					
Waste Transportation & Disposal	100	TN	$70	$7,000					
Surveying	1	LS	$20,000	$20,000					
Geotechnical Testing	1	LS	$5,000	$5,000					
SUBTOTAL LABOR AND INSTALLATION				$506,400					
SUBTOTAL DIRECT CAPITAL COST				*$1,051,700*					
INDIRECT CAPITAL COST									
Engineering and Design	15%			$128,400					
Health & Safety	5%			$42,800					
Construction Oversight	15%			$128,400					
Contingency	25%			$213,900					
Closure Report				$25,000					
SUBTOTAL INDIRECT CAPITAL COST				*$538,500*					
TOTAL CAPITAL COSTS				**$1,590,200**					
		NET PRESENT COST OF SYSTEM				**$1,911,000**			

Verification Sampling on faces/bases of excavated channel area - basis is discussed in the waste memo.
Basis for Existing soil verification is 1 sample per 1,000 cy.

Table 12. Estimated Cost of a Low-Permeable Cover System Response Action, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

CAPITAL COSTS

CAPITAL COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**
DIRECT CAPITAL COST				
EQUIPMENT				
Land Acquisition	7	Acre	$28,000	$196,000
Construction Storm Water Controls	1	LS	$7,500	$7,500
Stormwater Mgt	5	Month	$3,130	$15,700
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	3,709	CY	$5.00	$18,500
Relocation of Waste	3,709	CY	$5.00	$18,500
Cover Soil Placement	23,027	CY	$4.00	$92,100
Venting Equipment	1	LS	$10,000	$10,000
HDPE Synthetic Liner (2.3 acres)	97,512	SF	$0.38	$37,100
Geofabric (2.3 acres - 4 layers)	390,048	SF	$0.10	$39,000
Geogrid	97,512	SF	$0.36	$35,100
Base (6" thick, 2.7 acres)	2,203	CY	$6.00	$13,200
Subbase (12" thick, 2.7acres)	4,406	CY	$3.00	$13,200
Asphalt Paving (2.7 acres)	118,970	SF	$0.10	$11,900
Permanent Storm Water Controls	1	LS	$15,000	$15,000
Seed, Fertilizer, Mulch, Tack	4	Acre	$1,000	$4,000
Permanent Markers	4	Ea	$500	$2,000
SUBTOTAL EQUIPMENT COST				$620,900
LABOR AND INSTALLATION				
Mob/Demob	1	LS	$50,000	$50,000
Clearing & Grubbing	7	LS	$2,500	$17,500
Construction Storm Water Controls	1	LS	$12,500	$12,500
Stormwater Mgt	5	Month	$500	$2,500
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	3,709	CY	$5.50	$20,400
Relocation of Waste	3,709	CY	$5.50	$20,400
Cover Soil Placement	23,027	CY	$4.00	$92,100
Venting Equipment Installation	1	LS	$10,000	$10,000
HDPE Synthetic Liner (2.3 acres)	97,512	SF	$0.23	$22,400

OPERATIONS AND MAINTENANCE COSTS

ANNUAL O&M COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**
DIRECT ANNUAL O&M COST				
Long Term Maintenance	1	LS	$10,000	$10,000
Annual Inspection	1	LS	$2,500	$2,500
Vapor Monitoring	1	LS	$2,500	$2,500
Reporting	1	LS	$4,000	$4,000
SUBTOTAL ANNUAL O&M COST				*$19,000*
INDIRECT ANNUAL O&M COST				
Project Management	10%			$1,900
Contingency	0%			$0
SUBTOTAL INDIRECT ANNUAL O&M COST				*$1,900*
TOTAL ANNUAL O&M COST				***$20,900***
PRESENT WORTH OF NEXT 30 YEARS OF O&M				**$321,000**

Footnotes on Page 2.

Table 12. Estimated Cost of a Low-Permeable Cover System Response Action, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

CAPITAL COSTS

CAPITAL COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**
Geofabric (2.3 acres - 4 layers)	390,048	SF	$0.14	$54,600
Geogrid	97,512	SF	$0.14	$13,700
Base (6" thick, 2.7 acres)	2,203	CY	$12.00	$26,400
Subbase (12" thick, 2.7acres)	4,406	CY	$9.00	$39,700
Asphalt Paving (2.7 acres)	118,970	SF	$0.70	$83,300
Permanent Storm Water Controls	1	LS	$25,000	$25,000
Seed, Fertilizer, Mulch, Tack	4	Acre	$1,000	$4,000
Permanent Markers	4	Ea	$500	$2,000
Verification Sampling	25	LS	$1,405	$35,100
Existing Soil Verification Sampling	25	LS	$1,405	$35,100
Waste Transportation & Disposal	100	TN	$70	$7,000
Surveying	1	LS	$40,000	$40,000
Geotechnical Testing	1	LS	$25,000	$25,000
SUBTOTAL LABOR AND INSTALLATION				$730,800
SUBTOTAL DIRECT CAPITAL COST				*$1,351,700*
INDIRECT CAPITAL COST				
Engineering and Design	15%			$173,400
Health & Safety	4%			$46,200
Construction Oversight	15%			$173,400
Contingency	25%			$288,900
Closure Report				$25,000
SUBTOTAL INDIRECT CAPITAL COST				*$706,900*
TOTAL CAPITAL COSTS				**$2,058,600**

OPERATIONS AND MAINTENANCE COSTS

ANNUAL O&M COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**

NET PRESENT COST OF SYSTEM	**$2,380,000**

Verification Sampling on faces/bases of excavated channel area - basis is discussed in the waste memo.
Basis for Existing soil verification is 1 sample per 1,000 cy.

Table 13. Estimated Cost of an Excavation and Off-Site Disposal of Waste Material Response Action, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

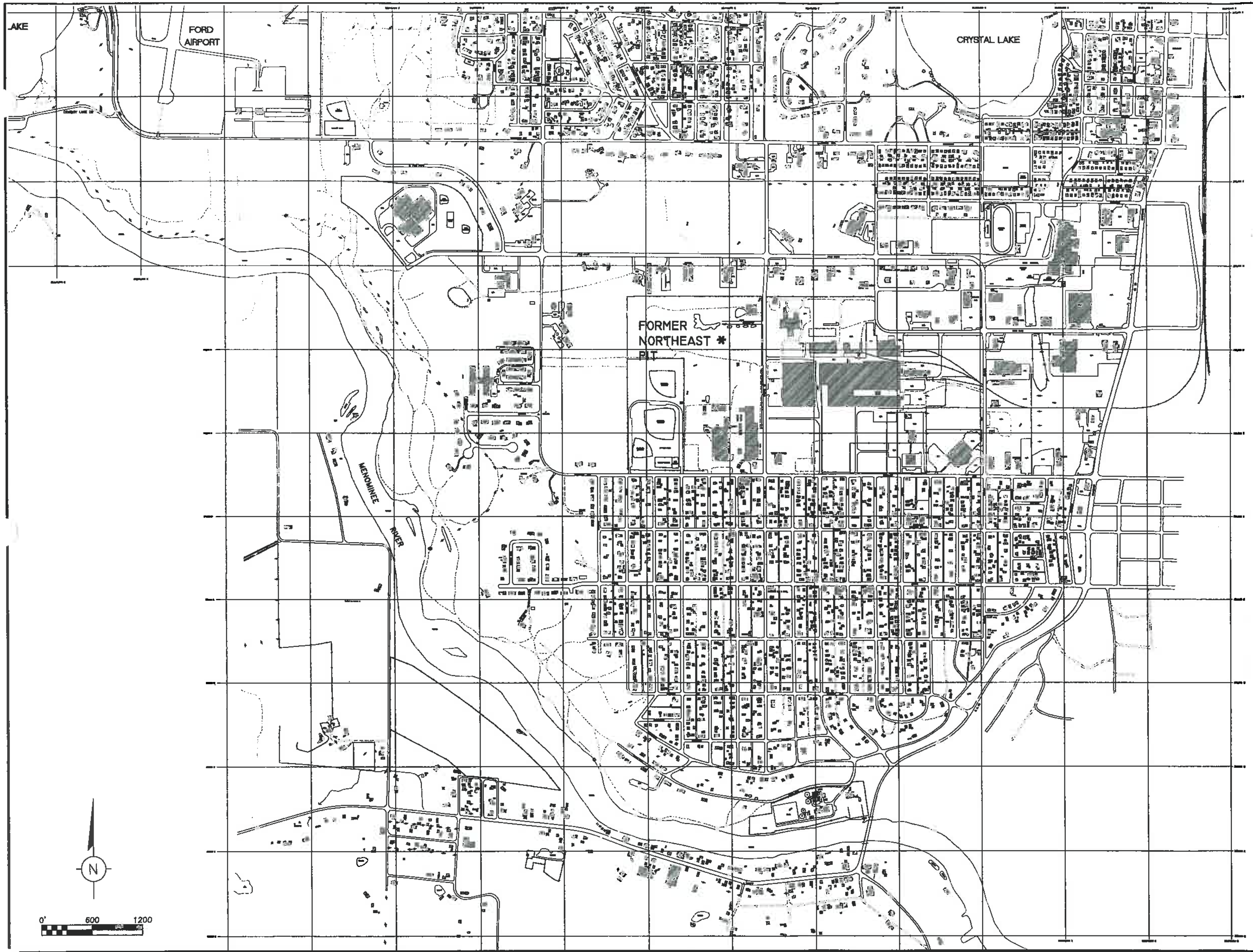
CAPITAL COSTS

CAPITAL COST	**Quantity**	**Unit**	**Cost per Unit**	**Total**
DIRECT CAPITAL COST				
EQUIPMENT				
Land Acquisition	7	Acre	$28,000	$196,000
Construction Storm Water Controls	1	LS	$7,500	$7,500
Stormwater Mgt	10	Month	$3,130	$31,300
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	53,000	CY	$5.00	$265,000
Cover Soil Placement	23,027	CY	$4.00	$92,100
Seed, Fertilizer, Mulch, Tack	7	Acre	$1,000	$7,000
SUBTOTAL EQUIPMENT COST				$691,000
LABOR AND INSTALLATION				
Mob/Demob	1	LS	$50,000	$50,000
Clearing & Grubbing	7	Acre	$2,500	$17,500
Construction Storm Water Controls	1	LS	$12,500	$12,500
Stormwater Mgt	10	Month	$500	$5,000
Excavation of Cover	23,027	CY	$4.00	$92,100
Excavation of Waste	53,000	CY	$5.50	$291,500
Cover Soil Placement	23,027	CY	$4.00	$92,100
Seed, Fertilizer, Mulch, Tack	7	Acre	$1,000	$7,000
Verification Sampling	70	LS	$1,405	$98,400
Existing Soil Verification Sampling	25	LS	$1,405	$35,100
Waste Transportation & Disposal	79,500	TN	$100	$7,950,000
Surveying	1	LS	$5,000	$5,000
SUBTOTAL LABOR AND INSTALLATION				$8,656,200
SUBTOTAL DIRECT CAPITAL COST				*$9,347,200*
INDIRECT CAPITAL COST				
Engineering and Design	2%			$183,000
Health & Safety	5%			$457,600
Construction Oversight	5%			$457,600
Contingency	25%			$2,287,800
Closure Report				$25,000
SUBTOTAL INDIRECT CAPITAL COST				*$3,411,000*
TOTAL CAPITAL COSTS				**$12,758,200**
	NET PRESENT COST OF SYSTEM			**$12,758,000**

Common fill placement= replacing what has been excavated, waste moved to pit.

Verification Sampling on faces/bases of excavated channel area - basis is discussed in the waste memo.

Basis for Existing soil verification is 1 sample per 1,000 cy.



NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG	DATE 09/27/02

LOCATION OF FORMER
NORTHEAST PIT

PROJECT MANAGER EC	DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE	CHECKED BE
PROJECT NUMBER WI00975.0012	FIGURE 1

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
DATE OF PHOTOGRAPHY: 05/04/97
ABRAMS AERIAL SURVEY CORPORATION # 26984.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

LEGEND

●	MONITOR WELL LOCATION
◕	SOIL BORING LOCATION
▚	FORMER TEMPORARY MONITOR WELL LOCATION
▲	GAS PROBES
■	TEST PIT LOCATION
☼	SURFACE SOIL SAMPLE LOCATION
◯	FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS
△ TS–3	SURFACE SEEP LOCATION
— – – —	PROPERTY BOUNDARY

G:\CAD\NORTHEAST PIT INVESTIGATION REPORT/FINAL REPORT/FIGURE 2

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NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
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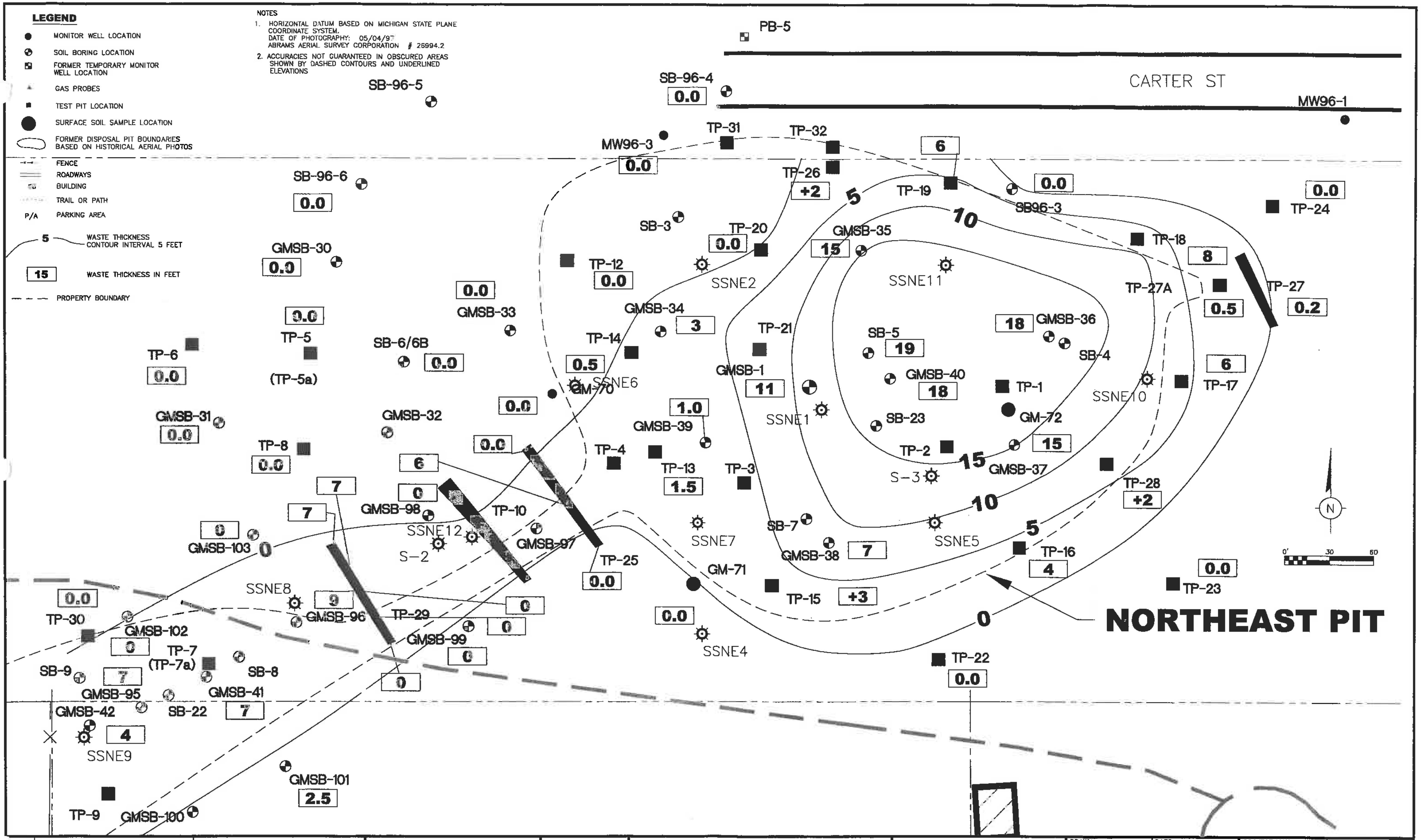
FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG	DATE 9/27/02

FORMER NORTHEAST
PIT AREA

PROJECT MANAGER EC	DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE	CHECKED BE
PROJECT NUMBER WI00975.0012	FIGURE 2



LEGEND

●	MONITOR WELL LOCATION
⊕	SOIL BORING LOCATION
▨	FORMER TEMPORARY MONITOR WELL LOCATION
▲	GAS PROBES
■	TEST PIT LOCATION
●	SURFACE SOIL SAMPLE LOCATION
○	FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS
—x—	FENCE
═	ROADWAYS
▨	BUILDING
┄	TRAIL OR PATH
P/A	PARKING AREA
5	WASTE THICKNESS CONTOUR INTERVAL 5 FEET
15	WASTE THICKNESS IN FEET
— — —	PROPERTY BOUNDARY

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

NO.	DATE	REVISION DESCRIPTION	BY / CKD

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FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

ISOPACH MAP OF THE
WASTE THICKNESS

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE 3

LEGEND

● MONITOR WELL LOCATION

⊕ SOIL BORING LOCATION

▨ FORMER TEMPORARY MONITOR WELL LOCATION

▲ GAS PROBES

■ TEST PIT LOCATION

☼ SURFACE SOIL SAMPLE LOCATION

⬭ FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS

FENCE

ROADWAYS

BUILDING

TRAIL OR PATH

P/A PARKING AREA

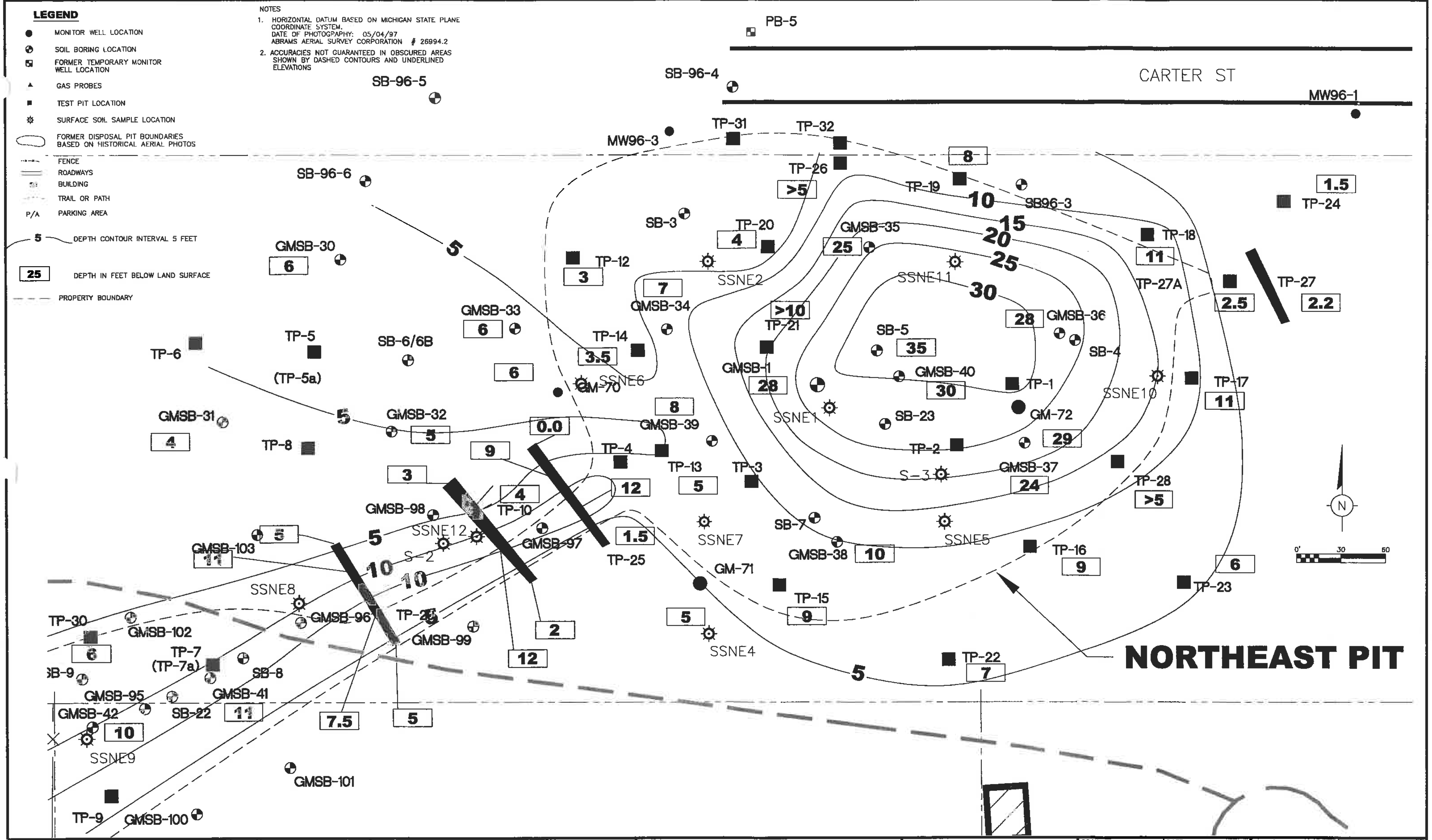
5 DEPTH CONTOUR INTERVAL 5 FEET

25 DEPTH IN FEET BELOW LAND SURFACE

PROPERTY BOUNDARY

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS



NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS

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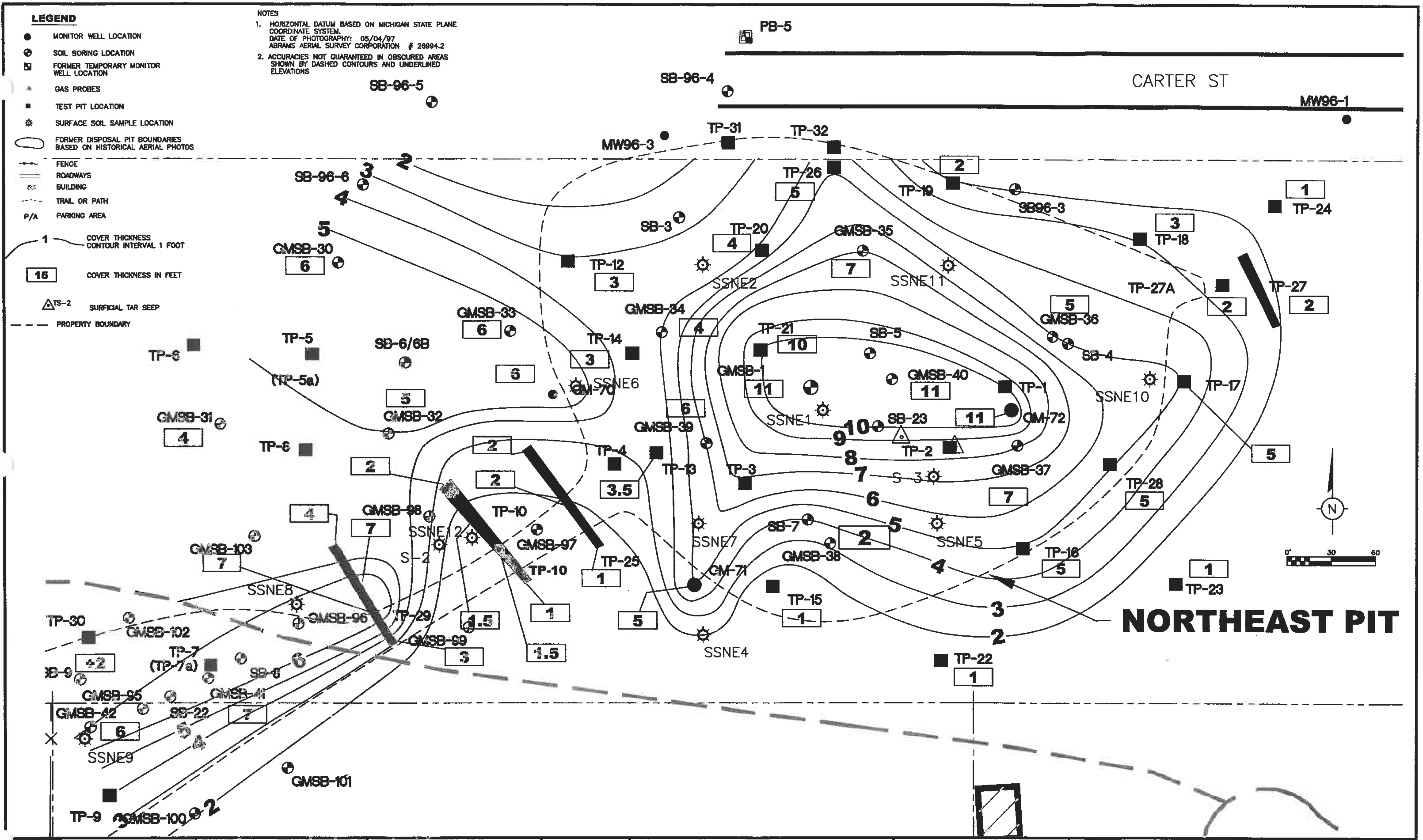
FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

DEPTH TO THE BASE OF THE FILL OR WASTE

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE 4



LEGEND

- ● MONITOR WELL LOCATION
- ⊕ SOIL BORING LOCATION
- ▨ FORMER TEMPORARY MONITOR WELL LOCATION
- ▲ GAS PROBES
- ■ TEST PIT LOCATION
- ✲ SURFACE SOIL SAMPLE LOCATION
- FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS
- FENCE
- ROADWAYS
- BUILDING
- TRAIL OR PATH
- P/A PARKING AREA
- 1 COVER THICKNESS CONTOUR INTERVAL 1 FOOT
- 15 COVER THICKNESS IN FEET
- △TS-2 SURFICIAL TAR SEEP
- — — — PROPERTY BOUNDARY

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

NO.	DATE	REVISION DESCRIPTION	BY	CKD

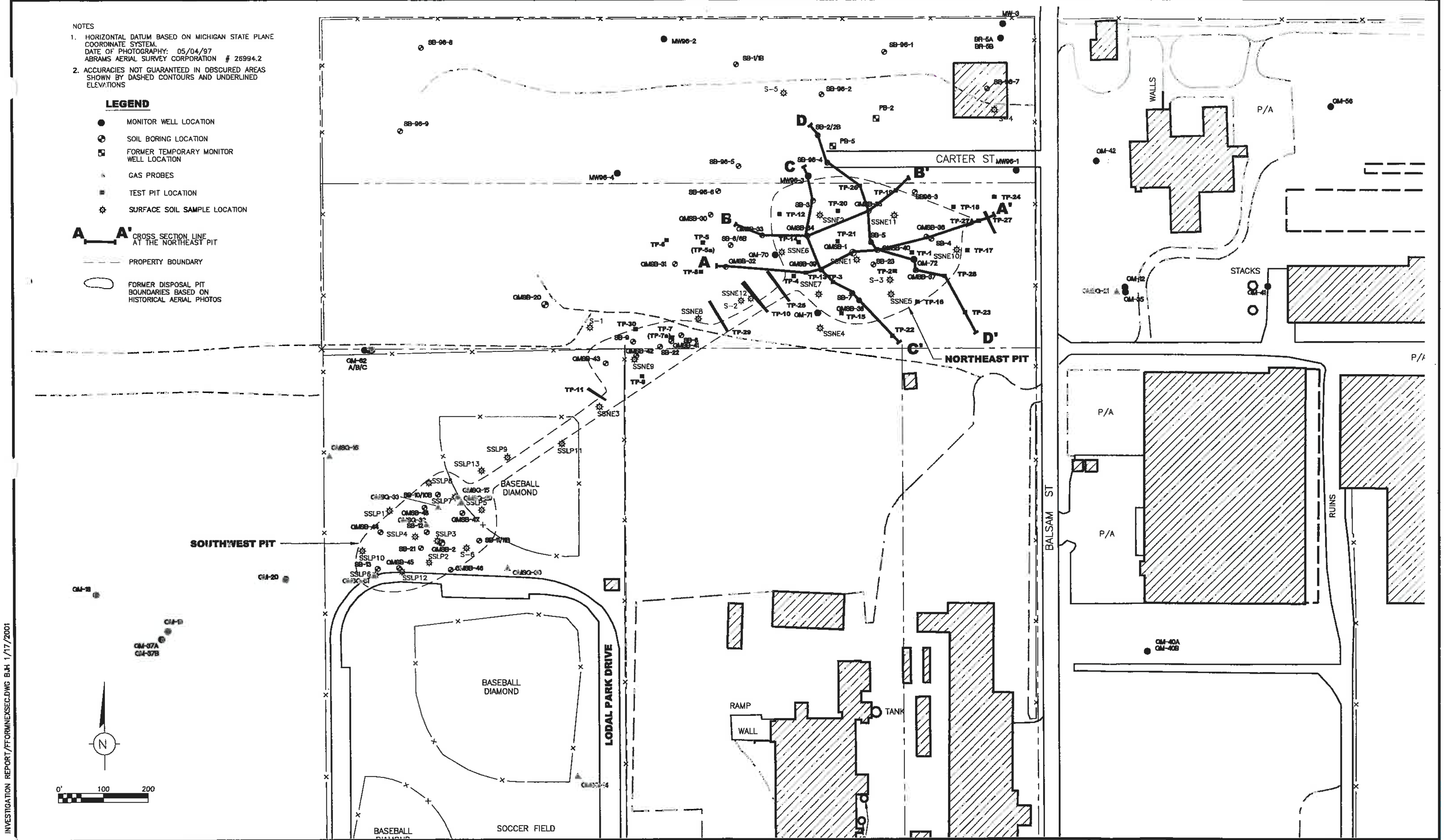
ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

ISOPACH MAP OF THE COVER THICKNESS

DRAWN JMG	DATE 09/27/02
PROJECT MANAGER EC	DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE	CHECKED BE
PROJECT NUMBER WI00975.0012	FIGURE 5



NOTES
1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
DATE OF PHOTOGRAPHY: 05/04/97
ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

LEGEND

● MONITOR WELL LOCATION
SOIL BORING LOCATION
FORMER TEMPORARY MONITOR WELL LOCATION
GAS PROBES
▪ TEST PIT LOCATION
SURFACE SOIL SAMPLE LOCATION
A—A' CROSS SECTION LINE AT THE NORTHEAST PIT
PROPERTY BOUNDARY
FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS

G:\CAD\NORTHEA INVESTIGATION REPORT/FFORMNEXSEC.DWG BJH 1/17/2001

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

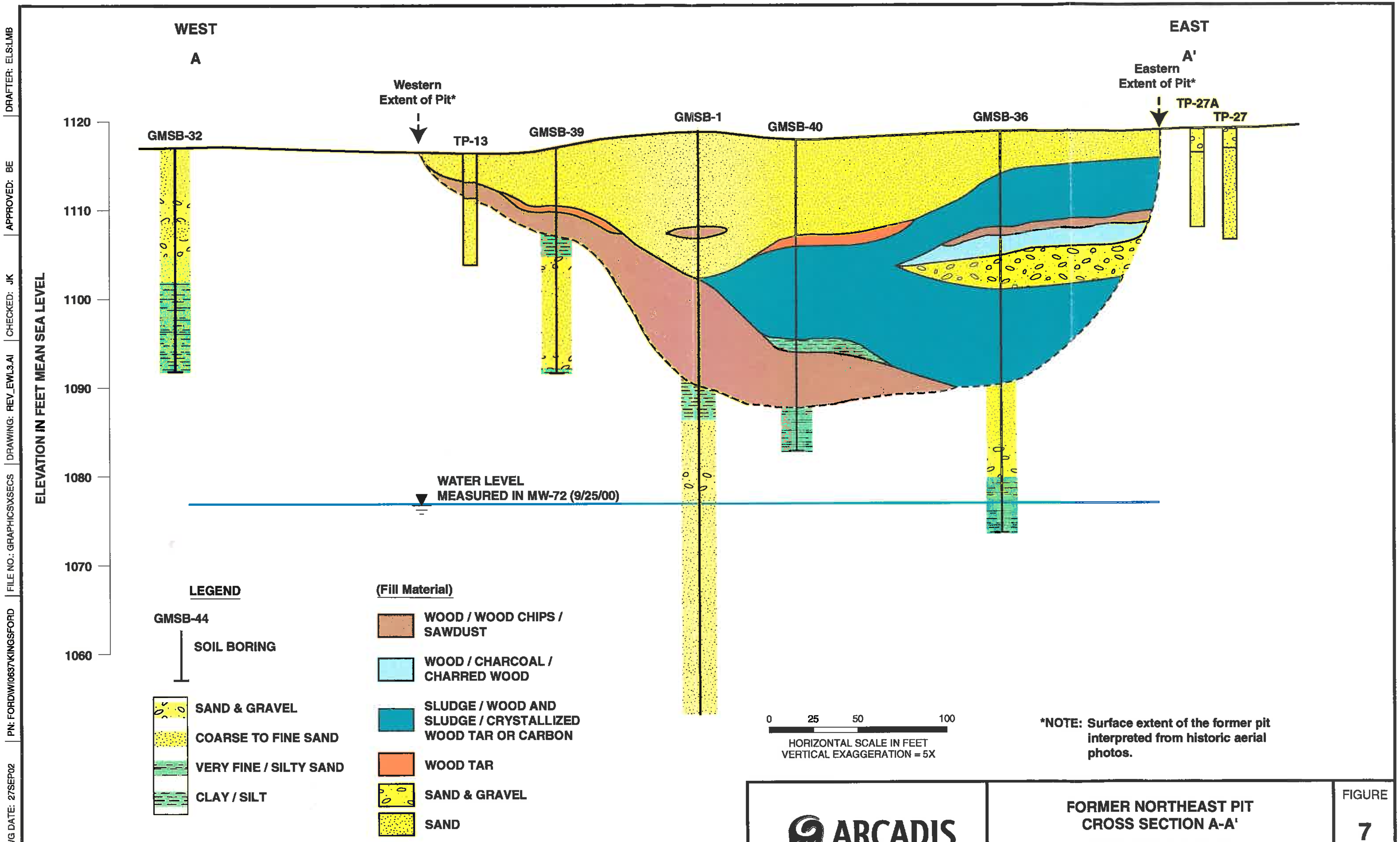
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

LOCATIONS OF
CROSS SECTIONS
FORMER NORTHEAST
PIT AREAS

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE 6

DRAFTER: ELS:LMB
APPROVED: BE
CHECKED: JK
DRAWING: REV_EWL3.AI
FILE NO.: GRAPHICS\XSECS
PN: FORDWI0637KINGSFORD
DWG DATE: 27SEP02



*NOTE: Surface extent of the former pit interpreted from historic aerial photos.

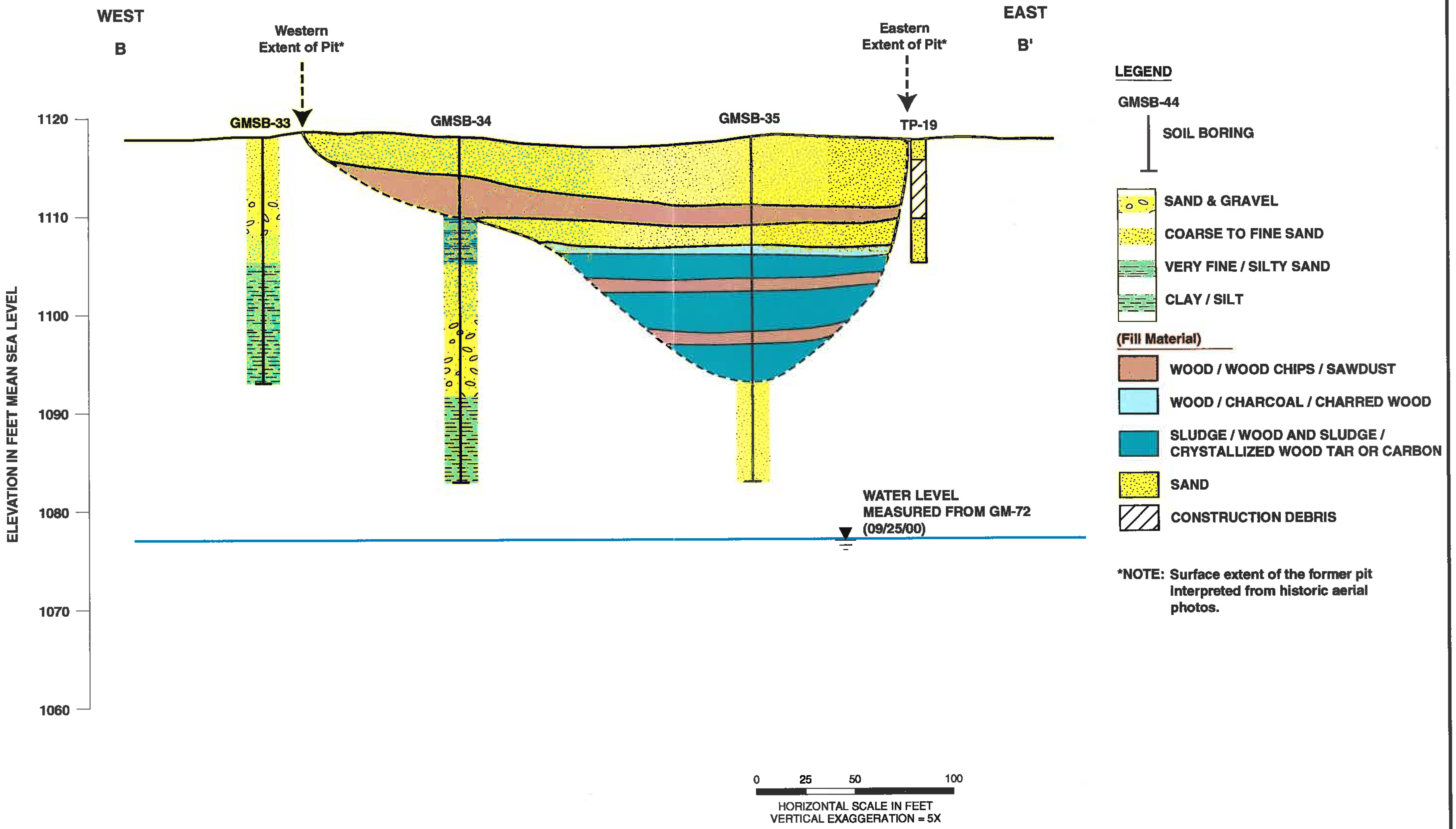
ARCADIS

FORMER NORTHEAST PIT CROSS SECTION A-A'

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
7

DRAFTER: ELS:LMB
APPROVED: BE
CHECKED: JK
DRAWING: REV_EWL2.AI
FILE NO.: GRAPHICS\XSECS
PN: FORDWI0637KINGSFORD
DWG DATE: 27SEP02



*NOTE: Surface extent of the former pit interpreted from historic aerial photos.

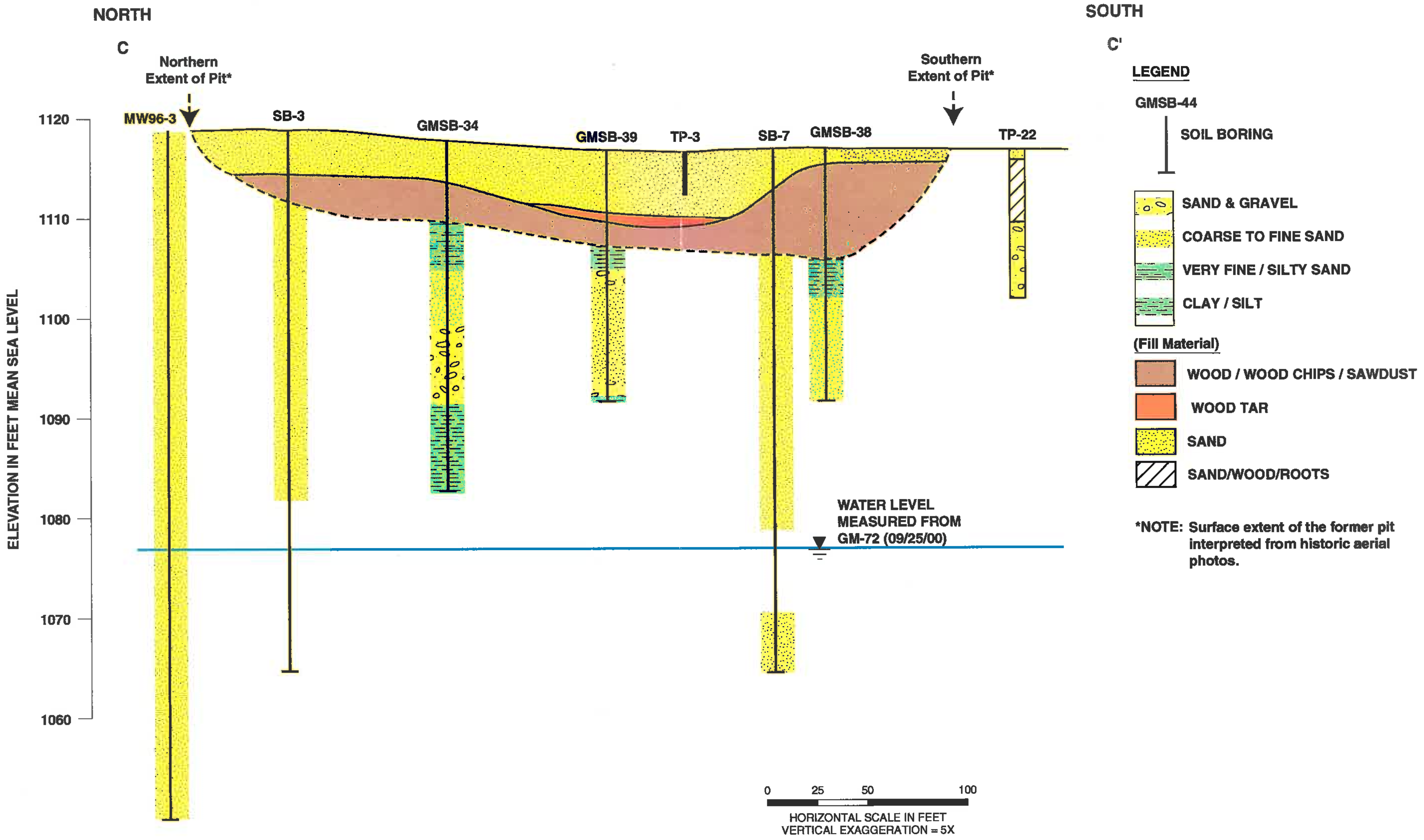
ARCADIS

FORMER NORTHEAST PIT
CROSS SECTION B-B'

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
8

DWG DATE: 27SEP02 | PN: FORD\WI0637\KINGSFORD | FILE NO.: GRAPHICS\XSECS | DRAWING: REV_NSL4.AI | CHECKED: JK | APPROVED: BE | DRAFTER: ELS



*NOTE: Surface extent of the former pit interpreted from historic aerial photos.

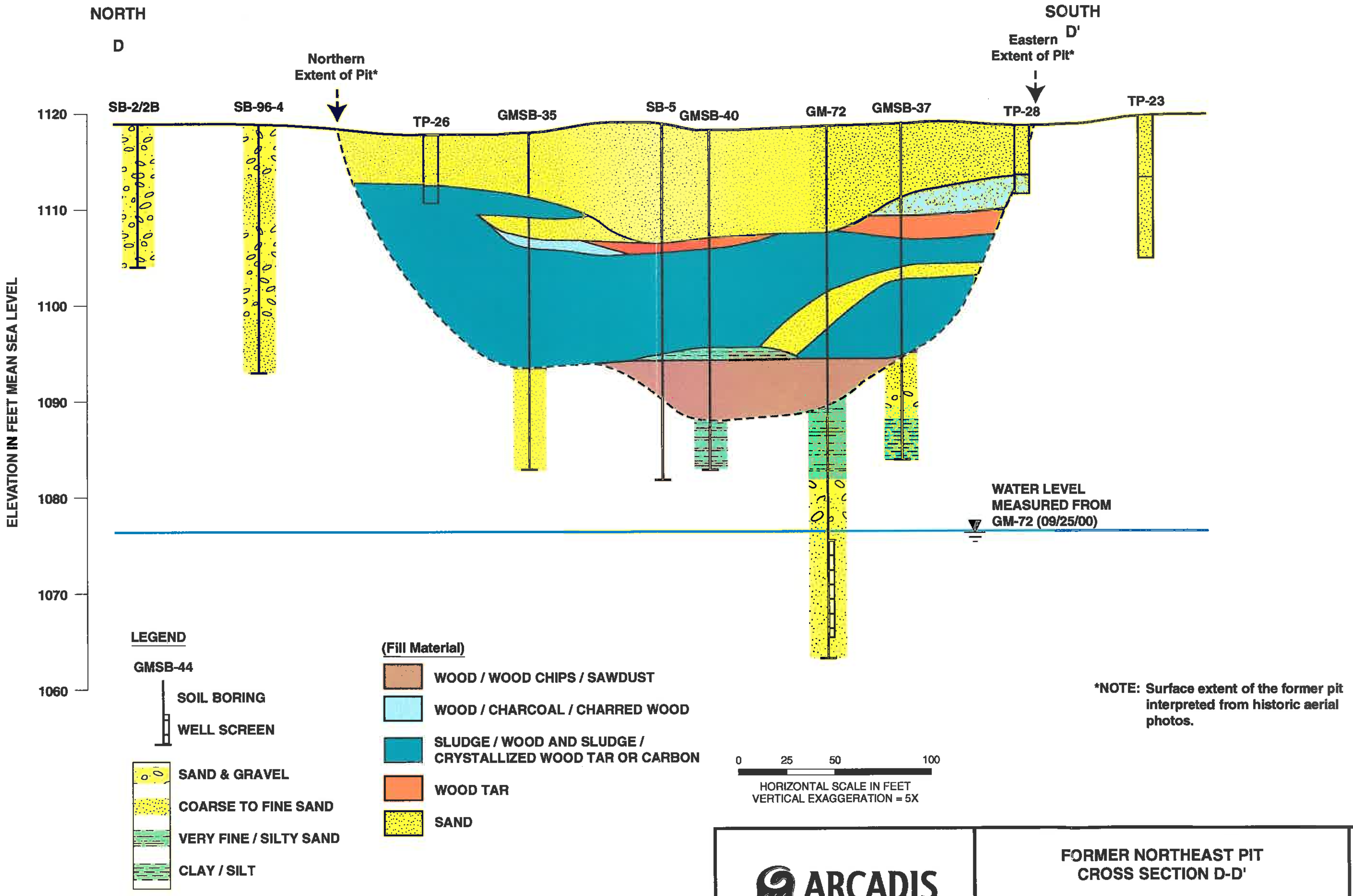
ARCADIS

FORMER NORTHEAST PIT
CROSS SECTION C-C'

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
9

DRAFTER: ELS:LMB
APPROVED: BE
CHECKED: JK
DRAWING: REV_NSL3.AI
FILE NO.: GRAPHICS\XSECS
PN: FORD\W0637\KINGSFORD
DWG DATE: 27SEP02



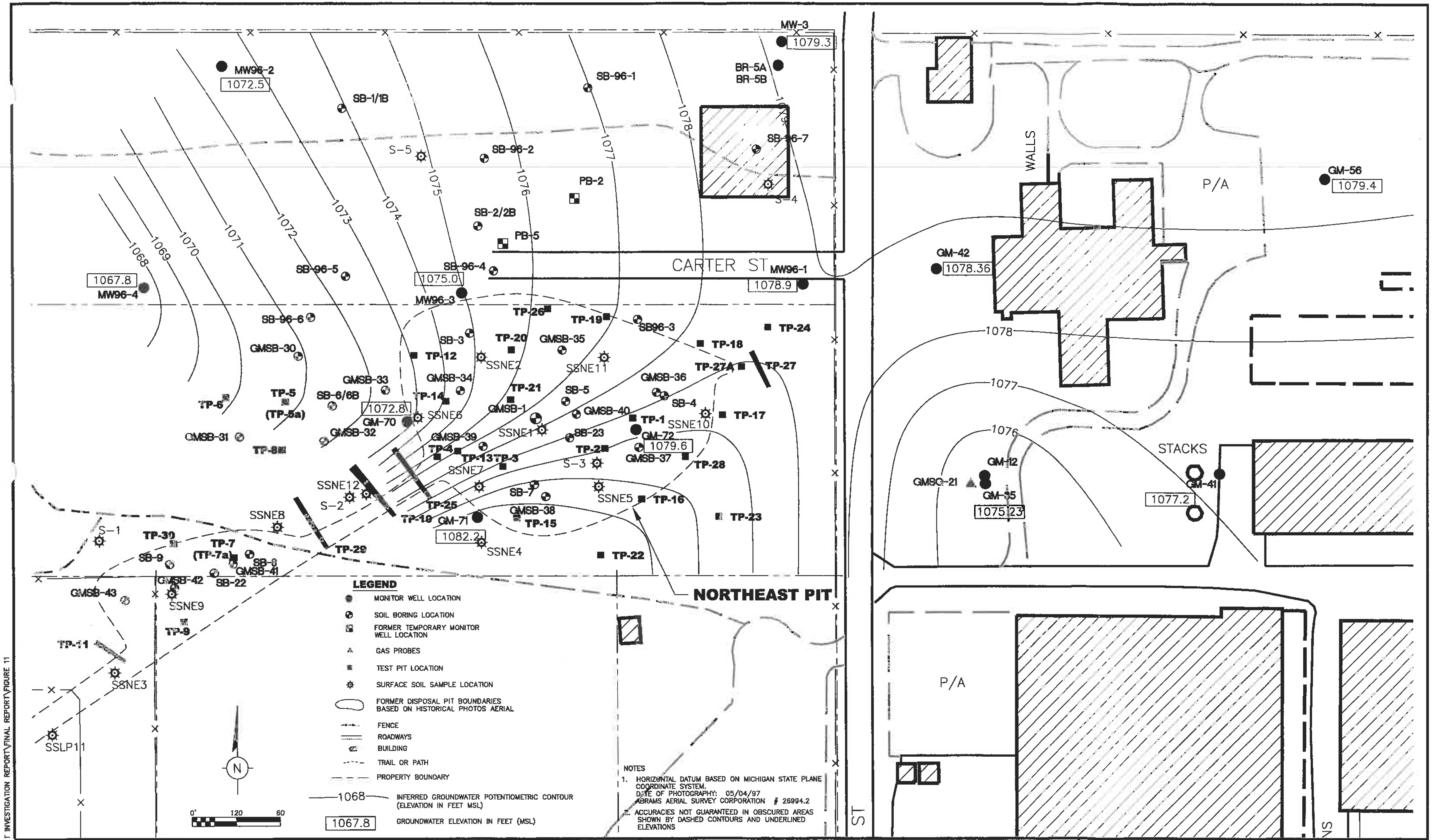
*NOTE: Surface extent of the former pit interpreted from historic aerial photos.

ARCADIS

FORMER NORTHEAST PIT
CROSS SECTION D-D'

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
10



LEGEND

●	MONITOR WELL LOCATION
◕	SOIL BORING LOCATION
▨	FORMER TEMPORARY MONITOR WELL LOCATION
▲	GAS PROBES
■	TEST PIT LOCATION
☼	SURFACE SOIL SAMPLE LOCATION
⬭	FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL PHOTOS AERIAL
-x-x-	FENCE
═	ROADWAYS
▨	BUILDING
- - -	TRAIL OR PATH
— — —	PROPERTY BOUNDARY
—1068—	INFERRED GROUNDWATER POTENTIOMETRIC CONTOUR (ELEVATION IN FEET MSL)
1067.8	GROUNDWATER ELEVATION IN FEET (MSL)

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
DATE OF PHOTOGRAPHY: 05/04/97
ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

G:\CAD\WORTHE... T INVESTIGATION REPORT\FINAL REPORT\FIGURE 11

NO.	DATE	REVISION DESCRIPTION	BY / CKD

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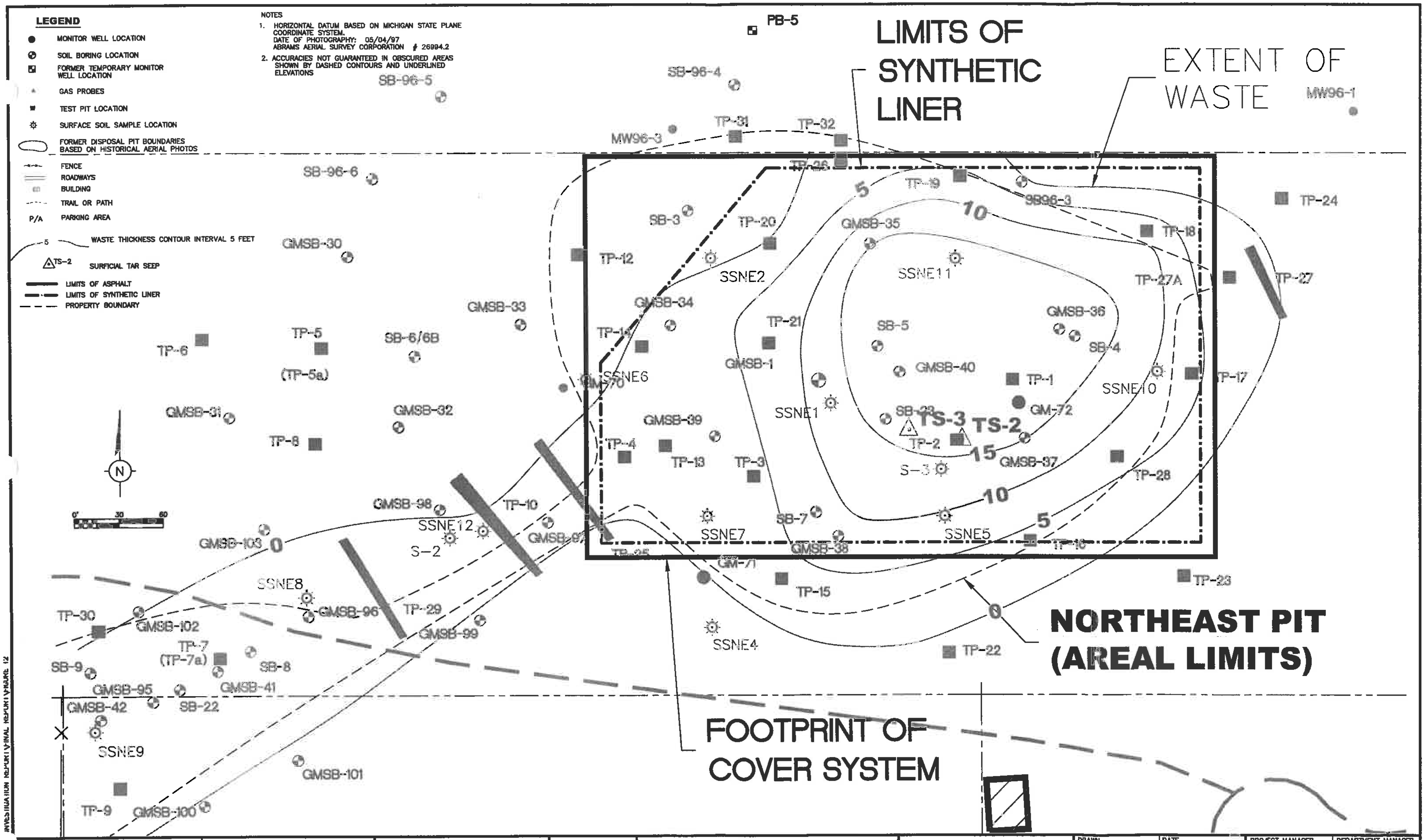
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

SHALLOW GROUNDWATER TABLE
CONTOUR MAP
9/25/2000

DRAWN	JMG
DATE	09/27/02
PROJECT MANAGER	EC
DEPARTMENT MANAGER	BE
LEAD DESIGN PROF.	BE
CHECKED	BE
PROJECT NUMBER	WI00975.0012
FIGURE	11



LEGEND

● MONITOR WELL LOCATION

SOIL BORING LOCATION

FORMER TEMPORARY MONITOR WELL LOCATION

GAS PROBES

TEST PIT LOCATION

SURFACE SOIL SAMPLE LOCATION

FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL AERIAL PHOTOS

FENCE

ROADWAYS

BUILDING

TRAIL OR PATH

P/A PARKING AREA

5 WASTE THICKNESS CONTOUR INTERVAL 5 FEET

△TS-2 SURFICIAL TAR SEEP

LIMITS OF ASPHALT

LIMITS OF SYNTHETIC LINER

PROPERTY BOUNDARY

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

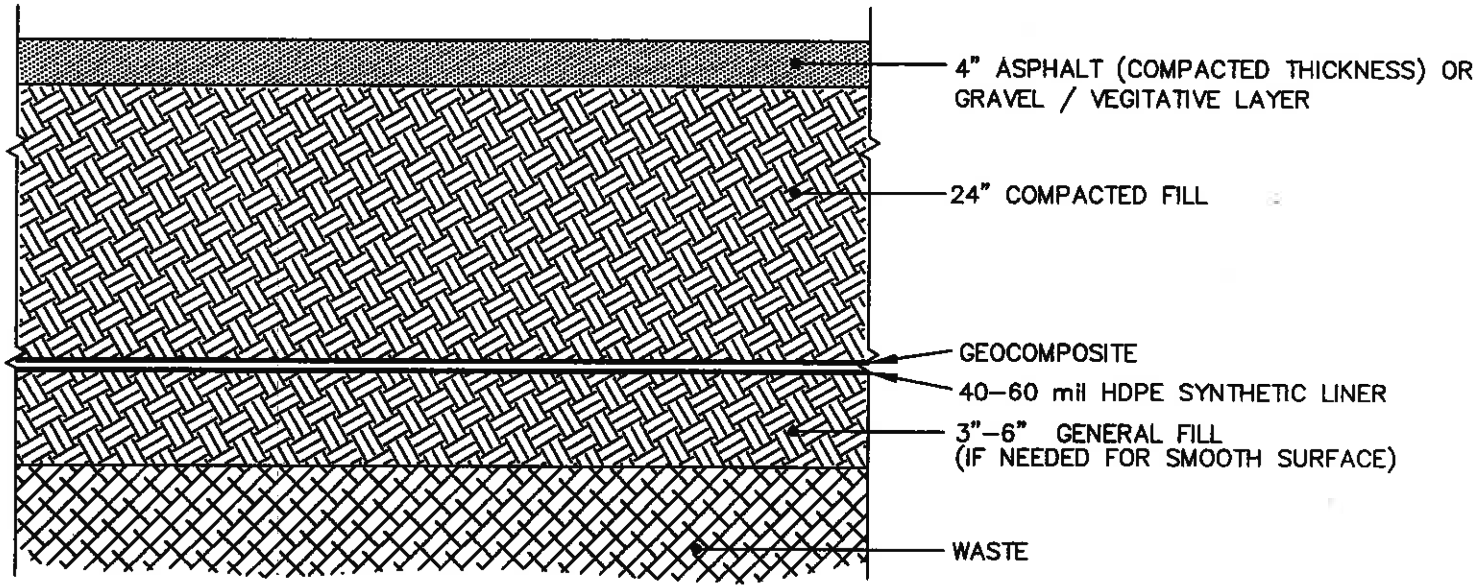
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

CONCEPTUAL FOOTPRINT
OF A COVER SYSTEM

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE 12

G:\CAD\NORTHEAS INVESTIGATION REPORT\FINAL REPORT\FIGURE 12



DETAIL-TYPICAL LOW-PERMEABLE COVER SYSTEM

SCALE: N.T.S.

ARCADIS

3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

DATE: 2/6/01
APPROVED: BE
DRAWN: BJH
CHECKED: BE
CADD FILE NAME: FCOVERSYS3.DWG
PROJECT NUMBER: WI00975.0012

TYPICAL LOW-PERMEABLE COVER SYSTEM

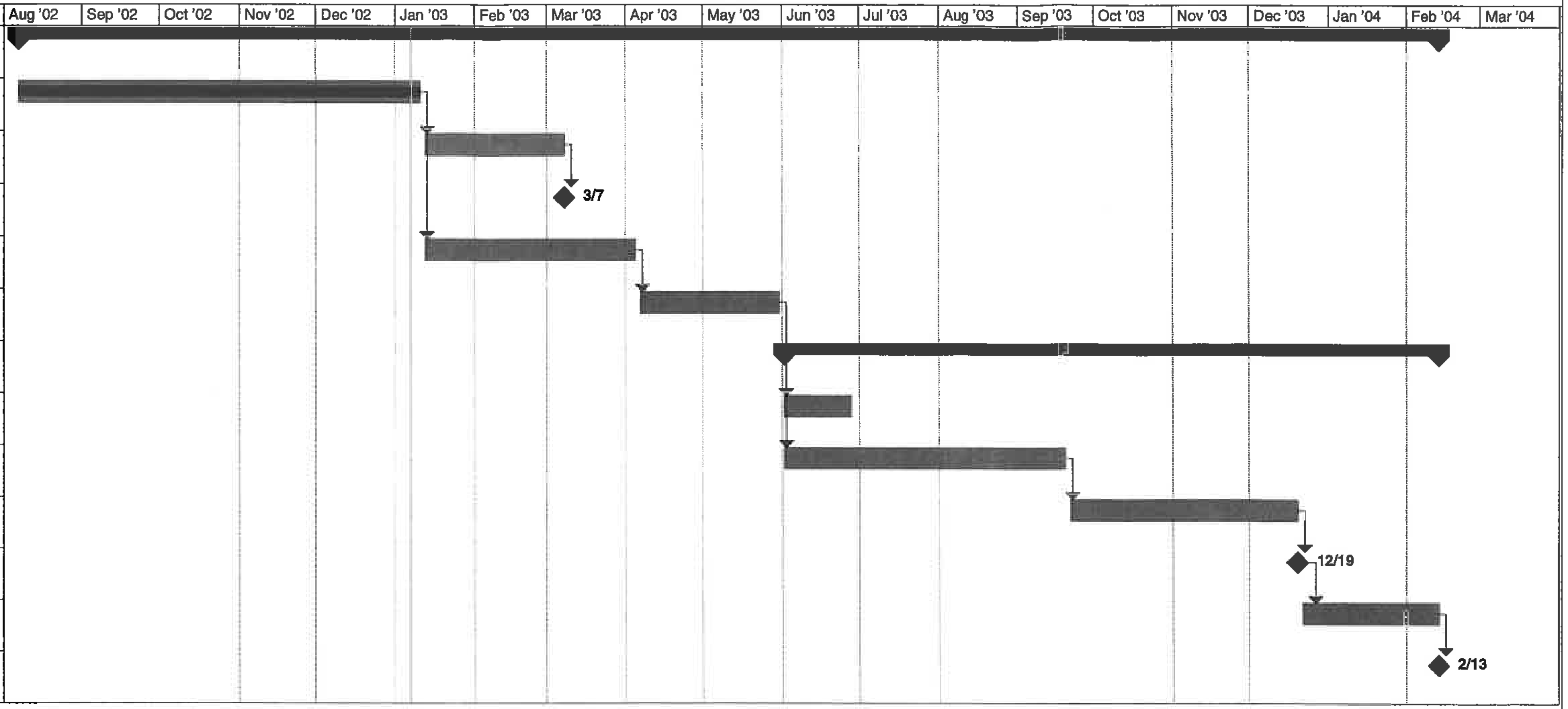
FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
13

G:\CAD\NORTHEAST PIT INVESTIGATION REPORT\FINAL REPORT\FIGURE 13

Figure 14. Project Schedule, Former Northeast Pit IRAP, Kingsford, Michigan

ID	Task Name	Duration
1	**NE Pit**	**398 days**
2	Finalize IRAP, Incorporate Landowner Approvals	113 days
3	MDEQ Review Final IRAP	40 days
4	MDEQ Approve IRAP	0 days
5	Finalize Plans, Specifications, Bid Documents	60 days
6	Bids/Contractor Selection	40 days
7	**Capping Option**	**185 days**
8	Site Civil/Stormwater Controls Implementation	20 days
9	IRAP Implementation Complete	80 days
10	IRAP Construction Report Preparation	65 days
11	Submit Construction Report to MDEQ	0 days
12	MDEQ Review Construction Report	40 days
13	MDEQ Approval, NE Pit Complete	0 days

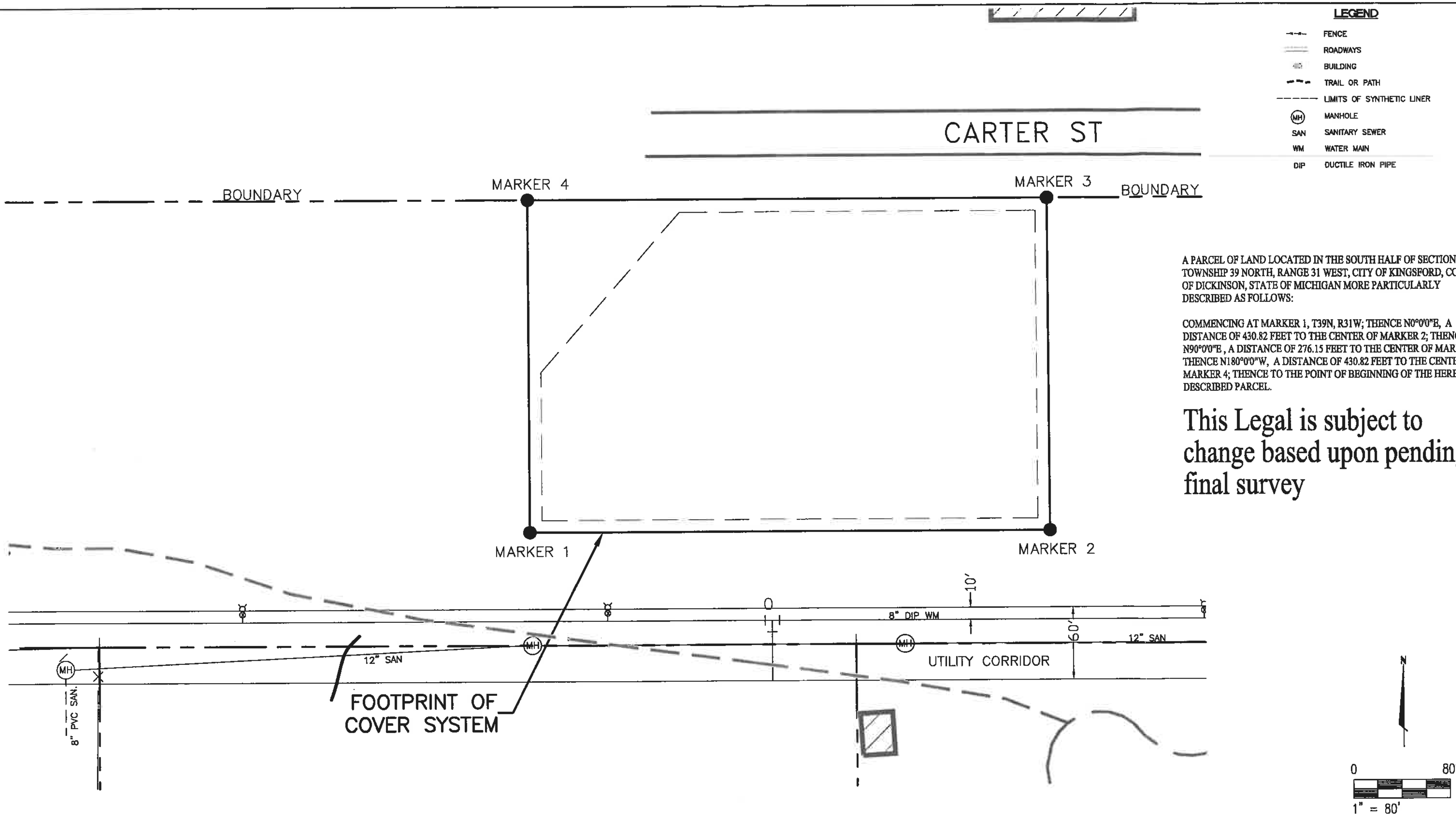


Project: NE Pit
Date: Tue 1/7/03

Task	▬	Progress	▬	Summary	▬	External Tasks	▬	Deadline	⇩
Split	....	Milestone	◆	Project Summary	▬	External Milestone	◆		

Appendix A

Legal Description



A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 2 TOWNSHIP 39 NORTH, RANGE 31 WEST, CITY OF KINGSFORD, COUNTY OF DICKINSON, STATE OF MICHIGAN MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT MARKER 1, T39N, R31W; THENCE N0°0'0"E, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 2; THENCE N90°0'0"E , A DISTANCE OF 276.15 FEET TO THE CENTER OF MARKER 3; THENCE N180°0'0"W, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 4; THENCE TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL.

This Legal is subject to change based upon pending final survey

G:\CAD\FORD\NORTHEAST PIT DESIGN\WASTE EXCAVATION MEMO\LEGAL DESCRIPTION.DWG

NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/264-3425

FORMER NORTHEAST PIT IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG	DATE 09/12/02	PROJECT MANAGER RS	DEPARTMENT MANAGER JB
LEGAL DESCRIPTION NE PIT COVER FOOTPRINT		LEAD DESIGN PROF. BZ	CHECKED AV
		PROJECT NUMBER WI00950.0013	FIGURE A1

Appendix B

Groundwater Ordinance

AN ORDINANCE OF THE CITY OF KINGSFORD
RESTRICTING WELLS

AN ORDINANCE PROVIDING FOR THE REGULATION, RESTRICTION, AND ABANDONMENT OF WELLS IN CERTAIN AREAS OF THE CITY.

The City of Kingsford Ordains:

Section 1: PREAMBLE. The purpose of this Ordinance is to provide for the protection of the public health, safety, and welfare in connection with the use of groundwater within certain portions of the City of Kingsford. It has been determined that groundwater within portions of the Restricted Zone (as defined in Section 2(b) below) contains hazardous substances at concentration levels which the Michigan Department of Environmental Quality has determined may be unsafe for consumption and other uses. It is further recognized that protection of residents of the City of Kingsford from Consumption and other uses of groundwater containing such hazardous substances will be fostered by the adoption of restrictions in certain areas with regard to the installation and/or use of wells and the restriction on installation and/or use of wells which may influence the movement of groundwater containing such hazardous substances.

Section 2: DEFINITIONS. When used in this Ordinance, the following terms shall have the meanings set forth below:

(a) "Well" means an opening in the surface of the earth for the purpose of removing water through non-mechanical or mechanical means for any purpose other than i) obtaining groundwater as part of a response action consistent with the Michigan Natural Resources and Environmental Protection Act of 1994, as amended, or ii) removal of wastewater from a septic tank.

(b) "Restricted Zone" shall mean an area described as follows:

All that area lying on Sections One (1), Two (2), Eleven (11) and Twelve (12), Town 39 North, Range 31 West. City of Kingsford, County of Dickinson, Michigan, described within the following description:

Beginning at a point where Menominee River intersects with Woodward Avenue (if extended west); thence south, southeasterly, and east meandering along the northerly shoreline of Menominee River until it intersects with the centerline of State Route 95; thence northeasterly along the centerline of State Route 95 to the intersection of State Route 95 and Hooper Street (if extended south); thence North along the extended line of Hooper Street and Hooper Street to the intersection of Hooper Street and Pyle Street; thence continuing North along the extended line (if extended north) of Hooper Street to the centerline of Woodward Street, thence West to a point 300 feet east from the intersection of the centerline of Westwood and Woodward Streets; thence North 300 feet; thence West along a line parallel with Woodward Street 600 feet; thence South 300 feet to the centerline of

Woodward Street; thence West along the centerline of Woodward Street to the point of beginning.

A map of the "restricted zone" is attached.

Section 3: PROHIBITION OF INSTALLATION AND USE OF WELLS WITHIN RESTRICTED ZONES. No person shall allow, permit, maintain, install, or use, a well on any property in the Restricted Zone. Property and portions of property within the Restricted Zone shall be serviced only public water supply. Notwithstanding anything contained in this Section 3, a well may be installed and used for the sole purpose of dewatering property to the extent required during construction activities, providing it is done in compliance with all applicable laws and regulations regarding the proper disposal of contaminated water generated during the dewatering and due care is taken to avoid exacerbating the existing contamination and preventing unacceptable exposure to persons who may come in contact with the contaminated groundwater.

Section 4: WELL ABANDONMENT. A survey of existing wells within the Restricted Zone and of wells outside the Restricted Zone large enough to affect the groundwater plume shall be conducted prior to the effective date of this ordinance. Notification to owners of the wells identified in the survey, shall be given by the City prior to the effective date of this Ordinance. All private wells within the Restricted Zone shall be properly abandoned in accordance with the American Standards for Testing and Materials (ASTM) Standard #D5299-92. Such wells shall be abandoned and closed within six months of the effective date of the provisions of this Ordinance.

Section 5. CITY INSPECTIONS; ENFORCEMENT. The City Water Department shall annually canvass or inspect all premises in the Restricted Zone where it is suspected that a well is being used and shall notify by appropriate means the owners and occupants thereof to terminate such use and comply with this Ordinance.

Section 6. Prior to the effective date of this Ordinance, the City shall notify the County Health Department and the County Water Department of the groundwater use restrictions contained in this Ordinance.

Section 7: MODIFICATION OR REPEAL OF THIS ORDINANCE; NOTICE TO THE STATE OF MICHIGAN. In the event this Ordinance is considered for modification or repeal, where said modification or repeal will allow the installation or use of groundwater wells in the Restricted Zone, this Ordinance shall not be modified or repealed except upon 30 days' prior written notice to the Michigan Department of Environmental Quality.

Section 8: PENALTY, REMEDIES.

Section 8.1: CIVIL INFRACTION. Any person violating this Ordinance shall be liable for 11 infraction and each day that the violation continues or occur shall be a separate offense.

Section 8.2: INJUNCTIVE RELIEF. The City may further enforce this Ordinance by action seeking injunctive relief in a court of competent jurisdiction. In such an action the City shall be awarded its costs, damages, and actual attorney fees.

Section 8.3. PUBLIC NUISANCE. A violation of this Ordinance is hereby declared to be a public nuisance and shall be abated by immediately taking the well out of service and properly abandoning and closing it. The City may seek abatement of such public nuisance in a court of competent jurisdiction and, in such action, recover its costs, damages, and actual attorney fees.

Section 9: BUILDING OR IMPROVEMENT PERMIT. No permit for building, alteration, or other required permit for a premises or improvement thereon shall be issued by the City for any premises found in violation of this Ordinance, or where it is proposed to install or use a well in violation of this Ordinance.

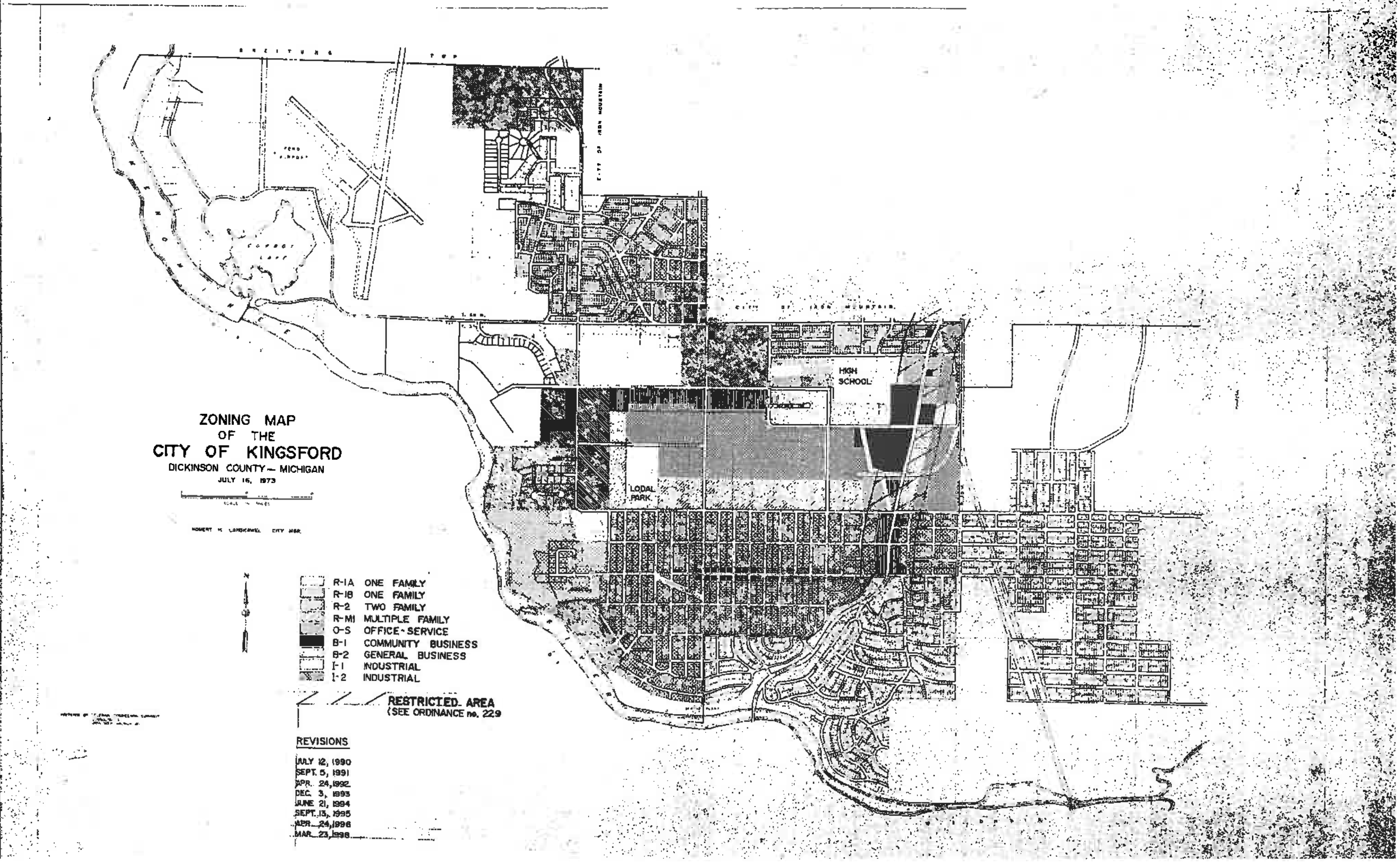
Section 10: REPEAL; SEVERABILITY. Effective thirty (30) days following adoption of this Ordinance, Code Section is repealed. In the event any part of this Ordinance is finally determined to be invalid or unenforceable by a court of competent jurisdiction, then said Determination shall not affect the validity of the remaining provisions. The City shall promptly notify the Michigan Department of Environmental Quality upon the occurrence of any event described in the preceding sentence.

Section 11: EFFECTIVE DATE. Provisions of this Ordinance shall become effective thirty (30) days following its adoption.

ARCADIS

Appendix C

Zoning Information



ZONING MAP
OF THE
CITY OF KINGSFORD

DICKINSON COUNTY — MICHIGAN

JULY 16, 1973

REVISIONS

JULY 12, 1990
SEPT. 5, 1991
APR. 24, 1992
DEC. 3, 1993
JUNE 21, 1994
SEPT. 13, 1995
APR. 24, 1996
MAR. 23, 1998

ARTICLE X

I-1 INDUSTRIAL DISTRICT

SECTION 1000. Intent: The I-1 Industrial Districts are designed to accommodate wholesale activities, warehouses, and industrial operations whose external, physical effects are restricted to the area of the district and in no manner affect in a detrimental way any of the surrounding districts. The I-1 District is so structured as to permit, along with any specified uses, the manufacturing, compounding, processing, packaging, assembly, and/or treatment of finished or semi-finished products from previously prepared material.

The general goals of this use district are:

1. To provide sufficient space, in appropriate locations, to meet the needs of the City for manufacturing and related uses.

2. To promote industrial development which is free from danger of fire, explosions, toxic and noxious matter, radiation, and other hazards, and from offensive noise, vibration, smoke, odor and other objectionable influences.

SECTION 1001. Principal Uses Permitted: No building or land shall be used and no building shall be erected except for one or more of the following specified uses:

1. Any use of a basic research, design and pilot or experimental product development when conducted within a completely enclosed building.

2. Any of the following uses when the manufacturing, compounding, or processing is conducted wholly within a completely enclosed building. That portion of the land used for open storage facilities for materials or equipment used in the manufacturing, compounding, or processing shall be totally obscured by a screening wall or fence on those sides abutting R-1A, R-B1, R-2, RM, OS-1, and B-1 Districts. In I District, the extent of such a wall or fence may be determined by the Planning Commission on the basis of usage. Such a wall shall not be less that four (4) feet in height and may, depending upon land usage, be required to be eight (8) feet in height, and shall be subject further to the requirements of ARTICLE XV, "GENERAL PROVISIONS". A chain link fence, with intense evergreen shrub planting shall be considered an obscuring wall (as an option).
    a. Warehousing and wholesale establishments, and trucking facilities.
    b. Machine shops and uses for the manufacture, compounding, processing, packaging, or treatment of such products as, but not limited to: foods, cosmetic, pharmaceuticals, toiletries, hardwares and tool and die.

c. The manufacture, compounding, assembling, or treatment of articles or merchandise from previously prepared materials.

d. The manufacture of pottery and figurines or other similar ceramic products using only previously pulverized clay and kilns fired only by electricity or gas.

e. Planing mills, veneer mills, and lumber yards.

f. Laboratories - experimental, film, or testing.

g. Central dry cleaning plants or laundries.

h. All public utilities, including buildings, necessary structures, storage yards and other related uses.

3. Warehouse, storage and transfer and electric and gas service buildings and yards. Public utility buildings, except steam power plants, telephone exchange buildings, electrical transformer stations and sub-stations, and gas regulator stations. Water supply and sewage disposal plants. Water and gas tank holders. Railroad transfer and storage tracks. Railroad rights-of-way. Freight terminals.

4. Storage facilities for building materials, sand, gravel, stone, lumber, storage of contractor's equipment and supplies, provided such is enclosed within a building or within an obscuring wall or fence on those sides abutting all Residential or Business Districts, and on any yard abutting a public thoroughfare. In any "I-1" District the extent of such fence or wall may be determined by the Planning Commission on the basis of usage.

Such fence or wall shall not be less than four (4) feet in height, and may, depending on land usage, be required to be eight (8) feet in height. A chain link type fence, with heavy evergreen shrubbery inside of said fence, shall be considered to be an obscuring fence.

5. Municipal uses such as water treatment plants, and reservoirs, sewage treatment plants, and all other municipal buildings and uses, including outdoor storage.

6. Commercial Kennels.

7. Greenhouses.

8. Trade or industrial schools.

9. Freestanding non-accessory signs.

10. Other uses of a similar and no more objectionable character to the above uses.

SECTION 1002. Principal Uses Permitted Subject To Special Conditions: The following uses shall be permitted, subject to the conditions hereinafter imposed for each use and subject further to the review and approval of the City Council:

1. Auto engine and body repair, and undercoating shops when completely enclosed.

2. Metal plating, buffing and polishing, subject to appropriate measures to prevent noxious results and/or nuisances.

3. Retail uses which have an industrial character in terms of either their outdoor storage requirements or activities (such as, but not limited to: lumber yard, building materials outlet, upholsterer, cabinet maker, outdoor boat, house trailer, automobile garage or agricultural implement sales) or serve convenience needs of the industrial district.

4. Other uses of a similar character to the above uses.

SECTION 1003. Required Conditions: Any use established in the "I-1" District after effective date of this Ordinance shall be operated so as to comply with the performance standards set forth hereinafter in ARTICLE, "GENERAL PROVISIONS", Section, "Performance Standards."

ARTICLE XI

I - 2 GENERAL INDUSTRIAL DISTRICT

SECTION 1100. Intent: General Industrial Districts are designed primarily for manufacturing, assembling, and fabrication activities including large scale or specialized industrial operations, whose external physical effects will be felt to some degree by surrounding districts. The I-2 District is so structured as to permit the manufacturing, processing, and compounding of semifinished or finished products from raw materials as well as from previously prepared material.

SECTION 1101. Principal Uses Permitted: No building or land shall be used and no building shall be erected except for one or more of the following specified uses:

1. Any use permitted in an I-1 District.

2. Heating and electric power generating plants, and all necessary uses.

3. Any production, processing, cleaning, servicing, testing, repair, or storage of materials, goods, or products shall conform with the performance standards set forth in ARTICLE "GENERAL PROVISIONS," Section, "Performance Standards," (except such uses as specifically excluded from the Municipality by Ordinances).

4. Junk yards, provided such are entirely enclosed within a building or within an eight (8) foot obscuring wall and provided further that one property line abuts a railroad right-of-way.

5. Any of the following production or manufacturing uses (not including storage of finished products) provided that they are located not less than six hundred (600) feet distant from any Residential District and not less than two hundred (200) feet distant from any other district.
   a. Incineration of garbage or refuse when conducted within an approved and enclosed incinerator plant.

b. Blast furnace, steel furnace, blooming or rolling mill.

c. Manufacture of corrosive acid or alkali, cement, lime, gypsum, or plaster of paris.

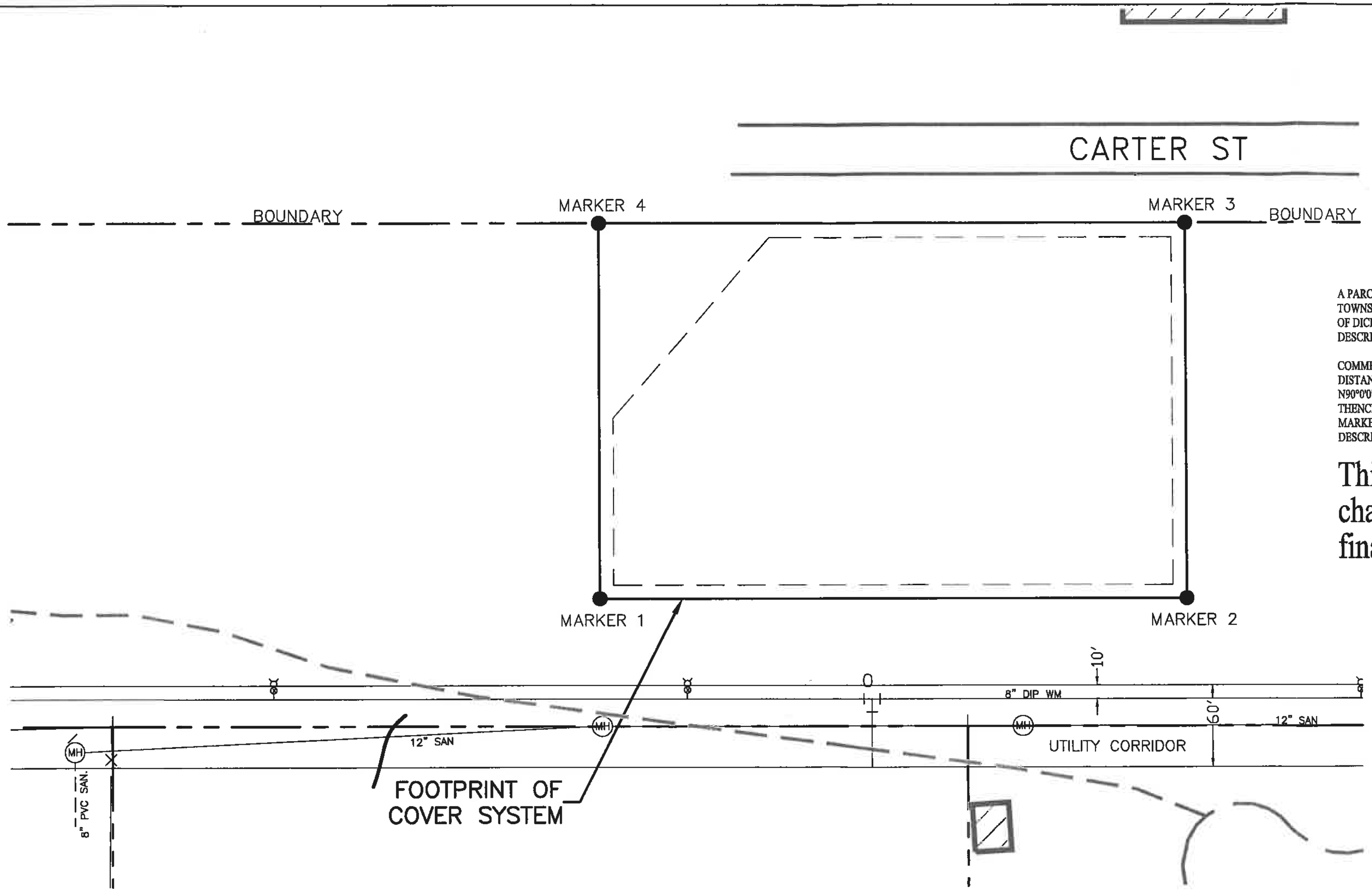
d. Petroleum or other inflammable liquids, production, refining, or storage.

e. Smelting of copper, iron or zinc ore.

7. Any other use determined by the Board of Appeals, to be of the same general character as the above permitted uses. The board may impose any required setback and/or performance standards so as to insure public health, safety, and general welfare.

Appendix D

Permanent Marker Information



LEGEND

-·-·-	FENCE
═	ROADWAYS
▨	BUILDING
━ ━	TRAIL OR PATH
——	LIMITS OF SYNTHETIC LINER
(MH)	MANHOLE
SAN	SANITARY SEWER
WM	WATER MAIN
DIP	DUCTILE IRON PIPE

A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 2 TOWNSHIP 39 NORTH, RANGE 31 WEST, CITY OF KINGSFORD, COUNTY OF DICKINSON, STATE OF MICHIGAN MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT MARKER 1, T39N, R31W; THENCE N0°0'0"E, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 2; THENCE N90°0'0"E , A DISTANCE OF 276.15 FEET TO THE CENTER OF MARKER 3; THENCE N180°0'0"W, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 4; THENCE TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL.

This Legal is subject to change based upon pending final survey

G:\CAD\FORD\NORTHEAST PIT DESIGN\WASTE EXCAVATION MEMO\LEGAL DESCRIPTIOND1.DWG

copyright © '02

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
3803 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/264-3425

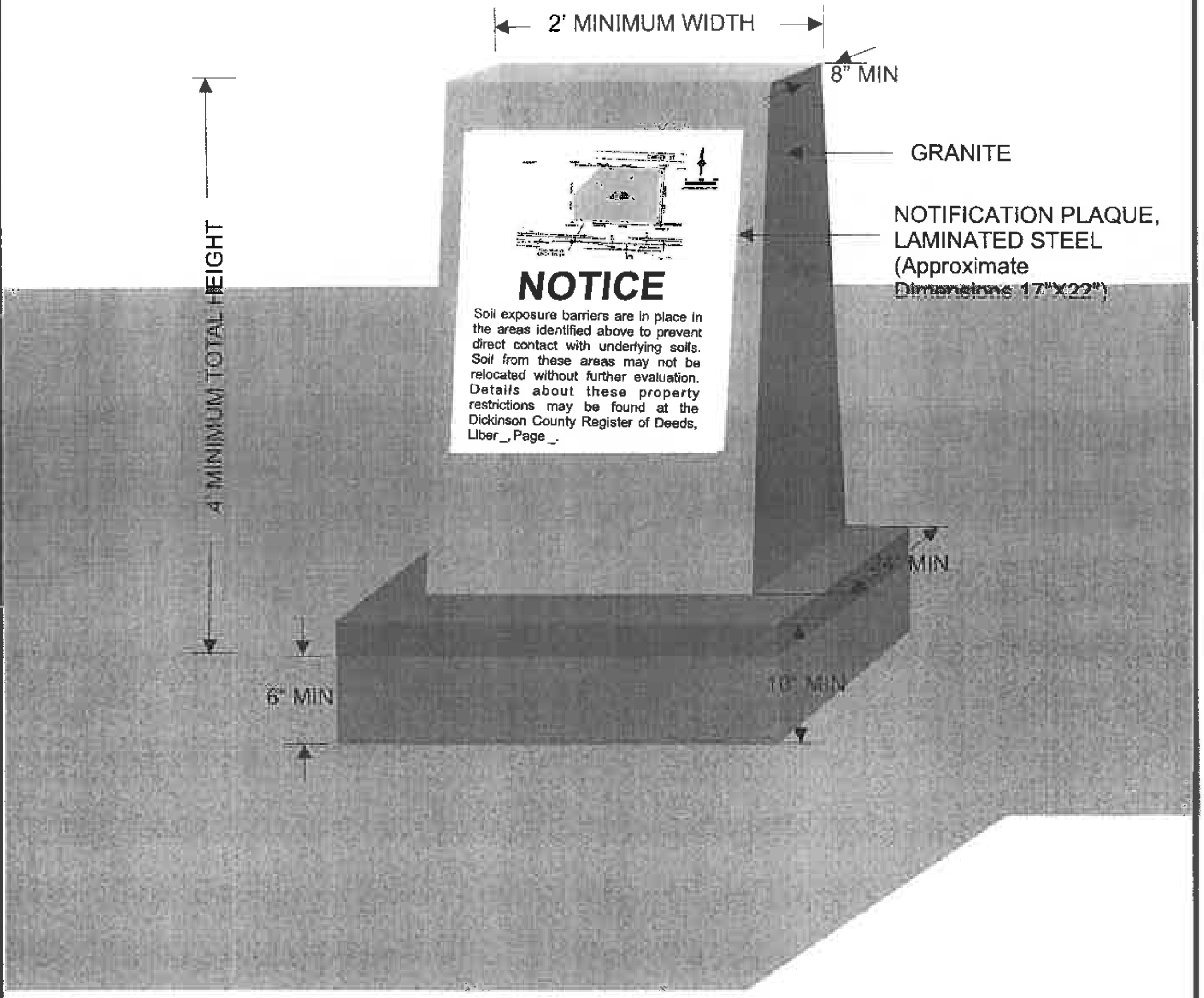
FORMER NORTHEAST PIT IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN: JMG
DATE: 09/12/02

LEGAL DESCRIPTION
NE PIT COVER FOOTPRINT

PROJECT MANAGER: RS
DEPARTMENT MANAGER: JB
LEAD DESIGN PROF.: BZ
CHECKED: AV
PROJECT NUMBER: WI00950.0013
FIGURE: D1



NOTICE

Soil exposure barriers are in place in the areas identified above to prevent direct contact with underlying soils. Soil from these areas may not be relocated without further evaluation. Details about these property restrictions may be found at the Dickinson County Register of Deeds, Liber _, Page _.

NOT TO SCALE

DRAFTER: DKN/MJC
APPROVED: RS
CHECKED: BZ
DRAWING: MARKER DESIGN-FINAL.CDR
FILE NO.: 2nd Permanent Marker
PN: WI0975/NE pit/
DWG DATE: 20Sept02

ARCADIS

PERMANENT MARKER DESIGN

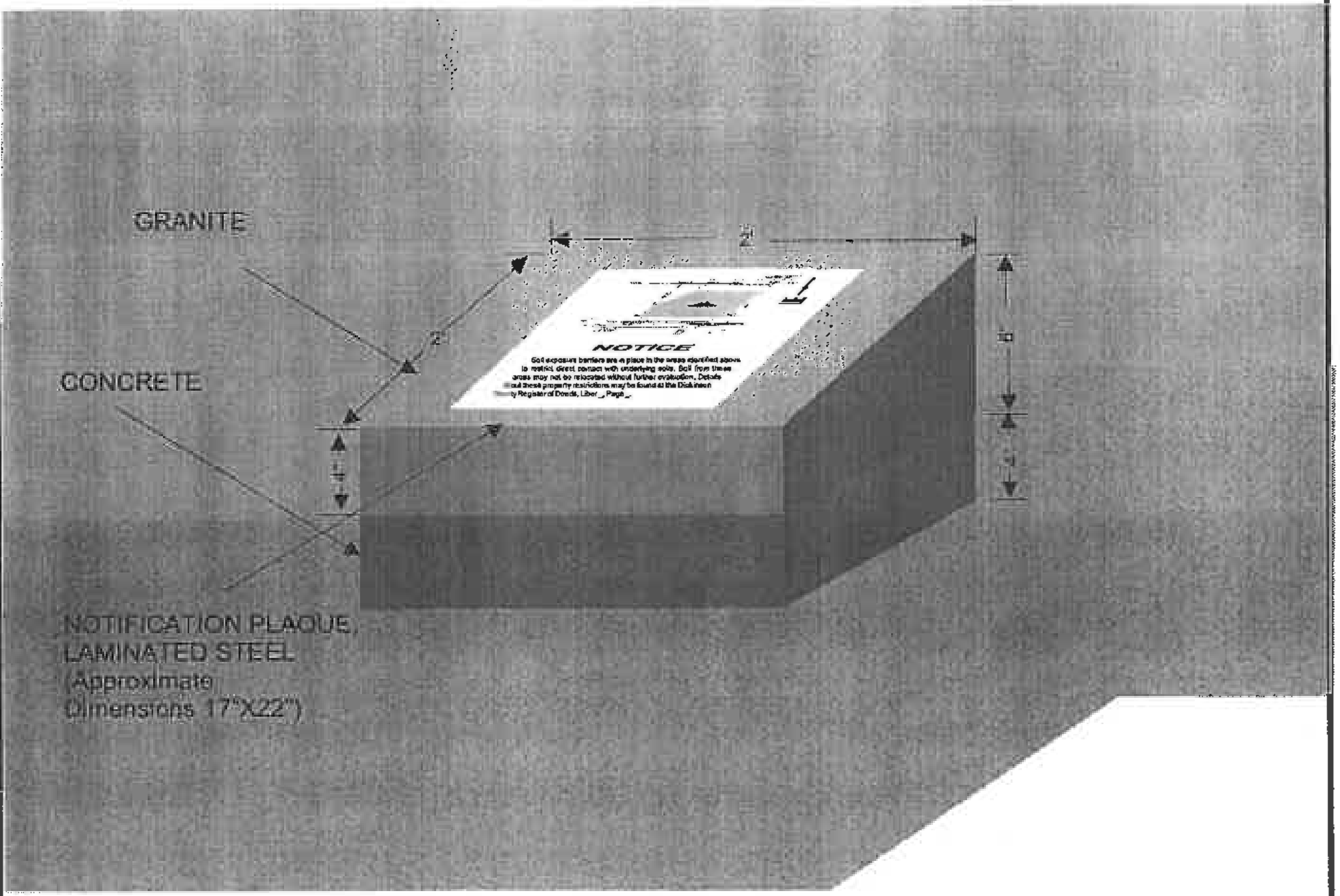
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE
D2

DRAFTER: DKN/MJC | APPROVED: RS | CHECKED: BZ

PN: WI0975/NE pit/2nd Permanent Marker/MARKER DESIGN-SMALL-Final.CDR

DWG DATE: 20Sept02



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NOT TO SCALE

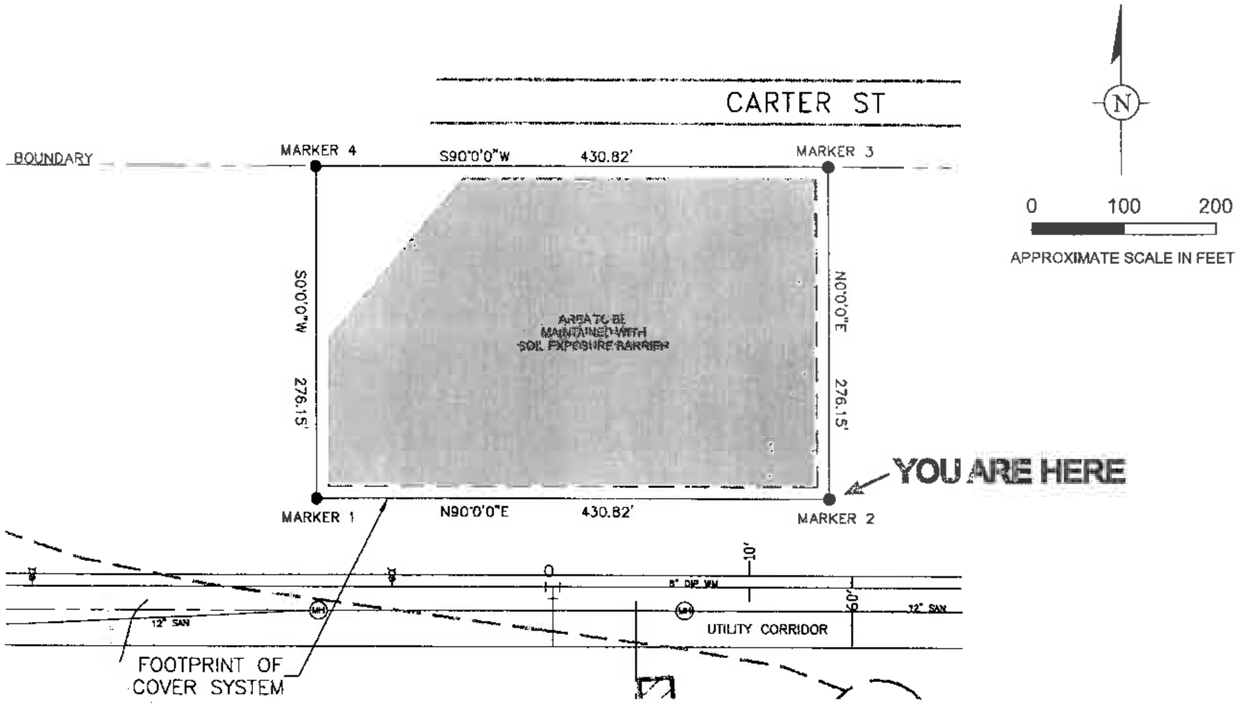
ARCADIS

SMALL MARKER DESIGN

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

D2A



NOTICE

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ARCADIS

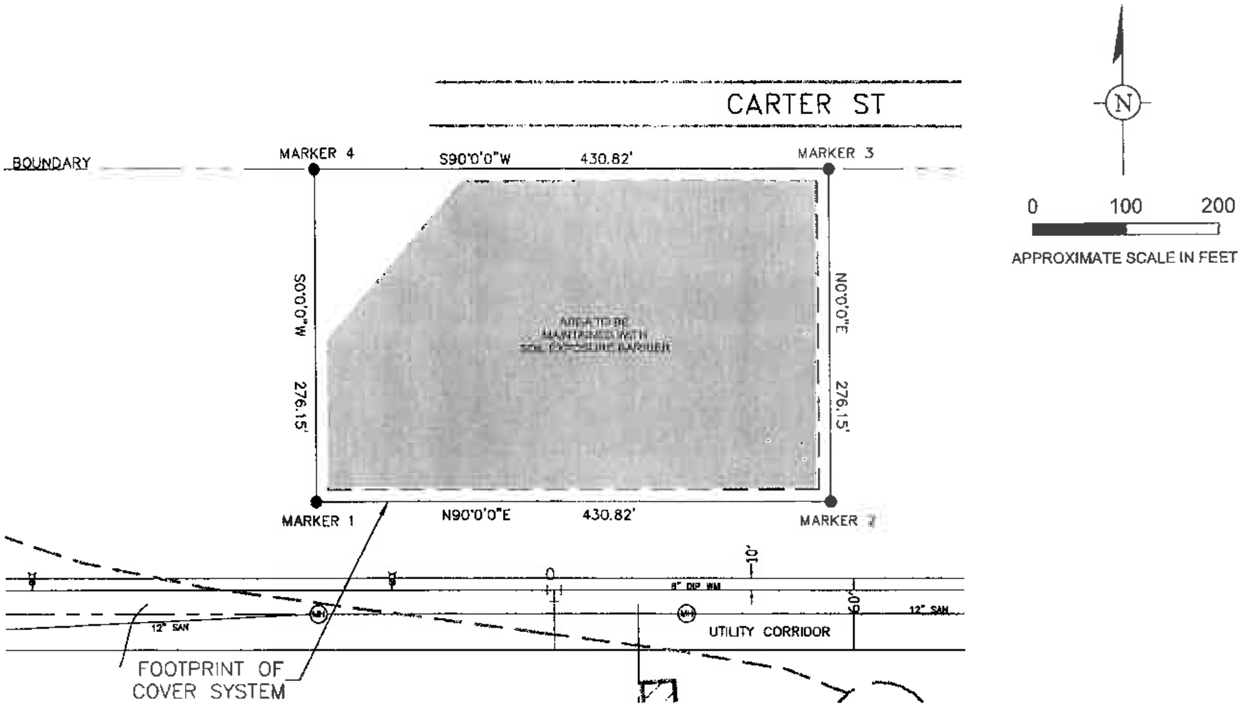
NOTIFICATION SIGN DISPLAY

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

D3

DWG DATE: 20Sept02 | PN: WI0975NE pif\ | FILE NO.: 2nd Permanent Marker | DRAWING: MARKER DISPLAY-Final.CDR | CHECKED: BZ | APPROVED: RS | DRAFTER: MJC



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ARCADIS

NOTIFICATION SIGN DISPLAY

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

D3A

DWG DATE: 20Sept02 | PN: WI0975NE.pit | FILE NO.: 2nd Permanent Marker | DRAWING: MARKER DISPLAY-2-Final.CDR | CHECKED: BZ | APPROVED: RS | DRAFTER: MJC

Appendix E

Waste Management Plan

ARCADIS

Appendix E
Waste Management Plan

Former Northeast Pit
Interim Response Action Plan
Ford/Kingsford Site
Kingsford, Michigan

PREPARED FOR

Ford Motor Company
The Kingsford Products Company

Table

Figures

1. Introduction

This Waste Management Plan (WMP) has been prepared for use in conjunction with implementation of the Interim Response Action Plan (IRAP) for the Former Northeast Pit Area (NE Pit) at the Ford/Kingsford Site in Kingsford, Michigan. Waste generated at the NE Pit during the implementation of the IRAP and in future work conducted at the NE Pit will be handled in accordance with this plan. This document is organized to provide background information for the site, present the IRAP implementation waste management plan, and present the approach for future waste management, in the event that construction work that takes place after the IRAP construction has been completed. This WMP has been developed in compliance with Public Act 451 of 1994. If any conditions or scope of work covered by the WMP change, a site-specific addendum will be generated prior to the beginning of any work. All work will be performed in accordance with applicable federal, state, and local regulations.

1.1 Purpose and Scope

The objective of this WMP is to provide a framework for management of waste generated from the response activities at the NE Pit. It describes the methods and protocol that will be implemented for removal and disposal of waste, as set forth in the Natural Resource and Environmental Protection Act, Act 451 of 1994, Chapter 4 IRAP Implementation, and Part 91 Soil Erosion and Sedimentation Control. This document will also serve as a general WMP for intrusive activities (subsurface utility work, drilling, excavation, or construction) associated with any future work within the NE Pit. This WMP is to be used in conjunction with the site specific Construction Health and Safety Plan (CHASP) and the Operation and Maintenance (O&M) Plan.

Elements of this WMP address the following:

- Excavation, Filling, and Grading.
- Consolidation and Disposal of Waste.
- Stormwater, Sediment, and Erosion Control Practices.
- Safety, Health, and Emergency Response.
- Waste Management Team.

The WMP defines the manner in which material generated from the construction activities will be managed. Specifically, this plan addresses:

- Estimated volumes and types of material generated.
- Locations of onsite areas where materials will be stored.
- Stormwater management plan for average rainfall.
- Stormwater management plan for catastrophic event.
- Spill prevention.

1.2 Site Description

The city of Kingsford is located in southwestern Dickinson County, in the western part of Michigan's Upper Peninsula. The City is bounded by the Menominee River on the west and south, by the city of Iron Mountain on the north, and by Breitung Township on the east. The NE Pit is located approximately 1,500 feet north of Breitung Avenue and approximately 600 feet west of Balsam Street. The location of the NE Pit is shown in figure E2-1. The NE Pit is located in a relatively flat upland area called the Upper Terrace, approximately 4,000 feet east of the Menominee River. Land use near the NE Pit is primarily commercial, and the area is zoned industrial. There exists a wooded area to the west, Balsam Street and the former plant area to the east. Kingsford Municipal Garage and commercial businesses are present to the north and south, respectively. The NE Pit property is currently owned by Dickinson Homes, although a small portion lies on land owned by Foley Martens. Dickinson Homes periodically uses the property for materials storage.

1.3 Site Assessment

Investigations of the NE Pit were initiated in 1985. ARCADIS has performed additional investigations of the NE Pit since 1997. Based on analytical results from these investigations, volatile organic compounds (VOCs), semi- volatile organic compounds (SVOCs), and metals have been identified at the site with concentrations above the Michigan Part 201 criteria. The NE Pit IRAP presents site assessment results and specific information with respect to the constituents that are above the Michigan Part 201 criteria.

Methane may also be present within the NE Pit area. The biodegradation of organic material in the groundwater is the primary source of methane gas throughout the Ford/KPC site, however biodegradation of organics in the waste material in the NE Pit may also result in the formation of shallow methane gas in the area.

1.4 Interim Response Action Plan Summary

The IRAP that has been recommended for the NE Pit is excavation of the waste material in the "channel" area between the NE Pit and Southwest Pit, consolidation of this waste material with waste contained in the NE Pit, and construction of an engineered cover system comprised of a synthetic liner and geocomposite drainage layer. The surface of the cover system will be an asphalt layer. Figure E2-2 presents a conceptual footprint of the cover system design. A methane venting system will be constructed integral to the cover design, as well as permanent markers to identify and monitor the area. Additionally, the response includes deed restrictions to maintain the integrity of the engineered cover system. The deed restrictions will be written to allow penetration of the cover system only with prior MDEQ approval, under controlled, temporary conditions, and under provision that the integrity of the cover system would be restored at completion of construction.

1.5 Future Work

Any future activities intrusive to the cover system at the NE Pit will require MDEQ approval, and will follow this WMP and the CHASP developed for the area. All workers involved in future activities intrusive to the cover system will receive the proper training, as referenced in the CHASP, if there is the possibility of contact with impacted soils/waste materials beneath the cover system. Any soils/waste materials that are excavated during future construction activities will need to be managed in accordance with this WMP.

After any future construction activities are complete, disturbed portions of the cover system will need to be restored to pre-construction condition. This will require the contractor to follow original design materials, specifications, and procedures in the repair or identify substitutions for prior approval. The disturbed area will be checked for settlement after construction activities. If settling has occurred, the cover system will be inspected to ensure that it still meets the specifications for the cover system. If the cover system does not meet the specifications, it will be re-constructed so that it does.

Any maintenance activities will be conducted in accordance with the site WMP and the CHASP. Any portion of the cover system that is disturbed by future work will be repaired as part of the activities that are being undertaken. The WMP will be followed any time that impacted soil or waste may be generated from onsite activities.

2. Characterization Of Wastes And Materials

The materials that may be generated during construction activities and managed under this WMP include excavated waste material and soil, excavated debris, water from dewatering operations, decontamination water and solids, stormwater and solids, and construction activity waste. The management of excavation areas and minimization of contact between stormwater and waste is the responsibility of the contractor.

This section describes and quantifies materials with the potential to be encountered at the NE Pit, during the course of IRAP implementation. Waste management approaches are given for each type of material described and, where necessary, to provide complete understanding, background, and design information are also supplied. Based on the previous investigations at the NE Pit and the results of the laboratory analysis of the samples collected, materials generated from the NE Pit activities are expected to be non-hazardous.

2.1 Estimated Waste Volumes and Management

The NE Pit response calls for waste from the channel area between the NE Pit and the Southwest Pit, and the NE Pit waste outside the proposed cover system, to be excavated and consolidated under the cover system. Soil below the surface layer and above the waste layer will be excavated and stockpiled, to determine if the material is clean and useful as fill or whether it will be necessary to place it below the cover system. Waste, excavated soil, and other expected and potential waste material are described below.

2.1.1 NE Pit Waste Material

The waste material remaining within the NE Pit is a combination of various types of material. Waste materials encountered ranged from 4 feet to 19 feet thick and are underlain by native silt and sand. The depth to the base of the fill and waste material ranges from 1.5 feet to 35 feet below land surface (ft bls). The waste material is are grouped into several categories, based on the types of waste described in the samples from previously completed soil borings. These categories include:

- Wood tar.

- Solely wood products (wood pieces, wood chips, bark, sawdust).
- Wood products mixed with charcoal fragments and carbonized wood.
- Combination of wood sludge, wood products, charcoal fragments, and carbon fragments. The wood sludge is likely the solid component of plant process wastewater placed in the NE Pit that settled out from the waste water.

The current volume of all waste types at the NE Pit is estimated at 50,000 cubic yards (cy). Of this volume, wood tar is estimated at 10 percent (5,000 cy), wood products at 35 percent (17,500 cy), and the volume of sludge-wood-charcoal material is estimated at 55 percent (27,500 cy). The majority of the wood tar is present in a 5-foot layer around the location of Soil Boring GMSB-37, and in a 1-foot layer in the central area and southern side of the former pit. The combined wood sludge-wood-charcoal unit appears to be inter-layered with the wood products and wood tar, and predominates in the eastern and southern portions of the pit. This estimation was obtained on review of the lithologic logs created from soil borings during drilling for the design investigation. The volume of sand fill above the waste material is approximately 30,000 cy.

2.1.2 Channel Waste Material

The channel connecting the NE Pit to the Southwest Pit also contains fill and waste material. The distribution and thickness of the waste material ranges from 0.5 feet to a maximum of 4 feet (at Soil Borings GMSB-41 and GMSB-42). The maximum depth to the base of the fill or waste material in the channel is 11 ft bls. The maximum thickness of sand cover in the channel is 7 feet at Soil Boring GMSB-42 and Test Pit T-29. The composition of the waste material in the channel area is essentially the same as the NE Pit, with a total volume of all categories of waste material of 3,000 cy. Based on observations during field activities, the wood tar material comprises less than 20 percent of this volume, and is located closer to the NE Pit end of the channel.

Excavated waste will not be stockpiled, but transferred directly from the channel area excavation into the NE Pit excavation. Transportation of waste will follow the waste management specification included in the design.

2.1.3 Excavated Soil

Excavated soil includes the soil removed from the channel area to access waste material, clean soil placed on the NE Pit after the 1987 to 1988 waste removal action, and other native soil found within the pit above waste material. These soils are considered clean, but will be sampled and analyzed for verification purposes.

Potentially impacted soil will be placed and stored in a manner that will prevent possible off-site migration of constituents. Soil is to be placed on a relatively impermeable surface. If no paved surfaces are available, the soil will be placed on plastic sheeting. The contractor should not allow direct precipitation or surface run-off or run-on from or onto the stockpiled soil, by covering the soil and providing acceptable diversions.

2.1.4 Excavated Debris Materail

A zone of construction debris was encountered during investigation activities in the area between Test Pits TP-18 and TP-26, and consists of rebar in concrete, bricks, wood, concrete pieces, and metal bands. The volume of debris that will be encountered is not known. Excavated debris will be cut/sized for placement under the cover system. Further detail regarding size requirements so as not to compromise liner integrity or stability will be included in the design specifications.

2.1.5 Water From Dewatering Operations

Information from past investigations indicates that perched water may be present at the NE Pit, but is not associated with the groundwater system. Limited water associated with fill material was observed in Test Pits TP-13, TP-16, TP-21, and TP-28. When encountered, and if dewatering is necessary for construction activities to proceed, the water will be collected and sampled to determine its final disposition and will be managed similarly to contact stormwater.

2.1.6 Stormwater-Related Waste Material

Stormwater-related waste will be minimized, to the extent practical, by preventing stormwater contact with the waste material. Any accumulated stormwater contacting waste, termed contact stormwater, will be contained and pumped from the excavation and placed in holding (fractionation) tanks. Holding tank volumes will be determined during the design. Contact stormwater sediment will be allowed to settle in the holding tanks and will be placed under the cover system liner. Contact stormwater that is collected will be treated in the existing biological treatment system or will be discharged directly to the Kingsford/Iron Mountain Publicly Owned Treatment Works

(POTW). Direct discharge to the POTW would require approval by the Iron Mountain/Kingsford Sewage Board and the associated acceptance sampling results.

2.1.7 Decontamination Water and Solids

Decontamination of small equipment and personnel is expected to be an on-going activity, and will take place in the contaminant reduction zone (CRZ). Large equipment decontamination will take place at a temporarily constructed decontamination pad located in the CRZ. The decontamination pad will be located as close as possible to excavation activities. This pad will be lined with a heavy (40-60 mil) plastic liner, and will be constructed so that rinsate generated during decontamination will drain to a lined sump. Collected water will be managed similar to contact stormwater.

In addition to decontamination liquids, a relatively small volume of decontamination solids will accumulate in decontamination pad sumps. Until such time as the cover system liner is installed, the solids may be placed under the cover system. Following liner placement, the decontamination solids will be sampled to determine if the material contains constituent concentrations above the applicable Michigan Part 201 criteria. If the material has no constituent concentrations above the Michigan Part 201 criteria, it will be placed in the fill below the surface layer. If the material has concentration of compounds above the Michigan Part 201 criteria, the solids will be disposed of offsite at an appropriate facility.

Dedicated excavation and on-site transportation equipment will be used to excavate the waste so as to minimize the generation of decontamination rinse water, and to minimize the potential cross-contamination of soil and other environmental media. Construction equipment, monitoring equipment, non-disposable Personal Protective Equipment (PPE), and other construction materials will be decontaminated when exiting the exclusion zone. The volume of decontamination water generated is dependent upon decisions made by the contractor relative to crew size and work tasks. End of project equipment decontamination water must also be managed prior to final demobilization.

2.1.8 Personal Protective Equipment and Other Construction Related Material

Some disposable PPE and other construction related material will be generated during the project. The amounts and types of the material will be dependent on contractor decisions. This material will be drummed and disposed offsite at an appropriate facility.

2.1.9 Final Demobilization Material

There are several waste streams that will be generated only during the demobilization phase. Final demobilization waste include, but are not limited to: haul road soil, potential stockpile base areas, and decontamination pad material. These materials will be sampled, and if found to contain constituents with concentrations above the Michigan Part 201 criteria they will be drummed and disposed offsite at an appropriate facility. If there are no constituents with concentrations above the applicable Michigan Part 201 criteria, the material may be included in the fill below the surface layer.

3. IRAP Implementation

3.1 Excavation, Backfilling, and Grading

3.1.1 Clearing and Grubbing

Clearing and grubbing will be performed on an incremental basis, only in areas of active construction. Proper sediment controls will be implemented in all disturbed areas, as necessary, and disturbed areas will be restored as soon as possible after construction is complete.

Any spoils encountered during clearing and grubbing activities will be stockpiled at the NE Pit and then consolidated beneath the cover system.

3.1.2 Excavation and Backfilling

Prior to excavation activities, the appropriate stormwater controls must be chosen and utilized as described in Section 3.3 of this document. Proper sediment controls will be implemented in disturbed areas, and disturbed areas will be backfilled and restored as soon as practicable following completion of excavation. Temporary barriers will be constructed around the perimeter of the excavation. The barriers will be maintained during excavation and in the interim period between the completion of excavation and backfilling to prevent surface runoff from entering the excavation. The excavation will not reach the groundwater depth of approximately 40 ft bls.

Stockpile locations will be selected by the construction contractor to facilitate access of construction vehicles to the excavation areas. Construction areas will be graded according to the design plans.

3.1.3 Grading

Construction areas will be graded according to the design plans. Future construction will return the area to graded conditions associated with the designed cover system so that drainage features and surface topography are restored.

3.2 Verification Soil Sampling

Confirmation soil samples will be collected following channel area waste excavation to ensure adequate excavation according to MDEQ guidelines entitled "Verification of Soil Remediation" (April 1994) and "Statistics Training Material for Part 201 Cleanup Criteria" (May 2001). Soil samples will be analyzed, at a minimum, for the constituents listed on Table E4-1. The analytical results will be compared to applicable Michigan Part 201 criteria.

Soil sampling procedures will be performed according to the ARCADIS Quality Assurance Plan for the Ford/Kingsford Site and will be analyzed through an approved contract laboratory using United States Environmental Protection Agency (U.S. EPA) Analytical Methods. Future excavation work involving waste or waste removal within the cover system will require collection of soil samples according to the MDEQ guidelines.

3.3 Stormwater Management

ARCADIS will adhere to the requirements of the Clean Water Act (CWA) for protection of water quality at the site. Engineering controls will be established to prevent water runoff and run-on during excavation and construction activities. Containment systems will be deployed, as necessary, to prevent soils and sediments associated with excavation from reaching stormwater drainage points at the site. Permanent stormwater management will be a part of the cover system design, when completed. Watershed computations will also be included as part of the cover design. The calculations will follow guidelines presented in the MDEQ Land and Water Management Division Construction Stormwater, Sediment, and Erosion Control Practices.

3.3.1 Construction Stormwater, Sediment, and Erosion Control Practices

Part 91 of Act 451 of 1994 requires a Soil and Sedimentation Control Permit prior to construction. Functional sediment and erosion controls must be constructed before commencing land disturbance activities. Suggested erosion and sediment control practices include (but are not limited to):

- Sediment and erosion controls.

- Stormwater management.

- Sediment traps.
- Sediment ponds/retention ponds.

The sediment and erosion controls may consist of the following:

- Silt fencing.
- Sediment ponds, basins, and dams.
- Diversion ditches.
- Check dams.
- Temporary construction entrances.

These controls are designed to prevent erosion of soils and to protect stormwater quality during construction activities. Controls are also in place to trap eroded material before it enters the proposed storm drainage system, and trap sediment before it leaves the site. Any controls will be maintained in good condition and inspected periodically after the beginning of a storm event. Each control is discussed in greater detail in the following subsections. Use of these controls at the site will be determined based on site conditions.

3.3.2 Silt Fencing

Silt fences are used for sediment and erosion control during construction, wherever runoff is expected in the form of sheet flow. Specifically, silt fences could be installed around soil stockpiles, along the downslope perimeter of utility trenches, and along the downslope perimeters of construction areas. Silt fences decrease flow velocity and trap sediments where sheet flow conditions exist or where flow is through tiny rills that can be converted to sheet flow. Silt fences would not be used where flow is channelized. The silt fence would be erected on relatively level ground a minimum distance of five feet from the toe of a slope. The bottom of the silt fences should be buried in the ground a minimum of 6 inches to prevent runoff from passing beneath the fence. Individual panels would be overlapped, and the ends of the silt fences would bend upslope to prevent water from flowing around the fence.

3.3.3 Diversion Ditches

Diversion ditches are used to carry sediment-laden run-off into a control structure or to carry clean run-off away from disturbed areas. The ditches provide permanent run-off control at the site. They are to be constructed on grade and act to intercept and transport channelized flows. Rip-rap check dams constructed along the lengths of the ditches on a regular spacing decrease flow velocity and facilitate settling-out of sediments by dissipating energy. Ditches that are to remain in place for longer than 30 days would be seeded and mulched. Sediment traps would collect stormwater run-off from the diversion ditches for removal of soil particles prior to on-site discharge. If the sediment is representative of the waste material, the sediment would be containerized for proper disposal as described in Section 3.4.

3.3.4 Check Dams

Check dams are constructed in diversion ditches to decrease flow velocity and facilitate settling of sediments by dissipating energy. The check dams provide run-off control during construction by causing sediment to settle within the diversion ditches and by minimizing the amount of erosion by water flowing though the ditches. This minimizes the quantity of sediment being delivered to the sediment ponds. Temporary rock check dams may also be constructed in outlet channels to trap sediment that may enter the storm drainage system. A typical check dam is approximately two feet high and two feet wide at the top. The upslope rip-rap face of the check dams would be covered with 6-inches of washed stone.

3.3.5 Temporary Construction Entrances

Temporary construction entrances will consist of gravel pads constructed of coarse aggregate (2- to 3-inch stone). The pads will be constructed in areas found to have relatively dry, firm soil to minimize the amount of soil or mud that adheres to the truck tires and undercarriages. In this way, the construction entrances will provide temporary soil stabilization during construction. Geotextile fabric will be placed over the subgrade beneath the pads in wet areas. Truck and heavy equipment traffic will be routed over the pads, minimizing the tracking of soils around and off the site. Trucks will be decontaminated by steam cleaning prior to exiting the site if in contact with waste material as described in the site-specific CHASP Section 2.4.2 and summarized below.

Heavy equipment used in contaminated areas will be decontaminated prior to moving to a clean location and before leaving the site. When decontaminating equipment, the following requirements will be implemented:

- The equipment will be inspected for gross debris. Where possible, contaminated soil deposits will be removed and containerized (or placed below the soil cover).
- After removal of gross debris, the equipment will be steam cleaned using a high-pressure washer (i.e., Hotsy).
- After steam cleaning, the equipment will be allowed to dry and will be reinspected. Any remaining visible debris will be re-cleaned through additional pressure washing.

After debris is removed according to the above procedure, the equipment will be released from the decontamination pad for use as necessary in other areas of the site. At the closeout of the exclusion zone activities or when a piece of equipment is to be demobilized from the project, the equipment will be given a final decontamination. Equipment will be inspected prior to release from the facility and inspection results will be documented in field logbooks. Decontamination wash water will be collected and sent to either the on-site water treatment system or an offsite permitted treatment/disposal system.

3.4 Waste Material Containerization, Storage, Tracking, and Reporting

Waste material containerization, storage, tracking and reporting are designated as a contractor responsibility. The inventory of waste material must be appropriately tracked and should be readily available for inspection. The following sections describe waste management containerization, labeling, tracking, and reporting procedures for waste material.

3.4.1 Containerization

Containerization would be required for several of the waste material types should they be found to have constituents with concentrations above the Michigan Part 201 criteria and cannot be placed under the cover system liner due to installation completion. These waste material types are: impacted sediment from contact stormwater, impacted sediment from dewatering operations, sediment from decontamination water, PPE and materials, and impacted final demobilization materials.

Containers used to hold these identified waste materials will be constructed of, or lined with, material that will not react with and are otherwise incompatible with the impacted waste material to be transferred for off-site disposal. Waste material will not be placed in an unwashed container that previously held an incompatible waste or material. Disposable sampling equipment and PPE will be collected in plastic bags and containerized at the end of each working day. At the end of construction activities, the material used to line the temporary decontamination pad will be removed and containerized for offsite transport and disposal. All of these materials will be held in an established accumulation area prior to disposal at the appropriate facility.

Proper marking and labeling will be applied to each container by the contractor. At the time the waste material is placed in the container, the appropriate waste material labeling and marking as provided by regulations will include:

- Accumulation start date clearly marked on "Non-Hazardous Material" label.
- A description of the composition and physical state.
- Warning word such as flammable, corrosive, or reactive, as applicable.
- Source of the waste material.
- Non-Hazardous Material Manifest Number (placed on container prior to shipment).
- DOT shipping description.
- DOT marking and labeling.
- Emergency contact and phone number.

3.4.2 Storage

The storage of waste material will be in compliance with the regulations and consistent with the waste material determination described in Section 2.0. All material will be accumulated only in containers or tanks in designated areas.

3.4.3 Reporting

If a shipment of material is sent off-site, a Non-Hazardous Waste Manifest or appropriate State manifest will be prepared and will accompany the shipment to the appropriate commercial facility. The contractor will create a manifest record that includes the original manifest with the commercial facility representative's signature.

3.5 Decontamination and Site Demobilization

3.5.1 Heavy Equipment

Heavy equipment used in contaminated areas will be decontaminated at the decontamination pad prior to moving to a clean location and before leaving the site. When decontaminating equipment, the following requirements will be implemented:

- The equipment will be inspected for gross debris. Where possible, soil deposits will be removed and containerized (or placed below the soil cover).
- After removal of gross debris, the equipment will be steam cleaned.
- After all debris is removed according to the above procedure, the equipment will be released from the decontamination pad for use as necessary in other areas of the site. At the close-out of the exclusion zone activities or when a piece of equipment is to be demobilized from the project, the equipment will be given a final decontamination. Equipment wash rinsate will be managed as stated in Section 2.0.

3.5.2 Haul Roads

When the haul road is no longer necessary, the haul road material, and any stained soil on or below the haul road, will be removed and sampled. If there are no constituent concentrations above the applicable Michigan Part 201 criteria, the material or soil may be placed under the cover system liner, if it has not yet been completed. Otherwise, the material or soil will be containerized and disposed of offsite at an appropriate facility.

3.5.3 Stockpile Base Areas

Temporary stockpile pads will be removed at the end of the project. The soil beneath and around the stockpile pads will be sampled after completion of the project. The soil will be sampled for target constituents as specified in the Sampling and Analysis Plan (SAP). Soil beneath the stockpile areas with constituent concentrations above applicable Michigan Part 201 criteria will be placed under the cover (if not yet complete) or disposed offsite.

4. Future Work

Construction activities within the NE Pit that will penetrate the cover system will follow this WMP and the CHASP that was developed for the workers involved with construction activities, where there is the possibility of dermal contact with impacted soil/waste material beneath the cover system. Soil/waste material that is excavated during future construction activities will be managed in accordance with this WMP. After future construction activities are complete, portions of the cover system that was disturbed will need to be restored to pre-construction condition. The disturbed area will be checked for settlement after construction activities. If settling has occurred, the cover system will be inspected for compliance with the specifications for the cover system. If the cover system does not meet the specifications, it will be re-constructed so that it does.

Maintenance activities, that involve penetrating the cover system, will also be conducted in accordance with the site WMP and the CHASP. Any portion of the cover system, that is disturbed, will be re-covered with fill and topsoil, and then seeded and watered to establish vegetative growth or graveled and/or paved as appropriate. If at any time, impacted soil or waste material is generated from onsite activities, the WMP will be activated.

4.1 Excavation, Backfilling, and Grading

4.1.1 Clearing and Grubbing

Clearing and grubbing will be performed on an incremental basis, only in areas of active construction. Proper sediment controls will be implemented in all disturbed areas, as necessary, and disturbed areas will be restored as soon as possible after construction is complete. Any surface vegetation encountered during clearing and grubbing activities that occur after cover system construction will be managed as clean material, as it does not have contact with waste material.

4.1.2 Excavation and Backfilling

Prior to excavation activities the appropriate stormwater controls must be chosen and utilized as described in Sections 3.3 of this document. Proper sediment controls will be implemented in disturbed areas, and disturbed areas will be backfilled and restored as soon as practicable following completion of excavation. Temporary barriers will be constructed around the perimeter of the excavation. The barriers will be maintained during excavation and in the interim period between the completion of an excavation and backfilling to prevent surface runoff from entering the excavation. Excavated material from under the constructed cover system, (i.e., 30-inches below land surface), will be managed as in Section 3.1.

Future construction will return the area to graded conditions associated with the designed cover system so that drainage features and surface topography are restored.

4.2 Solid Waste Material

This section describes the method that will be used to manage solid waste material generated from future activities that penetrate the cover system. The CHASP describes establishment of work zones, a decontamination area, and recommended work practices should construction activities involve waste material. Proper personnel, equipment, and material control and management are essential to minimize cross-contamination and protect human health and the environment.

4.2.1 Waste Material

Waste material previously encountered within the NE Pit include wood, charred wood, coal, wood tar, wood sludge, and demolition debris. If these objects are found during excavation activities, they will be transported to an appropriate off-site disposal facility. Should future construction within the NE Pit require waste removal, confirmation sampling will be necessary, as referenced in Section 3.2.

4.3 Stormwater Management

Construction at the site is to be conducted according to the requirements of the CWA for protection of water quality at the site. Engineering controls will be established to prevent water runoff and run on during excavation and construction activities. Containment systems will be deployed as necessary to prevent soil and sediment associated with excavation from reaching stormwater drainage points at the site.

4.4 Construction Stormwater, Sediment, and Erosion Control Practices

Part 91 of Act 451 of 1994 requires a Soil and Sedimentation Control Permit prior to construction. Functional sediment and erosion controls must be constructed before commencing land disturbance activities. Within individual construction areas, controls will be constructed as soon as practicable after first disturbance of soils. Suggested erosion and sediment control practices include (but are not limited to):

- Sediment and erosion controls.
- Stormwater management.
- Sediment traps.

The sediment and erosion controls may consist of the following:

- Silt fence.
- Diversion ditches.
- Check dams.
- Temporary construction entrances.

These controls are designed to prevent erosion of soils during construction activities and to protect stormwater quality after construction is complete. Controls are also in place to trap eroded material before it enters the proposed storm drainage system, and trap sediment before it leaves the site. Any controls will be maintained in good condition and inspected periodically after beginning of a storm event. Each control is discussed in greater detail in the following subsections.

4.4.1 Silt Fences

Silt fences are used for sediment and erosion control during construction wherever runoff is expected in the form of sheet flow. Specifically, silt fences could be installed around soil stockpiles, along the downslope perimeter of utility trenches, and along the downslope perimeters of construction areas. Silt fences decrease flow velocity and trap sediments where sheet flow conditions exist or where flow is through tiny rills that can be converted to sheet flow. Silt fences would not be used where flow is channelized. The silt fence would be erected on relatively level ground a minimum distance of five feet from the toe of a slope. The bottom of the silt fences should be buried in the ground a minimum of 6 inches to prevent runoff from passing beneath the fence.

Individual panels would be overlapped, and the ends of the silt fences would bend upslope to prevent water from flowing around the fence.

4.4.2 Diversion Ditches

Diversion ditches are used to carry sediment-laden runoff into a control structure or to carry clean runoff away from disturbed areas. The ditches provide permanent runoff control at the site. They are to be constructed on grade and act to intercept and transport channelized flows. Riprap check dams constructed along the lengths of the ditches on a regular spacing decrease flow velocity and facilitate settling-out of sediments by dissipating energy. Ditches that are to remain in place for longer than 30 days will be seeded and mulched. Sediment traps collect stormwater runoff from the diversion ditches for removal of soil particles prior to onsite discharge.

4.4.3 Check Dams

Check dams are constructed in diversion ditches to decrease flow velocity and facilitate settling-out of sediments by dissipating energy. The check dams provide runoff control during construction by causing sediment to settle out within the diversion ditches and by minimizing the amount of erosion by water flowing though the ditches. This minimizes the quantity of sediment being delivered to the sediment ponds. Temporary rock check dams may also be constructed in outlet channels to trap sediment that may enter the storm drainage system. A typical check dam is approximately 2 feet high and 2 feet wide at the top. The upslope riprap face of the check dams will be covered with 6 inches of washed stone.

4.4.4 Temporary Construction Entrances

Temporary construction entrances will consist of gravel pads constructed of coarse aggregate (2- to 3-inch stone). The pads will be constructed in areas found to have relatively dry, firm soil to minimize the amount of soil or mud that adheres to the truck tires and undercarriages. In this way, the construction entrances will provide temporary soil stabilization during construction. Geotextile fabric will be placed over the subgrade beneath the pads in wet areas. Truck and heavy equipment traffic will be routed over the pads, minimizing the tracking of soils around and off the site. Trucks will be decontaminated by steam cleaning prior to exiting the site if in contact with waste material as described in the site-specific CHASP Section 2.4.2 and summarized below. The CHASP also describes establishment of work zones and a decontamination area should waste be encountered.

Heavy equipment used in contaminated areas will be decontaminated prior to moving to a clean location and before leaving the site. When decontaminating equipment, the following requirements will be implemented:

- The equipment will be inspected for gross debris. Where possible, contaminated soil deposits will be removed and containerized (or placed below the soil cover).
- After removal of gross debris, the equipment will be steam cleaned using a high-pressure washer (i.e., Hotsy).
- After steam cleaning, the equipment will be allowed to dry and will be reinspected. Any remaining visible debris will be re-cleaned through additional pressure washing.

After debris is removed according to the above procedure, the equipment will be released from the decontamination pad for use as necessary in other areas of the site. At the closeout of the exclusion zone activities or when a piece of equipment is to be demobilized from the project, the equipment will be given a final decontamination. Equipment will be inspected prior to release from the facility and inspection results will be documented in field logbooks. Decontamination wash water will be collected and sent to either the on-site water treatment system or an off-site permitted treatment/disposal system.

5. Employee Training

The employee training program will inform project personnel of the components and objectives of the WMP, and the measures that will be implemented to ensure that these objectives are attained. Training will address each component of the WMP, and will inform personnel as to why and how control practices are to be implemented. Topics will include, at a minimum, the following:

- Spill prevention and response.
- Good housekeeping practices.
- Equipment operations training.
- Material management practices.
- Inspection and maintenance of sediment and erosion control practices.

Certain employees will receive initial training at the start of construction and refresher training thereafter, as necessary. Hazardous material training is discussed in the CHASP for the site, and is pertinent for personnel to be working with waste material.

6. Emergency Response

The CHASP generated for the NE Pit IRAP implementation contains a detailed emergency response procedure in Section 10.0, and is applicable to this WMP for both IRAP implementation and for future work. A list of emergency contacts and phone numbers is attached as Table E7-1, and a map showing the route from the site to Dickinson County Memorial Hospital is included as Figure E7-1. This emergency information is also included in the NE Pit IRAP CHASP.

Should a spill or leak of a hazardous substance occur, the following procedures will be followed:

- Contact the National Response Center immediately at (800) 424-8802.
- Contact the Michigan Department of Environmental Quality/Regional EPA Office within 24 hours of discovery at (906) 875-6622.
- Contact the Breitung Fire Department immediately at (906) 774-7505.
- Contact the State Fire Marshall immediately at (517) 336-6604.
- For a release that goes beyond the boundary of the property, immediately contact the local emergency planning committee (LEPC) for the area affected (from within Michigan call 800-292-4706; from outside Michigan call 517-373-7660). Submit a written report as soon as practicable after release to the state emergency response commission (SERC), in care of the MDEQ, Environmental Assistance Division, and to the LEPC.
- For an unpermitted release over a 24-hour period of a hazardous substance, contact the MDEQ, Environmental Response Division district office (or pollution emergency alerting system (PEAS) after hours) within 24 hours of discovery. From within Michigan, call 800-292-4706; from outside Michigan, call 517-373-7660.
- For an incident involving transportation of hazardous materials that results in fire, death, injury, property damage, evacuation, highway closure or flight pattern

alteration, contact the U.S. Department of Transportation (DOT) at 800-424-8802. Submit written report to DOT within 30 days of discovery.

- For a release that results in one death or the hospitalization of three or more persons, contact the Michigan Occupational Safety and Health Act Hotline at 800-858-0397 within eight hours of the incident.

- For unpermitted release to the public sewer system, surface water or groundwater from an oil storage facility or on-land facility of a polluting material, contact PEAS as soon as practicable after detection (from within Michigan call 800-292-4706; from outside Michigan call 517-373-7660). Submit written report within 10 days after release to the MDEQ, Waste Management Division chief.

For situations that involve materials other than fuel:

Where any amount of characteristic hazardous or listed hazardous waste (as defined in R 299.9203 "Hazardous Waste Rule 203"), has reached the surface water or groundwater,

or

A fire, explosion, or other release of hazardous waste or hazardous waste constituents occurs that could threaten human health or the environment.

or

A release of >1lb (or ≤1lb if not immediately cleaned up) hazardous waste to the environment from a tank system or associated secondary containment system.

- Immediately contact PEAS within 24 hours of discovery (from within Michigan call 800-292-4706; from outside Michigan call 517-373-7660). If threat to human health or environment, call the National Response Center (800-424-8802). Written report may be required.

- If liquid industrial waste spill could threaten public health, safety, welfare or the environment, or has reached surface water or groundwater, immediately call PEAS (from within Michigan call 800-292-4706; from outside Michigan call 517-373-7660). Submit written report within 30 days of incident to MDEQ, Waste Management Division district supervisor.

For situations that involve PCBs:

- Where there is a spill of PCBs, contact the U.S. EPA Region V Toxic Program Section at 312-886-6003 as soon as possible after discovery, and within 24 hours.

In the event of a release, this WMP will be amended within 14 calendar days of the event to minimize the chance of event reoccurrence.

6.1 Spill Prevention

To prevent or minimize the potential for stormwater and groundwater contamination at fueling areas, the following general practices for all near-term and future construction will be implemented:

- Leaks and spills will be contained and cleaned-up as soon as possible using dry absorbent materials, and leaking equipment will be removed from the site and repaired or replaced.

- Fuel drums, tanks, and containers will be stored in a bermed area or in overpack containers, spill pallets, or similar containment devices with a capacity of 110 percent of the volume of stored fuel.

7. Implementation

Implementation of this WMP during construction will be the responsibility of the Waste Management Team, as provided by the construction Contractor. Waste Management Team members will be properly trained as discussed in Section 5.0 of this document. A list of objectives and implementation procedures will be developed for each construction task, along with a preliminary task completion schedule. The Waste Management Team will also be responsible for ensuring stormwater and sediment and erosion control practices are in place at the appropriate time.

8. WMP Approvals

By their signature, the undersigned certify that this WMP is approved and will be utilized for operations to be conducted under this plan.

Contractor Project Manager	Date
Contractor Waste Management Team Leader	Date
ARCADIS Project Manager	Date

Tables

Table E4-1. Verification Soil Sampling Analytical Parameters, Former NE Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Parameter

VOC
1,1,2,2-Tetrachloroethane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
2-Hexanone
Acetone
Benzene
Ethylbenzene
Methylene chloride
n-Butylbenzene
n-Propylbenzene
Naphthalene
sec-Butylbenzene
Styrene
Toluene
Trichloroethene
Xylene, o
Xylenes (total)
Xylenes, m+p

SVOC
2,4-Dimethylphenol
2-Methylnaphthalene
2-Methylphenol
2-Nitrophenol
3-Methylphenol/4-Methylphenol(m& p-cresol)
4-Methylphenol
Diethylphthalate
Naphthalene
Phenol

Parameter

Metals
Aluminum
Antimony
Cobalt
Iron
Manganese
Molybdenum
Selenium
Sodium

Alcohols
Methanol
n-Butanol

Aldehydes
Acetaldehyde

Pestcides/PCBs
BHC (Lindane) (gamma)

Acetic Acid

Table E7-1. Emergency Telephone Numbers and Directions to Dickinson County Memorial Hospital, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

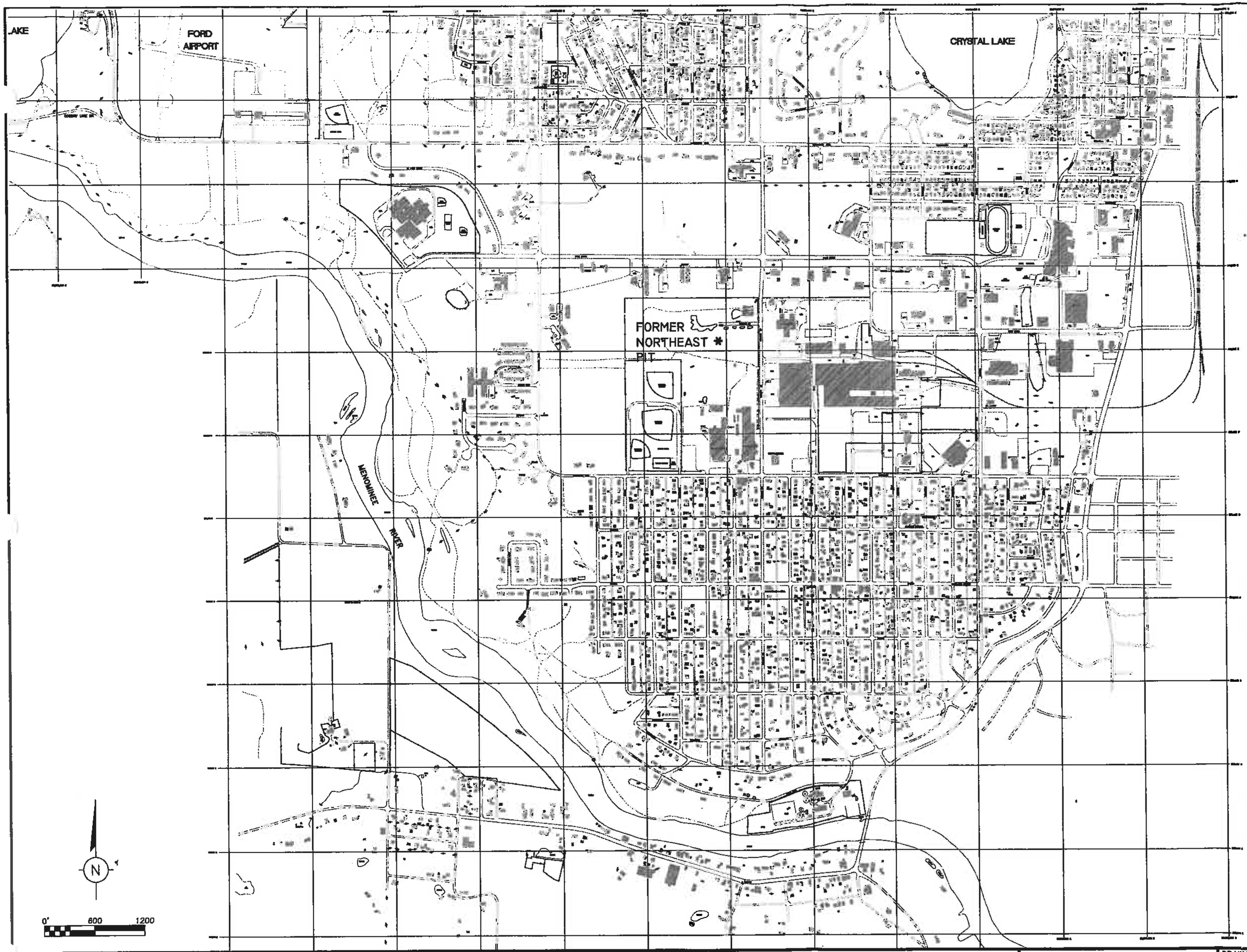
Area Code	906
Police Emergency	911
Police Non-Emergency	774-2525
Fire Emergency	911
Fire Non-Emergency	774-1265
Ambulance	911
Beacon Ambulance Service	779-5050
Rescue Squad	911
Dickinson County Sheriff	774-6262
Hospital Emergency	779-4555
Hospital Non-Emergency	774-1313
Poison Control Center	1 (800) 562-9781
Toxic Substances Center	1 (404) 452-4100
for Disease Control (CDC)	1 (202) 554-1404
CDC Hotline	1 (404) 329-2888
Contractor Project Manager	Insert Contact Numbers
ARCADIS Project Manager	Ric Studebaker (414) 276-7742
ARCADIS Coorporate Health & Safety Manager	Sam Moyers, (423) 481-3000
Contractor Corporate Health & Safety	Insert Contact Numbers
Miss Dig	1 (800) 482-7171

Dickinson County Memorial Hospital - South US Highway 2, Iron Mountain, Michigan.

Directions to Hospital:

East on Breitung Avenue to Hydraulic Falls Road. North (left) on Hydraulic Falls Road to US Highway 2 (Stephenson Avenue). South (right) on US Highway 2 for approximately 1 mile to Dickinson Memorial Hospital.

Figures



NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
DATE OF PHOTOGRAPHY: 05/04/97
ABRAMS AERIAL SURVEY CORPORATION # 26994.2

2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN
JMG

DATE
09/27/02

LOCATION OF FORMER
NORTHEAST PIT

PROJECT MANAGER
EC

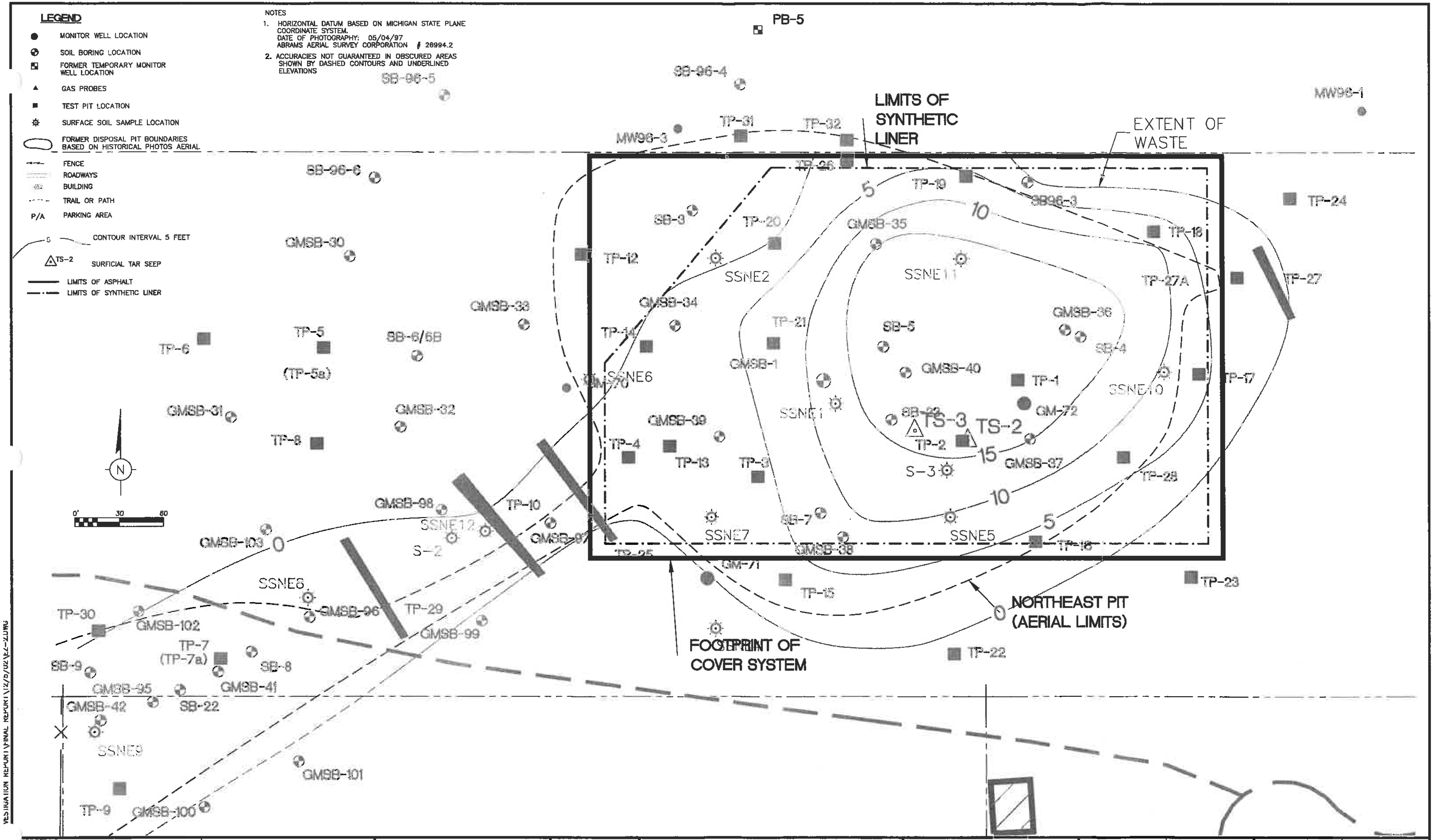
DEPARTMENT MANAGER
BE

LEAD DESIGN PROF.
BE

CHECKED
BE

PROJECT NUMBER
WI00975.0012

FIGURE
E2-1



NOTES
1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
DATE OF PHOTOGRAPHY: 05/04/97
ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS

G:\CAD\NORTHEAST VESTIGATION REPORT\FINAL REPORT\(12/5/02)\E2-2.DWG

NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax 813/961-2599

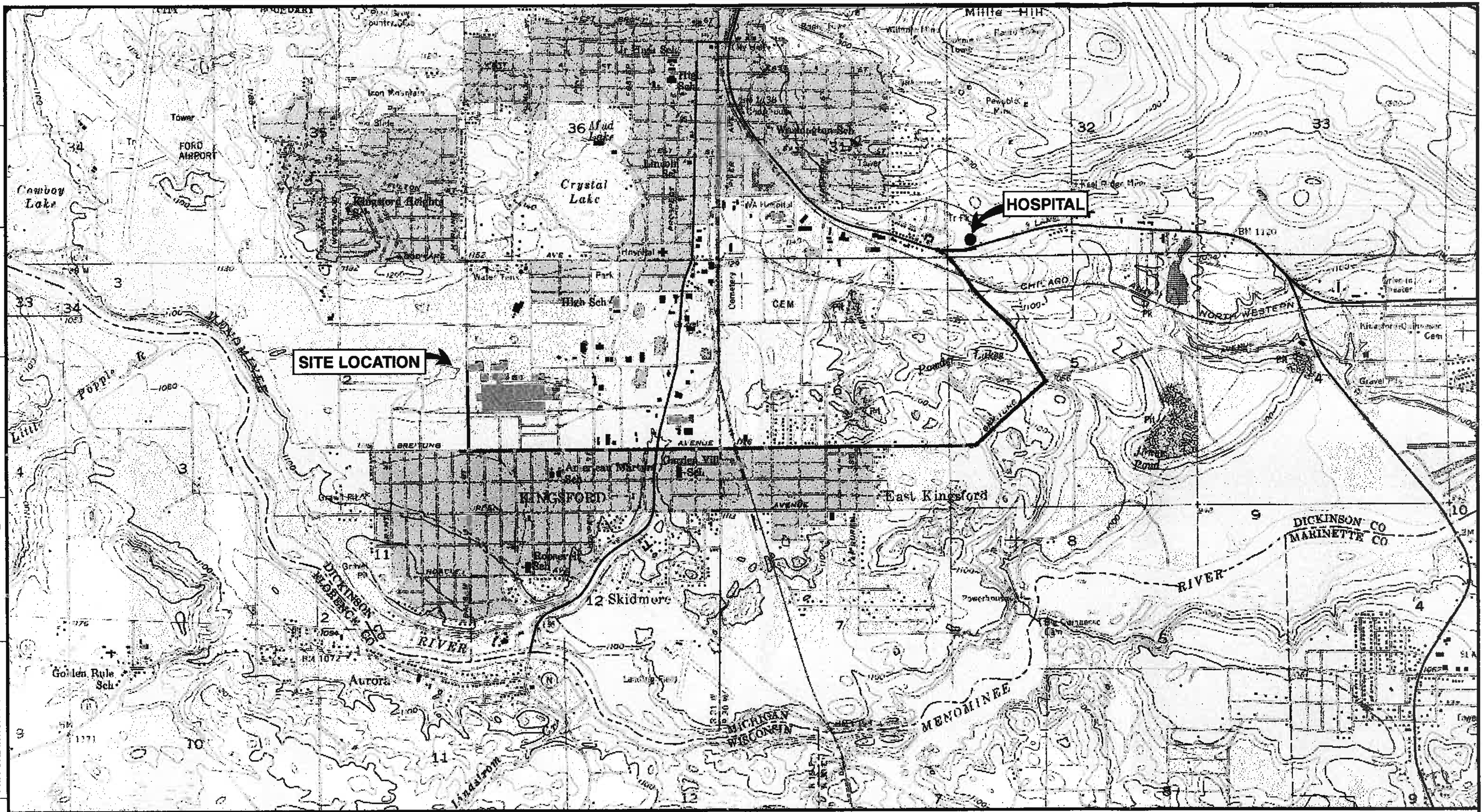
FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

CONCEPTUAL FOOTPRINT
OF A COVER SYSTEM

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER W100975.0012
FIGURE E2-2



SOURCE: USGS 7.5 Minute Topographic Map, IRON MOUNTAIN, MICH.-WIS. Quadrangle, 1955, Photorevised 1982

Route to Hospital: Balsam Street south to Breitung Avenue. East on Breitung Avenue to Hydraulic Falls Road. North on Hydraulic Falls Road to U.S. Highway 2 (Stephenson Avenue). South on U.S. Highway 2 to Dickinson County Memorial Hospital.

Hospital Address: 1721 Stephenson Avenue, Iron Mountain, Michigan.

N

0 2000 4000 8000

SCALE IN FEET

ARCADIS

ROUTE TO HOSPITAL

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

E7-1

DRAFTER: ELS
APPROVED:
CHECKED: KMLBIK
DRAWING: ROUTE_HOSP.AI
FILE NO.: GRAPHICS\NE_PIT
PN: FORDWI0637\KINGSFORD
DWG DATE: 07JAN02

Appendix F

Construction Health and Safety Plan Guideline

ARCADIS

Appendix F
Construction Health and Safety Plan Guideline

Former Northeast Pit Interim
Response Action Plan,
Ford/Kingsford Site, Kingsford,
Michigan

PREPARED FOR

Ford Motor Company
The Kingsford Products Company

Table of Contents

Tables

Figures

1. Introduction

This Construction Health and Safety Plan Guideline (CHASP) has been prepared for use in conjunction with an Interim Response Action Plan (IRAP) for the former Northeast Pit Area (NE Pit) at the Ford/Kingsford Site in Kingsford, Michigan. This document presents requirements that must be incorporated into a contractor generated Construction Health & Safety Plan (Contractor CHASP) when conducting construction activities that could potentially disturb the cover system and expose personnel to waste material present below the cover. The Contractor will generate the Contractor CHASP as part of their work for the identified site conditions, scope of work, and necessary personnel in accordance with the guidelines presented here. The contractors may include additional content consistent with their own corporate health and safety guidelines or procedures. The responsibility for the development, implementation, and enforcement of the Contractor CHASP lies solely with the contractor, not Ford Motor Company (Ford) or The Kingsford Products Company (KPC).

The elements of the CHASP are based upon the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (October 1985) and the Michigan Occupational Safety and Health Act and its Rules. These guidelines have been supplemented by information obtained during site investigation activities. All reasonable precautions will be taken by the selected Contractor and its subcontractors to protect the safety and health of workers and the general public. All work will be performed in accordance with applicable federal, state, and local regulations.

The objective of this CHASP is to structure and maintain safe working conditions at the site and to develop a plan of action in the case of a site emergency during field activities. The safety organization and procedures have been established based on an analysis of potential hazards, and personnel protection measures have been selected in response to these potential hazards.

Elements of this CHASP address the following:

- Project Organization
- Site History and Project Description
- Training
- Potential Hazards of Site Contaminants

- Activity Hazard Analysis
- Safety Considerations for Site Operations
- Protective Equipment
- Monitoring Requirements
- Site Control Zones and Communication
- Medical Surveillance
- Decontamination and Waste Disposal
- Emergency Response Plan

2. Contractor Organization and Responsibilities

The Contractor will be responsible for its employees and their adherence to the Contractor CHASP during construction activities that have the potential to disturb the cover system and expose personnel to the waste material below the cover system. The Contractor CHASP will adhere to the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (October 1985 and March 1989) prepared by the National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), US Coast Guard (USCG), and US Environmental Protection Agency (U.S.EPA). The Contractor CHASP will also adhere to Michigan Occupational Safety and Health Act and its Rules. Trained staff will supervise the work in accordance with the health and safety requirements described herein, the current edition of the Michigan regulations for hazardous waste operations, and all applicable federal, state, and local health and safety regulations.

2.1 Organizational Structure

Proper planning and careful Contractor CHASP implementation is essential to carrying out the proposed construction activities at the site. An organizational structure detailing personnel requirements and responsibilities is presented in this section. The organizational structure defines the chain of command and identifies the person responsible for directing activities related to the project. Necessary personnel for project implementation will be identified as well as their general functions and responsibilities. This structure also identifies lines of authority, responsibility, and communication among the project team and indicates the person(s) responsible for communicating with the emergency response community. A typical organization chart is shown on Figure F2-1.

An overall project manager (PM) and a project superintendent (PS) and Site Safety Officer (SSO) will be called out by the Contractor in the CHASP, and an alternate project manager and project superintendent will be identified. Their responsibilities include:

- Having the authority to direct all activities.
- Ensuring the implementation of the Contractor CHASP and effective loss control principles.
- Ensuring that safe work rules and practices are enforced.

- Performing on-site inspections to make certain the Contractor CHASP is being followed.
- Implementing corrective actions following audits, inspections, incident investigations, etc.
- Ensuring that resources are available for all health and safety requirements.
- Assigning trained and qualified personnel to project tasks.
- Providing the appropriate monitoring and safety equipment necessary for implementing the Contractor CHASP.

The PM and PS have the ability to authorize the following safety-related suspensions:

- Temporary suspension of field activities if the health and safety of personnel are endangered.
- Temporary suspension of an individual from field activities for infraction of the Contractor CHASP.

The PM and PS will have ready access to occupational health and safety professionals, including an industrial hygienist.

2.2 Record Keeping Requirements

The PS will ensure that all health and safety record keeping requirements mandated by Rule 408.22101 et seq., Rule 324.52101 et seq. under the Michigan Occupational Safety and Health Act, and any other applicable standards are met. An administrative area will be designated for maintenance of such records including Michigan Occupational Safety and Health Act (MiOSHA) certifications, exposure monitoring records, training certificates, and health and safety field logbooks. Additional records to be kept, when applicable, may include the following:

- Daily Health and Safety Meeting Form (Figure F2-2).
- Field Team Review Sheet (Figure F2-3).

- Visitor's log and Contractor CHASP sign-off (Figure F2-4).
- Qualification and testing for respirator use and fit test.
- Emergency Medical Data Sheets (Figure F2-5).
- Calibration logs as described in Section 7.3.
- Monitoring logs for volatile organic compounds (VOCs), oxygen levels, particulates, and any other monitored parameter.
- Perimeter monitoring charts, data, and calculation sheets.
- Personal Protective Equipment (PPE) log for levels of protection greater than Level D with date, type of PPE, time and duration of PPE use.
- Exposure and incident reports.
- Emergency Report Form (Figure F2-6).
- Work stoppage and work re-start reports.
- Copies of the Contractor CHASP with appropriate signatures, CHASP Approvals (Figure F2-7).

2.3 Training

It will be the responsibility of the PM, PS and SSO to ensure that properly trained personnel are assigned to each work task. Members of the project team performing tasks that could potentially result in exposure to waste materials will have satisfied the training requirements of Rule 325.52101 et seq. (MiOSHA regulation of hazardous waste site activities). MiOSHA certificates for these members will be current and available. These employees will also be subject to appropriate medical surveillance in accordance with Rule 325.52101 et seq. Site-specific training will be provided as necessary for those workers, including subcontractors, and will include a discussion of the following topics:

- Names of all health and safety related personnel and alternates

- Health and safety organization
- Locations where Contractor CHASP will be stored
- Nature of anticipated hazards
- Recognition and avoidance of hazards at the site
- Safe use of engineering controls and equipment on the site
- Hazard communication
- Exposure risk
- Safe work practices
- PPE to be used
- Personnel and equipment decontamination procedure
- Air monitoring
- Emergency procedures and on-site First Aid Station and Procedures
- Rules and regulations for vehicle use
- Safe use of field equipment
- Handling, storage, and transportation of hazardous materials
- Employee rights and responsibilities

Additionally, field personnel will be responsible for knowing and understanding the information contained in the Contractor CHASP. Attendees will also sign a Field Team Review Sheet stating that they have been trained in, understand, and agree to comply with the provisions of the Contractor CHASP. Anyone refusing to sign the form will be prohibited from working at the site.

When a new employee has been assigned to the site, the PS and SSO must present a similar briefing before the new employee participates in any field activities. All new employees must sign the Field Team Review Sheet after receiving training and before beginning fieldwork.

2.4 Health and Safety Meeting

Prior to initiating site work, site personnel will be required to attend an orientation session given by the PS and SSO as outlined on Figure F2-2. This session will take place at the site prior to the start of work and may include, but is not limited to, the following topics:

- Site history.
- Scope of fieldwork.
- Specific hazards (toxicological data, heat stress/exposure, other physical hazards).
- Hazard recognition.
- Standard operation procedures and injury prevention, including no smoking and no hand-to-mouth contact within the exclusion zones or prior to completing decontamination.
- Decontamination (personnel and equipment).
- Emergency procedures.
- Potential respirator use.

Field personnel must attend this meeting, the minutes of which will be documented in the site logbook and maintained as indicated in Section 2. In addition, a safety meeting will be conducted before each work day.

2.5 Health Monitoring and Surveillance

A health monitoring and surveillance program will be established to verify that the worker is physically fit to perform the necessary tasks. The monitoring program will be performed in accordance with MiOSHA requirements. An initial screening of the worker will be performed in accordance with OSHA 29 CFR 1910 guidelines prior to site placement to document current level of health and ability to wear protective gear. The initial health screening should focus on examination of the kidneys, heart, and lungs, and should include the following physical examinations:

1. Height, weight, temperature, pulse respiration, and blood pressure.
2. Head, nose, and throat.
3. Eyes, including vision tests that measure refraction, depth perception, and color vision.
4. Ears. Requirements for this test are listed in 29 CFR 1910.95.
5. Chest (heart and lungs), including pulmonary function and electrocardiogram (EKG) testing.
6. Peripheral vascular system.
7. Abdomen and rectum (including hernia exam).
8. Spine and other components of the musculoskeletal system.
9. Genitourinary system.
10. Skin.
11. Nervous system.

The following tests should also be performed during the pre-employment examination:

- Blood (including complete blood count with differential, comprehensive metabolic panel, cadmium, mercury, and serum polychlorinated biphenyl [PCBs]).
- Urine.
- Chest X-rays.

Periodic medical exams should also be part of the Contractor's Corporate Medical Monitoring Program in accordance with 29 CFR 1910. Annual exams are acceptable; however, more frequent examinations may be necessary depending on the types of chemicals the worker has been exposed to, the duration of the assignment, and the potential or actual exposure levels.

In addition, testing is necessary to confirm that the worker is capable of completing the work tasks while wearing protective equipment. Medical records for each team must be maintained on-site as stated in Section 2.2 to include the following information:

Qualification statement for hazardous waste work.

Qualification for respirator use.

Respirator fit test results.

Emergency Medical Data Sheet (Figure F2-5).

The Contractor will provide in the Contractor CHASP the components of their active medical monitoring program, including a detailed plan of health signs and symptoms to be monitored throughout the workday. A record of these monitoring reports will be maintained on site along with each worker's health history record.

3. Background

3.1 Site Description

The city of Kingsford is located in southwestern Dickinson County, in the western part of Michigan's Upper Peninsula. The NE Pit is a former glacial kettle with a center point located approximately 1,500 feet north of Breitung Avenue and approximately 600 feet west of Balsam Street (Figures F3-1 and F3-2). The area is zoned for industrial use. City of Kingsford zoning information for the area is included in Appendix C of the IRAP. The NE Pit area is elliptical in shape, approximately 30 feet (ft) deep, 3 acres in size, and is linked by a channel to a second pit to the southwest. A portion of the channel is included in the scope of work for the NE Pit IRAP implementation. The NE Pit is vacant, relatively flat land that is sparsely vegetated with several areas where wood tar occasionally seeps to the surface. The depth to groundwater in the area of the NE Pit ranges from approximately 39 feet to 50 feet below land surface (ft bls), and groundwater flow is generally to the west. There are no bodies of water on the site.

3.2 Site History

Aerial photographs and historic records indicate that waste disposal at the NE Pit began in the 1920s. Wood pieces, wood sawdust, wood bark chips, and charcoal were reportedly disposed of within the NE Pit along with wastewater containing dissolved organic material from wood pyrolysis processes. Historical investigations have detected the presence of VOCs, semi-volatile organic compounds (SVOCs), and metals in soil and waste material within the area of the NE Pit. Site characterization activities were completed for the surface soil, subsurface soil, and waste material, which include wood sludge and wood tar.

Investigations of the NE Pit area were initiated in 1985. In 1987 and 1988, based on the findings, a removal program was implemented by Ford that consisted of excavation and off-site disposal of wood tar. As part of characterization, exposure pathways were identified and a comparison of the site data to applicable criteria was made. The results of the NE Pit characterization are discussed in the NE Pit IRAP.

3.3 Waste Material

Only a portion of the fill within the NE Pit is waste material, the remainder of the fill material consists of imported sand, with some silt. The waste material encountered ranged from 4 to 19 feet thick, and are underlain by native silt and sand. The depth to the base of the fill and waste material ranges from 1.5 to 35 ft bls. The remaining fill is covered by fine to coarse sand ranging from 2 to 16 feet thick.

The waste material remaining within the NE Pit is a combination of various types of materials. The waste grouped into several categories, including solely wood products (wood pieces, wood chips, bark, sawdust), wood products mixed with charcoal fragments and carbonized wood, tar, and a combination of wood sludge, wood products, charcoal fragments, and carbon fragments. In addition, construction debris was observed in several of the test pits. The waste material is also interlayered with fill material consisting of sand or silt.

3.3.1 Methane Gas

The biodegradation of organic material in the groundwater system is the primary source of methane gas throughout the site. However, biodegradation of organics in the waste material may also result in methane gas formation at the NE Pit. Methane that is migrating in the unsaturated zone above the water table (vadose zone) may either degrade naturally, or migrate to the surface if no confining layer is present. Investigations have shown that where a confining layer is present, the methane migration to the surface is prevented.

4. Chemical Constituent Descriptions

Laboratory analytical data compiled for soil and waste samples within the NE Pit indicate that VOCs, SVOCs, alcohols, aldehydes, pesticides, and metals have been detected in samples at concentrations above background levels. Any chemical constituent detected in the soil or waste material at the NE Pit facility is listed below. Exposure limits, explosive limits (if applicable), and potential exposure routes for these chemical constituents of potential concern are listed in Table F4-1. Monitoring and Contractor designation of action levels will be discussed in Section 7.

VOCs:

- 1,1,2,2-Tetrachloroethane
- 1,2-Dichloroethane
- 1,2-Dichloroethene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- 1,4-Dichlorobenzene
- 2-Butanone (MEK)
- 2-Hexanone
- Acetone
- Benzene
- n-Butylbenzene
- sec-Butylbenzene
- Carbon Dioxide
- Carbon disulfide

- Chlorobenzene
- Chloroform
- Ethylbenzene
- Isopropylbenzene
- Methyl chloride
- n-Propylbenzene
- Styrene
- Tetrachloroethene
- Trichloroethene
- Toluene
- Xylenes

SVOCs:

- 1-Methylnaphthalene
- 2-Methylnaphthalene
- 2-Methylphenol
- 2-Nitroaniline
- 2-Nitrophenol
- 2,4-Dimethylphenol
- 3-Methylphenol

- 4-Methylphenol
- 4-Nitrophenol
- Acenaphthene
- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Benzoic acid
- Bis(2-ethylhexyl)phthalate
- Butylbenzene phthalate
- Chrysene
- Dibenzofuran
- Di-n-butyl phthalate
- Di-n-octylphthalate
- Fluoranthene
- Fluorene
- Isopropyltoluene
- Naphthalene

- Pentachlorophenol
- Phenanthrene
- Phenol
- Pyrene

Alcohols:

- 1-Propanol
- Ethanol
- Ethylacetate
- Isobutanol
- Isopropanol
- Methanol
- n-Butanol

Aldehydes:

- Acetaldehyde
- Formaldehyde
- Hexanal
- m-Tolualdehyde
- Paraldehyde
- Pentanal
- Propanal

Pesticides:

- Aldrin
- Aroclor 1242
- Lindane (BHC gamma)
- Chlordane (alpha)
- Chlordane (gamma)
- Endosulfan I
- Endosulfan II
- Endrin
- Heptachlor epoxide
- Methoxychlor

Metals:

- Aluminum
- Antimony
- Arsenic
- Barium
- Berylium
- Cadmium
- Calcium
- Chromium

- Cobalt
- Copper
- Cyanide
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Potassium
- Selenium
- Silver
- Sodium
- Thallium
- Titanium
- Vanadium
- Zinc

In addition, the presence of potentially explosive concentrations of methane gas exists. Since methane gas is lighter than air, it will rise into the vadose zone in the absence of silt or clay layers. Historical investigations at the NE Pit have shown the prevalence of methane gas is within the waste material. Provisions must be included in the Contractor CHASP for the possible occurrence of methane gas in the vadose zone.

5. Potential Exposure Pathways and Hazard Evaluation

Attention will be given to protecting on-site personnel from the physical and chemical hazards that may be encountered during construction activities that have the potential to disturb the cover system and expose personnel to the waste material below the cover system. Potential exposure pathways, physical hazards, and hazards due to typical construction activities, that may be necessary in the area and have the potential to disturb the cover system, will be discussed in this section. An evaluation of identified potential hazards is based on site history, previously completed field activities, and the typical construction activities that may be required.

5.1 Chemical Hazards

Exposure pathways have been identified according to the NIOSH Pocket Guide to Hazardous Chemicals (1997). These exposure pathways and other chemical hazards that may affect the health and safety of the on-site personnel are listed below.

The following potential exposure and chemical hazard pathways may be encountered during fieldwork at the site:

- Ingestion of affected surface soil or material.
- Dermal contact with affected particles, vapors, or gases.
- Inhalation of particles, vapors or gases.
- Dispersal of dust/particulates.
- Contact with contaminated storm water during construction.

These exposure pathways will be minimized by following the protocol for the designated working level of protection as described in Section 6.0 (Personnel Protection Program). Toxicological data for the major constituents detected at the site are listed in Table F4-1.

5.2 Physical Hazards

Field personnel may be exposed to physical hazards during this project. Physical hazards that may be encountered are:

- Explosive Hazards
- Noise
- Heat/cold stress
- Lacerations and contusions
- Lifting hazards

General considerations are discussed below; specific comments are presented in Section 5.3.

5.2.1 Flammability and Explosivity of Vapors

Flammable and explosive methane vapors are known to be present, at depth, adjacent to the site. Frequent air monitoring for methane gas will be conducted during the field activities at the site, as well as measuring the lower explosive limit and oxygen concentrations within the breathing zone.

5.2.2 Construction Explosive Hazards

Other explosive hazards associated with construction activities include storage of vehicle fuel and calibration gases for measuring devices.

5.2.3 Noise Exposure

Construction crews may be exposed to loud noise levels from construction equipment. Hearing protection may be necessary.

5.2.4 Heat/Cold Stress

Workers may be required to wear protective clothing, which insulates the body. A hazard may exist if workers wear protective clothing in temperatures exceeding 90°F. In addition to heat stress, exposure to temperatures at or below freezing may result in frostbite and/or hypothermia. A monitoring program will be in place during use of protective gear.

5.2.5 Lacerations and Contusions (Cuts and Bruises)

Earthwork and excavation activities usually involve contact with moving machinery and physical objects. If the field team is cut or bruised during this project, the PS will be prepared to deal with cuts and bruises, and a first aid kit will be present during all site operations.

5.2.6 Insect and Wildlife Hazards

If construction activities require workers to enter areas of overgrown vegetation, potential exposure to insect bites and ticks exist. Workers will pay special attention to the presence of wildlife and inspect themselves at the end of each field day. The first aid kit will contain medications for insect bites.

5.2.7 Lifting Hazards

Construction activities may involve heavy lifting. Field team members will be trained in the proper methods to lift heavy objects and cautioned against lifting objects that are too heavy for one person to handle safely.

5.2.8 Packaging and Shipping Hazards

Any samples collected from the site will be transported to subcontracted laboratories in compliance with Department of Transportation (DOT) regulations. The instructions given below will be followed to comply with DOT regulations and reduce the potential for sample breakage during transport.

- Appropriate packaging materials will be placed into shipping containers.
- The shipping containers will be classified and secured according to appropriate DOT regulations, and other relevant regulations.

5.3 Field Activities/Physical Hazards

Listed below are potential construction activities that may be performed following implementation of the IRAP as described in Section 3.3.

5.3.1 Hazard Analysis: Excavation

A permeable soil cover exists over waste areas at the NE Pit. Should excavation to depths greater than 24 inches be necessary in the cover area, these construction activities may expose field personnel to the chemical and physical hazards listed below:

Chemical Hazards:

- Exposure to explosive vapors.
- Inhalation of vapors.
- Inhalation of dust particles.
- Dermal contact with chemical constituents in the affected soil or waste material.

Physical Hazards:

- Being hit by equipment.
- Being struck by falling objects.
- Exposure to loud noise.
- Exposure to extreme outside temperatures.

In addition, should excavations greater than 4 feet deep be required, field personnel could be exposed to confined space conditions. Any excavation greater than 4 feet deep will follow the procedures identified by the OSHA Construction Code 29 CFR 1926 for excavation sloping/shoring/benching.

5.3.2 Hazard Analysis: Restoring the Protective Cover

Following disturbance of the cover system, construction activities will need to be conducted to repair/restore the protective cover. These activities may expose field personnel to the chemical and physical hazards listed below:

Chemical Hazards:

- Exposure to explosive vapors
- Inhalation of vapors
- Inhalation of dust particles
- Dermal contact with chemical constituents in the affected soil or waste material.

Physical Hazards:

- Being hit by equipment
- Being struck by falling objects
- Exposure to loud noise
- Exposure to extreme outside temperatures

5.3.3 Hazard Analysis: Collecting Soil Samples for Laboratory Analysis

A permeable soil cover exists over waste areas at the NE Pit. Should it be necessary to collect soil samples at depths greater than 24 inches in the cover area, these activities may expose field personnel to the chemical and physical hazards listed below:

Chemical Hazards:

- Inhalation of particulates
- Dermal contact with chemical constituents in the affected soil or waste material.

After the samples have been collected in sampling jars, the samples will be properly packaged to protect shipping personnel from potential exposure to constituents. There is no particular hazard in performing the packaging operation, yet if this operation is not done properly, unsuspecting individuals may be exposed if the containers leak or break. Preservation of water samples may involve the use of acids or bases to adjust sample pH. Precautions will be taken to avoid contact with these reagents.

5.3.4 Hazard Analysis: Geotechnical Sampling as Required During Construction

A permeable soil cover exists over waste areas at the NE Pit. Should geotechnical borings/samples be required at depths greater than 24 inches in the cover area, these construction activities may expose field personnel to the chemical and physical hazards listed below:

Chemical Hazards:

- Inhalation of particulates
- Dermal contact with chemical constituents in the affected soil or waste material.

Physical Hazards:

- Falling objects
- Exposure to loud noise
- Exposure to extreme outside temperatures

6. Personnel Protection Program

A Personnel Protection Program will be established in the Contractor CHASP to be maintained for personnel working at the site and conducting construction activities that could potentially disturb the cover system and expose personnel to waste material present below the cover system. The Personnel Protection Program will provide necessary health and safety training to the contractor personnel assigned to perform or oversee work, health and safety, security, administrative duties, or any other related functions at the site. Site safety meetings will be held before work begins each day or as specified by the PS. Separate protocol will be followed for site visitors as described in a later section.

Personnel will wear Personnel Protection Equipment (PPE) during any of the following conditions: (1) field activities involving the potential for exposure to contaminants, (2) site activities that may generate vapors, gases, particulates, mists, or aerosols, or (3) direct contaminant contact with skin. The type of required PPE is categorized by a level of protection as described below. Any respiratory protection plan implemented during on-site activities will be done in accordance with 29 CFR Part 1910.134.

The levels of protection and the equipment utilized are defined as follows:

6.1 Level D Protection

The following PPE will be considered typical Level D protection:

- Coveralls
- Leather or chemical-resistant boots with a steel toe and shank
- Work gloves
- Safety glasses, chemical splash goggles, or face shield (as determined by the PS)
- Hard hat
- Hearing protection (as determined by the PS)
- Outer latex disposable boots (optional)

6.2 Level D Modified Protection

Level D Modified protection will be used when an increased need for dermal protection is recognized, but respiratory protection is not indicated. The following equipment will be used for Level D Modified protection:

- Chemical-resistant clothing (Tyvek coveralls for particulate hazard or Saranex coveralls or rubber outer gear for liquid hazard).
- Disposable nitrile or butyl outer gloves (glove selection will be based on the site-specific contaminant hazard).
- Nitrile or latex inner gloves (glove selection will be based on the site-specific contaminant hazard).
- Polyvinyl chloride (PVC) boots (chemical-resistant) with a steel toe and shank.
- Hard hat.
- Hearing protection (as determined by the PS).
- Latex outer booties (optional).
- Safety glasses, chemical splash goggles or face shield (as determined by the PS).

6.3 Level C Protection

The following PPE will be considered Level C protection:

- Full-face piece air-purifying cartridge respirator with organic vapor/high-efficiency particulate filter cartridges (as site conditions warrant, a different APR cartridge may be specified in site-specific addenda).
- Chemical-resistant clothing (Tyvek coveralls for particulate hazard or Saranex coveralls or rubber outer gear for liquid hazard).
- Disposable nitrile or butyl outer gloves.

- Nitrile or latex inner gloves.
- PVC boots (chemical-resistant) with a steel toe and shank.
- Hard hat.
- Hearing protection (as required).
- Latex outer booties (optional).
- Two-way radio communications.

The use of a full-face piece air-purifying respirator is approved only if the following applies:

- Substances are identified and their concentrations measured.
- Substances have adequate warning properties.
- Individual passes a qualitative fit test for the assigned respirator.
- An appropriate cartridge is selected based on the hazard.

It is particularly important that the air monitoring is effectively implemented when personnel are wearing Level C protection. No changes to the specified level of protection will be made without the approval of the PS.

Verbal communication on site may be impeded by background noise caused by heavy equipment or the use of PPE. Accordingly, hand held radios will be made available. If radios are not available, all individuals will remain within sight of the project leader and hand signals will be used between personnel within the work zone. Communications requirements will be reviewed during the site safety meetings.

The following hand signals will be used in the event of an emergency where audible communication is not possible:

Hand Signal	Meaning
Hand gripping throat	Out of air, cannot breath
Gripping partner's wrist or both hands on waist	Leave area now, no debate
Hands on top of head	Need assistance
Thumbs Up	OK, I'm all right, I understand
Thumbs Down	No, Negative

6.4 Level B Protection

The following PPE will be considered Level B protection:

- Pressure demand supplied air respirator or self-contained breathing apparatus.
- Chemical-resistant clothing (Tyvek coveralls for particulate hazard or Saranex coveralls or rubber outer gear for liquid hazard).
- Disposable nitrile or butyl outer gloves.
- Nitrile or latex inner gloves.
- PVC boots (chemical-resistant) with a steel toe and shank.
- Hard hat.
- Hearing protection (as required).
- Latex outer booties (optional).
- Two-way radio communications.

The use of a full-face piece air-purifying supplied air respirator is approved only if the following applies:

- Substances are identified and their concentrations measured.
- Individual passes a qualitative fit test for the assigned respirator.

6.5 Decontamination Procedures

It is the responsibility of the PS to make certain that all personnel and pieces of equipment leaving the site are properly decontaminated according to the procedures outlined in this section. All personnel exiting controlled work zones must follow decontamination procedures. Only during an emergency evacuation will personnel be allowed to leave the site before decontamination.

6.5.1 Level D Decontamination Procedures

The general decontamination procedures for workers in Level D conditions are illustrated on Figure F6-1. Gloves and outer boot covers will be washed and rinsed, if required. Steel-toed boots will also be scrubbed with decontamination solution, if required. Outer garments and Tyvek will be removed and deposited in plastic bags once they exit the hotline and prior to exiting the contamination control line. Hands and face will be washed as soon as possible.

6.5.2 Level C Decontamination Procedures

A sample decontamination procedure for workers wearing Level C Protection is illustrated on Figure F6-2. Equipment used in the exclusion zone (tools, sampling devices and containers, monitoring instruments, radios, clip boards, etc.) will be deposited on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. Various size containers, plastic liners, and plastic drop cloths will be required for this task. Outer boots and gloves will be cleaned with the proper decontamination solution (hexane or methanol) and detergent/water. The outer gloves and boots will be rinsed and the rinse water will be contained in plastic bucket. Boots, gloves, and outer garments will be removed first, followed by removal of the respirator. Once the respirator is cleaned for storage or placed in an appropriate container, inner gloves may be removed. Workers will wash hands and face as soon as possible.

If a worker leaves the exclusion zone to change a respirator cartridge, it is not necessary to proceed through the entire contamination reduction zone. Once the worker's cartridge is exchanged, the outer glove and boot covers will be donned with joints taped and the worker may return to the exclusion zone.

At a minimum, disposable items (e.g., Tyvek coveralls, inner gloves, and latex overboots) will be changed on a daily basis. Decontamination solutions will be changed daily, or as conditions require.

Small equipment will be protected from contamination by draping, masking, or otherwise covering as much of the instrument as possible with plastic, without hindering the operation of the unit. Contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe. As necessary, air monitoring equipment will be placed in clear plastic bags that allow reading of the scale and operation of the knobs. The sensors or probes can be partially wrapped, keeping the sensor tip and discharge port clear.

To prevent trans-location of contaminants and inadvertent exposures to personnel, heavy equipment used in contaminated areas will also be decontaminated, prior to moving to a new location and before leaving the facility. When decontaminating equipment, the following requirements will be implemented:

- The equipment will be inspected for gross debris. Where possible, contaminated soil deposits will be removed and containerized.
- After removal of gross debris, the equipment will be steam cleaned using a high-pressure washer (i.e., Hotsy).
- After steam cleaning, the equipment will be allowed to dry and will be reinspected. Any remaining visible debris will be re-cleaned through additional pressure washing.

After all debris is removed according to the above procedure, the equipment will be released from the decontamination pad for use as necessary in other areas of the site. At the close-out of the exclusion zone activities, or when a piece of equipment is to be demobilized from the project, the equipment will be given a final decontamination. Equipment wash rinsate will be containerized for proper disposal. Decontamination wash water will be collected and sent to either the on-site water treatment system or an off-site permitted treatment / disposal system.

Inspections of equipment for release from the facility will be completed by the PM or PS. Inspections will consist of visual observations, wipe sampling and cleaning solution analysis. Inspection results will be documented in field logbooks.

6.6 Heat Stress Control and Monitoring

The PS will set work and break schedules depending on how heavy the workload is and the outside temperature. Generally, workers conducting activities in PPE need to break in the shade at least 10 minutes out of every hour during temperatures elevated above 90 degrees Fahrenheit (°F). Rest time will also include fluid replacement with electrolytes.

During conditions where the temperature, humidity, and solar radiation are high and the air movement is low, the following procedures will be implemented to prevent heat stress injury:

- Provide disposable cups and water. Urge workers to drink water regularly. Monitor for signs of heat stress.
- Make certain that adequate shelter is available to protect personnel against heat. If possible, set up a rest area in the shade.
- Workloads and/or duration of physical exertion will be less during the first days of exposure to heat and will be gradually increased to allow acclimatization.
- Heavy work will be scheduled during the cooler periods of the day (e.g., early morning), as possible.
- Alternate work and rest periods will be scheduled in heat stress conditions; in moderately hot conditions.

At the PS's discretion, monitoring activities for heat stress will be performed when workers are using PPE in elevated temperatures. Observation of the field team for signs and symptoms of heat stress which include:

1. Pale, clammy skin progressing to hot, dry and red skin,

2. Profuse perspiration,

3. Cramps,

4. Dizziness,

5. Headaches,

6. Nausea, and

7. Fainting.

Heat stress monitoring will be done at the discretion of the PS, when temperatures are greater than 90 °F or workers exhibit any indication of heat stress. Signs and symptoms of heat stress are summarized in Table F6-1.

6.7 Cold Stress Control and Monitoring

Persons working outdoors in temperatures at or below freezing or with increased wind chill may experience two types of cold weather-related injuries: frostbite and hypothermia. Ambient air temperature and the velocity of the wind are the two factors that influence the development of a cold weather-related injury.

Frostbite is a cold weather-related injury. Areas of the body, which have high surface-area-to-volume ratios such as fingers, toes and ears, are most susceptible to frostbite. Frostbite of the extremities can be categorized into three types:

- **Frost nip or incipient frostbite:** This is characterized by skin blanching or whitening.

- **Superficial frostbite:** In this case, the skin has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient.

- **Deep frostbite:** When this occurs, the tissues are cold, pale and solid. Deep frostbite is an extremely serious injury.

Hypothermia is the second type of cold weather-related injury. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and sometimes rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death.

The term "wind chill" is used to describe the chilling effect of moving air in combination with low temperature. For instance, an air temperature of 10°F with a wind of 15 miles per hour (mph) is the equivalent in chilling effect of air at -18°F. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Because of the effects of wind chill, there is a greater danger from cold-related injuries on cold, windy days, than on cold days where there is little or no wind.

Water conducts heat 240 times faster than air. Therefore, the body cools more quickly when damp or wet. Site personnel may become wet from: decontamination water, contact with on-site water (e.g., surface ponding, perched water in the excavation, etc.), precipitation or perspiration. Care will be taken to minimize the possibility of workers becoming damp or wet. If workers do become damp or wet, efforts will be made to minimize the time that the worker is exposed to the cold. If clothing beneath the PPE becomes damp, the PS will assess site specific weather conditions to determine if it is appropriate for site workers to remove PPE outdoors.

In general, the PS will follow these procedures to reduce cold stress:

- Install heaters in the support zone and/or trailers to provide a warming area for site personnel if necessary.

- Rotate shifts of workers.

- Schedule work and rest periods.

- Monitor workers' physical conditions.

7. Air Monitoring

Air quality monitoring will be conducted for the identification and quantification of potential airborne contaminants when construction activities that could potentially disturb the cover system and expose personnel to waste materials present below the cover system are performed. Both direct-reading instruments and laboratory analysis of air samples may be used for air monitoring activities. Monitoring of methane gas, oxygen, and explosive levels in the breathing zone will be emphasized. General on-site monitoring will include visual inspection of the site to look for places where vapors may gather, such as confined spaces, low-lying areas, and wind barriers.

7.1 Air Monitoring

Standard monitoring instruments that may be used for monitoring site conditions include combustible gas indicators (CGI), photo-ionization detectors (PID), flame ionization detectors (FID), oxygen meters, colorimetric indicator tubes, and organic vapor analyzer (OVA). A MIE Data-RAM, or equivalent unit, can be used to monitor total suspended particulates. The contractor will identify specific monitoring instruments in their CHASP.

Upwind vapor levels and work zone levels will be obtained prior to initiation of activities, and will be repeated at pre-specified time intervals. An initial monitoring frequency of once per hour can be used. Once site conditions are characterized, monitoring frequency may be decreased to a frequency specified in the Contractor CHASP Monitoring Plan. Site monitoring will also be completed when site conditions change, for instance, when work begins on a different portion of the site, a different contaminant is being handled, or a different type of operation is begun.

7.2 Perimeter Monitoring

A plan for perimeter monitoring will be incorporated into the Contractor CHASP to be implemented only if on-site monitoring of activities indicates the presence of hazardous vapors. This will be used to ensure that airborne contaminants are not migrating beyond the site boundaries at concentrations harmful to human health. Initially, perimeter monitoring may be limited to particulates. If action levels for onsite monitoring with regard to particulates, VOCs, or SVOCs are exceeded, an evaluation will be made as to the extent of these impacts. If such impacts are determined to extend to the perimeter of the exclusion zone, perimeter monitoring will be expanded to analysis of VOCs and SVOCs, and engineering controls will be implemented.

7.3 Organic Vapor Monitoring

Air quality in the breathing zone will be evaluated by collecting readings of organic vapor levels. Air monitoring readings will be collected periodically as specified in the Contractor CHASP, and at the discretion of the PS. Observation of wind direction during investigation activities will be emphasized. The contractor will select the most suitable instrument for air monitoring purpose, considering the presence of methane in the atmosphere. A flame-ionized vapor analyzer requires methane filtration for an actual organic vapor reading, while a photo-ionization detector does not detect methane. To prevent confusion among groups working at multiple locations, a single set of action levels for organic vapors will be used.

Based on the list of chemicals of concern provided in Table F4-1, the Contractor will select hazardous chemicals that require monitoring. A plan will be presented that will include the identification and quantification of the selected constituents prior to the beginning of construction activities. Draeger gas detectors can be used for gas identification and quantification. Following initial detection of gases, the Contractor CHASP will provide levels of organic vapors at which specified actions will be required. The plan will call out specific concentrations at which field personnel will change to a higher level of PPE, or at which engineering controls will be implemented. Typical action levels are provided in Table F7-1.

The PS must be responsible for monitoring, calibrating, and maintaining the instruments. Calibrations and maintenance for all instruments will be completed in accordance to the manufacturer's recommendations. Calibrations will be recorded and the following information will be recorded in the calibration logbook to be maintained according to Section 2:

- Instrument and instrument serial number
- Calibration gas and lot number
- Initial reading
- Final Reading

- Any adjustments or maintenance
- Name of the person performing the adjustments or maintenance
- Date and time

7.4 Combustible Gas/Oxygen Monitoring

The PS will ensure that combustible gas indicator/oxygen levels (CGI/O_2) are measured prior to entry into open excavations, sumps, confined spaces, or other sites/conditions where a flammable, combustible, or oxygen-deficient atmosphere may be present. To ensure accurate measurements, the O_2 concentration will be measured before the lower explosive limit (LEL) concentration. The Contractor will present a schedule for CGI/O_2 monitoring based on known methane issues and the constituent of concern list in Table F4-1.

Action levels for LEL and O_2 will be identified in the Contractor CHASP. When used, CGI/O_2 meters must be maintained and calibrated before use in accordance with manufacturers' instructions.

8. Site Control

The purpose of site control is to minimize potential contamination of workers, protect the public from the site's hazards, and prevent vandalism when performing construction activities that could potentially disturb the cover system and expose personnel to waste materials present below the cover system. Site control is essential in emergency situations. The plan for site control includes established work zones, site preparation, use of the buddy system, established and enforced decontamination procedures for personnel and equipment, site security measures, communication networks, and safe work practices.

8.1 Site Preparation

Prior to commencement of construction activities that could potentially disturb the cover system and expose personnel to waste materials present below the cover system, the site will be prepared for cleanup activities. Site preparation can also be hazardous, and the following steps will be taken, where necessary:

- Construct roadways to provide ease of access and a sound roadbed for heavy equipment and vehicles.
- Arrange traffic flow patterns to ensure safe and efficient operations.
- Eliminate physical hazards from the work area as much as possible, including:
    - Ignition sources in flammable hazard area.
    - Exposed underground electrical wiring and low overhead wiring that may entangle equipment.
    - Sharp or protruding edges, such as glass, nails, and torn metal which can puncture protective clothing and equipment and inflict puncture wounds.
    - Debris, holes, loose steps or flooring, protruding objects, slippery surfaces, or unsecured railings, which can cause falls, slips, and trips.
    - Unsecured objects, such as bricks and gas cylinders, near the edges of elevated surfaces, which may dislodge and fall on workers.

- Construct operation pads for mobile facilities and temporary structures.
- Construct loading docks, processing and staging areas, and decontamination pads.
- Provide adequate illumination for work activities. Equip temporary lights with guards to prevent accidental contact.
- Install all wiring and electrical equipment in accordance with the applicable code.

8.2 Work Zones

Prevention of exposure to and spread of constituents by activities at the site will be achieved through the establishment of work zones. Three work zones will be used including: 1) Exclusion Zone; 2) Contaminant Reduction Zone; and 3) Support Zone. Flagging or barrier tape will be used to delineate each of these three zones.

8.2.1 Exclusion Zone

The Exclusion Zone is the area where all earthwork and clearing activities are conducted, and where chemical constituents and physical hazards are potentially present. Only properly trained individuals who are wearing appropriate PPE will be allowed to enter and work in this zone. Level D protection will be required for workers in this zone. The size of the Exclusion Zone incorporates the entire area where the cover system will potentially be disturbed and adequate space for movement of heavy equipment. Personnel in the Exclusion Zone will remain within sight of the PS or have radio communication with the PS.

8.2.2 Contaminant Reduction Zone

The Contaminant Reduction Zone is a transitional area between the Exclusion Zone and the clean area. The Contaminant Reduction Zone contains a corridor that leads from the Exclusion Zone to the Support Zone. This corridor may contain wash buckets, solid waste disposal containers, brushes, and equipment drop tarps. All decontamination activities will occur in the contaminant reduction corridor. The Contaminant Reduction Zone has a decreasing level of contamination, moving outward. The outer boundary of the Contaminant Reduction Zone is called the contamination control line, which separates the possibly low contamination area from the clean support zone. The Contaminant Reduction Zone is also the area where equipment resupply takes place, samples are prepared prior to transport to laboratory, where rest area(s) are designated for workers (including portable toilet facilities, bench/chair, liquids and shade), and storage of emergency response equipment.

8.2.3 Support Zone

The Support Zone is the area where the field team will be when not performing site work. This area is to be used for meal breaks, eating, clean equipment storage, and staging. This zone will be located in an unaffected area and as far upwind from the exclusion zone as practical. The Support Zone is also the location for administrative personnel and office equipment. A portable first aid and eye wash station and toilets will be located here.

8.3 General Work Rules

Fieldwork will be conducted only during daylight hours, unless adequate artificial lighting is provided. The "buddy" system will be observed at all times when site personnel are required to wear respiratory protection.

Entry into and exit from the continuous work area, Exclusion Zone, and Contamination Reduction Zone will be permitted only through designated access points, except during an emergency or as authorized by the PS. Personnel entering the Exclusion Zone must be wearing the required minimum protective clothing as specified in Section 6.0, and they must exit these areas via the Decontamination Station.

Hands and face must be thoroughly washed as soon as possible after leaving the work area and before eating or drinking. No excessive facial hair, which interferes with a satisfactory fit of the respirator mask-to-face seal, is allowed on personnel required to wear respiratory protective equipment. The PS will determine if facial hair presents such interference.

Personnel assigned for on-site activities must be adequately trained and briefed on anticipated hazards, instruction on handling hazardous materials, if applicable, instruction on harmful plants, animals or insects, if applicable, equipment to be worn, safety practices to be followed, emergency procedures, and communications. Daily safety meetings will be held with field personnel prior to the start of work.

Field activities will comply with OSHA 28 CFR 1926/1910 Safety and Health Standards for the Constructive Industry. Regular inspections of the site, materials and equipment will be made by the SHSO to certify compliance with Subpart C (29 CFR

1926.20) General Safety and Health Provisions. The Contractor CHASP will be available on the site for inspection.

8.3.1 Overhead Utilities

Any overhead wire will be considered an energized line unless the person owning that line or the electrical utility authorities verify and provide documentation that it is not an energized line and that it has been visibly grounded.

A person will be designated to observe excavation or other equipment and to give timely warning of all operations where it is difficult for the operator to maintain the desired clearance by visual means. Parameters for minimum clearance from energized overhead lines are presented in the following table. The only acceptable method of proving inactive or de-energized state is through an effectively implemented and documented control of a hazardous energy program. Electricity in all structures will be considered to be on until proven inactive.

Minimum Clearance From Energized Overhead Electric Lines

Nominal System Voltage (Kilovolts)	Minimum Required Clearance (feet)
0 – 50	10
51 – 100	12
101 – 200	15
201 – 300	20
301 – 500	25
501 – 750	35
751 – 1000	45

8.3.2 Inclement Weather

Natural phenomena (e.g., heat or cold, rain, snow, ice, and lightning) can affect work activities and increase risk. Additionally, extremes in temperature and moisture could affect the function of monitoring instrumentation and PPE. It is the responsibility of the SHSO to recognize weather conditions and adjust site activities accordingly.

8.3.3 Manual Lifting

Personnel performing material handling will abide by the following guidelines:

- **DO** design manual lifting and lowering out of the task and workplace. If manual lifting must be accomplished, perform it between knuckle and shoulder height.
- **DO** be in good physical shape. If you are not used to lifting and vigorous exercise, do not attempt to do difficult lifting or lowering tasks.
- **DO** think before acting. Place material conveniently within reach. Have handling aids available. Make sure sufficient space is cleared.
- **DO** get the load close to your body. Test the weight before trying to move it. If it is too bulky or heavy, get a mechanical lifting aid or somebody else to help, or both. Place your feet close to the load. Stand in a stable position with the feet pointing in the direction of movement. Lift mostly by straightening the legs.
- **DO NOT** twist the back or bend sideways.
- **DO NOT** lift or lower awkwardly.
- **DO NOT** hesitate to get mechanical help or help from another person.
- **DO NOT** continue lifting when the load is not of a manageable weight.

8.3.4 Portable Ladders

All portable ladders will be used for their designated purposes only, and will be constructed, maintained, and used in accordance with American National Standards Institute standards A-14.1 and A-14.2, OSHA 29 CFR 1926 Subpart X, and manufacturers' instructions. Before use, each ladder will be inspected to verify that all parts are in good condition and all components function properly. Defective ladders will be tagged "do not use" by the SHSO.

In general, personnel will follow these guidelines when using portable ladders:

- Set ladders on flat, firm surfaces.

- Contact both handrails of a straight ladder with the upper support.
- To prevent slippage of a straight ladder, use another person to hold the ladder in place or tie the ladder securely to the upper support.
- Retain a ratio of 4 to 1 regarding the height of extension related to the distance of the bottom of the ladder to the well or vertical plane (1 foot out for every 4 feet up).
- Extend the handrails of a straight ladder at least 36 inches above the upper support.
- Do not use metal ladders around electrical conductors.
- Do not allow a second person to use the same ladder that you are using.
- Do not stand on the top two rungs of ladder or within 3 feet of the top of the ladder.
- Position the ladder so that no more than half of your body extends beyond either handrail during the work activity.

Review ladder raising and usage techniques as applicable under the guidance of the PS.

8.3.5 Heavy Equipment Safety

Heavy equipment can present a variety of hazards. In general, the SHSO will observe the following procedures:

- Require subcontractors to provide equipment that meets the requirements of all relevant OSHA standards.
- Inspect equipment before use. At a minimum, guarding, hydraulics, hoisting, rigging, and overall condition will be reviewed. Correct deficiencies before equipment is used.
- Verify operator qualifications before beginning work.
- Conduct noise monitoring to ensure that personnel are adequately protected.

- Equip all equipment with operational backup alarms and a fire extinguisher.
- Review copies of all pertinent inspections before the start of work.
- Investigate any safety and health concerns arising during the course of work.

8.3.6 Driver Safety

During the performance of this work, all personnel using project vehicles will possess a valid driver's license, pass any necessary permit, and obey all posted speed limits, traffic signs, and traffic signals.

8.3.7 Power and Hand Tools

Personnel will use power and hand tools in accordance with the following procedures:

- Use tools only after being trained.
- Maintain tools in good condition and inspect them prior to use.
- Use electrical tools that are double-insulated or have a ground plug.
- Use tools for their intended purpose only.
- Remove unsafe tools from service and tag with "Do not use".

8.3.8 Hand Protection

In addition to required PPE, field personnel will wear protective gloves as needed when handling materials or performing other work that could result in hand injury.

8.3.9 Lockout/Tagout

In accordance with 29 CFR 1910.147, the site personnel will use lockout/tagout procedures as necessary to control employee exposure to hazardous energy sources, particularly underground and aboveground utilities and services. Subcontractors will present their lockout/tagout procedures to the PHSM.

8.3.10 Traffic Control

The PS will coordinate all activities impacting base traffic. Unauthorized vehicles will be controlled through the use of barricades, cones, or other warning devices.

8.3.11 Material Storage

A strategy for storage of flammable and combustible liquids, compressed gasses, and corrosives will be presented in the Contractor CHASP.

8.3.12 Fire Prevention

To prevent the occurrence of fires on the project, the following will be completed in accordance with 29 CFR 1926.151:

- Electrical installations will meet the requirements of Rule 408.41701 et seq. of the Michigan Occupational Safety and Health Act 29 CFR 1926, Subpart K.
- Potential sources of fire ignition will be located away from fuel sources.
- Flammable and combustible liquids and compressed gasses will be stored in accordance with the Construction Waste Management Plan (CWMP).
- Fire extinguishers will be provided for the site in accordance with applicable portions of Rule 408.41851 and Rule 408.41852.

8.3.13 Inspections

Contractor will be prepared for health and safety inspections by Michigan Department of Consumer and Industry Services, Construction Safety Division or any other county or city official with authoritative power.

8.4 Site Security

The Contractor CHASP will also call out a plan to maintain site security. Site security measures are necessary during and after normal working hours to:

- Prevent exposure of unauthorized, unprotected people to the site hazards.

- Prevent vandalism and increased hazards of persons trying to dispose other waste on the site.

- Prevent theft.

- Avoid interference with safe working practices.

Security protocol provided in the Contractor CHASP will include the following provisions:

- Assign the responsibility of enforcing security measures to a person who acknowledges that responsibility.

- An identification system to identify authorized persons as well as the limitations to their approved activities.

- Post signs around the perimeter of the site.

- Secure equipment for overnight storage.

- All site visitors will be approved, signed in, and given the proper PPE.

8.5 Site Visitors

Visitors to the site will be instructed to stay outside of the barricaded or Exclusion Zone and remain within the Support Zone during the extent of their stay. Visitors will be cautioned to avoid skin contact with potentially contaminated surfaces. During visitation, hand-to-mouth transfers will be reduced with special warnings not to eat, drink, smoke, or chew gum or tobacco. The use of alcohol during site visitation is prohibited.

Authorized visitors requiring observation of the work in the Exclusion Zone must read the Contractor CHASP and sign a form stating that they have read and understand the safety protocol, and will abide by it (Figure F2-4). All visitors entering the Exclusion Zone must wear appropriate personal protective gear. The Contractor CHASP will specify how site visitors will be controlled and what protective gear will be provided. Access to the site by visitors will be restricted as follows:

- All site visitors must notify the PS or his/her designee before obtaining access to a Support Zone.
- Site visitors entering controlled work zones will be strictly limited. The PS must approve entry and the visitor must demonstrate medical and training clearance to enter a controlled work zone and must be given site-specific training.
- All site visitor access must be clearly documented, and visitors must comply with all provisions of the Contractor CHASP.

8.6 Disposal of Material

Disposal of materials generated on-site will be in accordance with the CWMP developed for the IRAP.

9. Engineering Controls

A variety of external measures can be used to influence site conditions to prevent them from becoming hazardous, or to reduce the risk of harm to human health when conducting construction activities that could potentially disturb the cover system and expose personnel to waste materials present below the cover system. At a minimum, the following measures, or engineering controls, will be included in the Contractor CHASP.

1. Water sprayers will be used to control excessive dust conditions. The CHASP will state at what levels dust suppression will be used.

2. An oxygen analyzer will be used to monitor oxygen content in the air within the Exclusion Zone. If levels reduce to 19.5 percent oxygen or less in the breathing zone, work will be temporarily halted and industrial fans will be used for forced ventilation of the work area. Work cannot commence until oxygen levels in the breathing zone have normalized. In the event that oxygen concentrations increase to 23 percent or greater, work will be halted, but no ventilation will be applied. The work area will be allowed to ventilate naturally.

3. Ventilation of methane from the subsurface will be performed as described in the IRAP design.

Additional engineering control measures may be added to the Contractor CHASP where appropriate.

10. Emergency Procedures

On-site personnel will use the following standard emergency procedures when conducting construction activities that could potentially disturb the cover system and expose personnel to waste materials present below the cover system. The PS will be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed. An emergency report (Figure F2-6) will be completed and submitted to the site PS for each instance of employee injury or possible exposure.

10.1 Emergency Phone Numbers and Hospital Location

Emergency phone numbers (Table F10-1) will be posted at a conspicuous place in the Support Zone. Directions to Dickinson County Memorial Hospital are given in Table F10-1, and a map with the route to the hospital is presented as Figure F10-1. The PS will be responsible for making sure that all field personnel are familiar with the location of the hospital, and know where the emergency phone list and directions to the hospital are located.

10.2 Personnel Injury in the Exclusion Zone

In the event of an injury in the Exclusion Zone, all site personnel will assemble at the decontamination line. The PS will evaluate the nature of the injury and the affected person will be decontaminated to the extent possible prior to movement to the Support Zone. Appropriate first aid will be initiated, and contact will be made with the Dickinson County Memorial Hospital for an ambulance (if required) (Table F10-1). No person will re-enter the Exclusion Zone until the cause of injury or symptoms are determined. An injury report will be created and submitted to the established authority for action (Figure F2-6).

10.3 Personnel Injury in the Support Zone

Upon notification of an injury in the Support Zone, the PM and PS will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, and the appropriate first aid and necessary follow-up, as stated above, will be initiated. An injury report will be created and submitted to the established authority for action (Figure F2-6). Approved first aid kits will be kept in appropriate places on the work site. The PS will be responsible for making sure personnel are familiar with the first aid kit locations. The PS will also be responsible for the maintenance of the first aid kits.

10.4 Fire/Explosion Emergency Procedures

The threat of fire/explosion on this work site is considered high because of potential concentrations of methane gas in the subsurface. In addition, fire hazards exist in the following activities:

- Equipment refueling.
- High pressure water cleaning, fuel storage, and refueling.
- Presence of solvent contamination.

The PS will check to see that each vehicle fire extinguisher is appropriate for the fire hazard present at this site. Generally, Type A, B, and C extinguishers are appropriate. The field team will be prepared to fight small fires with extinguishers. In the event of a large fire, the field team will contact the appropriate authorities and report the fire.

10.4.1 Emergency Procedures

In an emergency, the PS (or alternate PS) will assume total control and decision making on site. In the event of a chemical spill, the release reporting procedures as detailed in the Waste Management Plan will be followed and the PS will attempt to containerize the material. In the event of a fire or explosion, the PS will take the following actions:

- Notification of site personnel and appropriate authorities.
- Shutdown site activities.
- Account for site workers at decontamination corridor.
- Evacuate the site, if necessary.

Methane in the gas state is a dangerous fire and explosion hazard when exposed to heat or flame. Care will be taken to eliminate sources of potential ignition, such as smoking, and non-explosion-proof electrical and internal combustion equipment. The use of flame devices such as cutting torches or welding equipment will only be done with approval of the PS after combustible gas (cg) monitoring. In the event of a small methane fire, the field team will be prepared to control the fire using CO_2 or dry chemical.

Upon notification of an on-site fire or explosion, all site personnel will assemble at the decontamination line. The fire department will be alerted by calling 911 for response services. All site personnel will be moved a safe distance from the involved area.

If PPE worn by personnel fails or is otherwise altered in such a manner that the level of protection is affected, the workplace must be vacated. The person affected will immediately leave the work zone. Re-entry will not be permitted until the equipment has been repaired or replaced.

Field personnel must notify the PS when any on-site equipment fails to operate properly. The PS will determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel, or prevents completion of assigned tasks, all personnel will leave the work zone until the situation is evaluated and appropriate actions taken.

In all situations, when an onsite emergency results in evacuation, personnel will not re-enter until:

1. The conditions resulting in emergency have been corrected,
2. The hazards have been reassessed,
3. The CHASP has been reviewed; and
4. Site personnel have been briefed on any changes in the CHASP.

10.4.2 Emergency Medical Care

The following describes emergency procedures when it is suspected that a person has suffered from chemical exposure.

Dickinson County Memorial Hospital (Phone # 779-4555) will be contacted in an emergency. The hospital is located at 1721 Stephenson Avenue, Iron Mountain, Michigan, and a map of the route and alternate routes is attached as Figure F10-1. A local ambulance service is available by calling 911. First-aid equipment (including a first-aid kit, emergency eye wash and emergency shower) will be available on site.

Skin Contact

1. Flush with water.
2. Remove clothing, if necessary.
3. Wash and rinse affected area for at least 20 minutes. Decontaminate and provide appropriate medical attention.

Inhalation

1. Move person away from area.
2. Administer CPR as needed.
3. Decontaminate and transport to hospital for medical attention (Figure F10-1).

Ingestion

1. Decontaminate and transport to hospital for medical attention.

Eye Contact

1. Irrigate with water for at least 15 minutes.
2. Decontaminate and transport to hospital for medical attention (Figure F10-1).

In the event of a serious accident/injury, the PS will make an immediate telephone report to the PM outlining all details of the accident/injury and action(s) taken. This reporting procedure will be accomplished using the Contractor's Accident/Incident Report. The report will include at a minimum the following information:

- Chronological history of the incident.
- Facts concerning the incident and when they became available.
- Title and names of personnel involved.

- Actions (decisions made and by whom) orders given (to whom, by whom, and when) action taken (who did what, when, where, and how).
- Possible exposure(s) of site personnel.
- History of all injuries or illnesses during or as a result of the emergency.

In the event of a spill of hazardous materials on site, the PS will control the spill and proceed to absorb and containerize the material. In addition, the PS may conduct air monitoring to characterize exposure hazards from the incident.

Tables

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Maximum Concentrations (µg/kg)	OSHA PEL	IDLH	Potential Exposure Route	Ioniation Potential	UEL/LEL
ORGANICS						
VOCs						
Acetone	100,000	250 ppm	2,500 ppm	Inh, Ing, Con	9.69 eV	12.8%/2.5%
Benzene [1]	21,000	0.1 ppm	CA 500 ppm	Inh, Abs, Ing, Con	9.24 eV	7.8%/1.2%
2-Butanone (MEK)	140,000 DBJ	200 ppm	3,000 ppm	Inh, Ing, Con	9.54 eV	11.4%(200 F)/1.4%(200 F)
n-Butylbenzene	370,000	NE				
(also called 1-Phenylbutane)						
sec-Butylbenzene	130,000	NE				
(also called 2-Phenylbutane)						
Carbon Dioxide	15,000 R	5,000 ppm	40,000 ppm	Inh, Con	13.77 eV	NA/NA
Carbon disulfide	79	1 ppm	500 ppm	Inh, Abs, Ing, Con	10.08 eV	50.0%/1.3%
Chlorobenzene	2,000 J	75 ppm (OSHA)	1,000 ppm	Inh, Ing, Con	9.07 eV	9.6%/1.3%
Chloroform	13	50 ppm	CA 500 ppm	Inh, Abs, Ing, Con	11.42 eV	NA/NA
1,4-Dichlorobenzene	15	NE				
1,2-Dichloroethane	17 J	NE				
Ethylbenzene	46,000	100 ppm	800 ppm	Inh, Ing, Con	8.76 eV	6.7%/0.8%
2-Hexanone	33,000	1 ppm	1,600 ppm	Inh, Abs, Ing, Con	9.34 eV	8%/ND
Isopropylbenzene	2,900 J	NE				
Methylene chloride	120	25 ppm	CA 2,300 ppm	Inh, Abs, Ing, Con	11.32 eV	23%/13%
n-Propylbenzene	92,000	NE				
Styrene	16,000	50 ppm	700 ppm	Inh, Ing, Con	8.40 eV	6.8%/0.9%
1,1,2,2-Tetrachloroethane	4,900 J	1 ppm	CA 100 ppm	Inh, Abs, Ing, Con	11.10 eV	NA/NA

Footnotes on Page 6.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Maximum Concentrations (µg/kg)	OSHA PEL	IDLH	Potential Exposure Route	Ionization Potential	UEL/LEL
VOCs (continued)						
Tetrachloroethene	7	NE				
Trichloroethene (also called Trichloroethylene)	110,000	25 ppm	CA 1,000 ppm	Inh, Abs, Ing, Con	9.45 eV	10.5%/8%
1,2,4-Trimethylbenzene	210,000	25 ppm	ND	Inh, Ing, Con	8.27 eV	6.4%/0.9%
1,3,5-Trimethylbenzene	57,000	25 ppm	ND	Inh, Ing, Con	8.39 eV	ND
Toluene	110,000	100 ppm	500 ppm	Inh, Abs, Ing, Con	8.82 eV	7.1%/1.1%
m-Xylene	0.4 J	100 ppm	900 ppm	Inh, Abs, Ing, Con	8.56 eV	7.0%/1.1%
o-Xylene	150,000	100 ppm	900 ppm	Inh, Abs, Ing, Con	8.56 eV	6.7%/0.9%
p-Xylene	150,000	100 ppm	900 ppm	Inh, Abs, Ing, Con	8.44 eV	7.0%/1.1%
SVOCs						
Acenaphthene	4,800 J	NE				
Anthracene	3,900 J	NE				
Benzo(a)anthracene	1,100 J	NE				
Benzoic acid	850 J	NE				
bis(2-Ethylhexyl)phthalate	4,200	NE				
Butylbenzylphthalate	150 J	NE				
Chrysene	1,500 J	NE				
Dibenzofuran	240,000	NE				
Diethyl phthalate	2,000,000	5 ppm	ND	Inh, Ing, Con	ND	ND/0.7%
2,4-Dimethylphenol	960,000	NE	NE			ND

Footnotes on Page 6.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Maximum Concentrations (µg/kg)	OSHA PEL	IDLH	Potential Exposure Route	Ioniation Potential	UEL/LEL
SVOCs (continued)						
Di-n-Butylphthalate	440,000	NE				
Di-n-octylphthalate	220 J	NE				
Fluoranthene	2,300 J	NE				
Fluorene	76,000	NE				
p-Isopropyltoluene	250,000	NE				
4-Methyl-2-pentanone (MIBK)	6,000 JD	50 ppm	500 ppm	Inh, Ing, Con	9.30 eV	8.0%(200 F)/1.2%(200 F)
1-Methylnaphthalene	10,000	NE				
2-Methylnaphthalene	370,000	NE	NE	Ing		ND
2-Methylphenol (also called o-Cresol)	1,000,000	2.3 ppm	250 ppm	Inh, Abs, Ing, Con	8.93 eV	ND/1.4%
3-Methylphenol (also called m-Cresol)	1,400,000	2.3 ppm	250 ppm	Inh, Abs, Ing, Con	8.98 eV	ND/1.1%
4-Methylphenol (also called p-Cresol)	400,000	2.3 ppm	250 ppm	Inh, Abs, Ing, Con	8.97 eV	ND/1.1%
Naphthalene	440,000	10 ppm	250 ppm	Inh, Abs, Ing, Con	8.12 eV	5.9%/0.9%
2-Nitroaniline	3,100	NE				
2-Nitrophenol	310,000	NE	NE			
4-Nitrophenol	470,000	NE				
Pentachlorophenol	460 J	0.5 ppm	2.5 ppm	Inh, Abs, Ing, Con	NA	NA/NA
Phenanthrene	11,000 J	NE				
Phenol	1,100,000	5 ppm	250 ppm	Inh, Abs, Ing, Con	8.50 eV	8.6%/1.6%
Pyrene	2,800 J	NE				

Footnotes on Page 6.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

PESTICIDES						
Aldrin	43 J	0.25 mg/m^3	CA 0.25 mg/m^3	Inh, Abs, Ing, Con	ND	NA/NA
Aroclor 1242	48,000 D	None				
Chlordane (alpha)	11 J	0.5 mg/m^3	CA 100 mg/m^3	Inh, Abs, Ing, Con	ND	NA/NA
Endosulfan I	2.8 P	0.1 mg/m^3	ND	Inh, Abs, Ing, Con	ND	NA/NA
Endosulfan II	1 J	0.1 mg/m^3	ND	Inh, Abs, Ing, Con	ND	NA/NA
Endrin	57 J	0.1 mg/m^3	2 mg/m^3	Inh, Abs, Ing, Con	ND	NA/NA
Heptachlor epoxide	25 J	0.5 mg/m^3	CA 35 mg/m^3	Inh, Abs, Ing, Con	ND	NA/NA
Lindane (BHC gamma)	120 J	0.5 ppm	50 ppm	Inh, Abs, Ing, Con	ND	NA/NA
Methoxychlor	29 J	15 mg/m^3 (OSHA)	CA 5,000 mg/m^3	Inh, Ing	ND	NA/NA
ALCOHOLS						
n-Butanol	530,000 R	50 ppm	ND	Inh, Abs, Ing, Con	10.04 eV	11.2%/1.4%
Ethanol	380,000 J	1,000 ppm	3,300 ppm	Inh, Abs, Ing, Con	10.47 eV	19%/3.3%
Ethylacetate	16,000	400 ppm	2,000 ppm	Inh, Ing, Con	10.01 eV	11.5%/2.0%
Isobutanol	1,600 J	50 ppm	1,600 ppm	Inh, Ing, Con	10.12 eV	10.6% (202 F)/1.7% (123 F)
Isopropanol	2,000 J	400 ppm	2,000 ppm	Inh, Ing, Con	10.10 eV	12.7% (200 F)/2.0%
Methanol	830,000 B	200 ppm	6,000 ppm	Inh, Abs, Ing, Con	10.84 eV	36%/6.0%
1-Propanol	21,000	NE				
ALDEHYDES						
Acetaldehyde	100,000	200 ppm	CA 2,000 ppm	Inh, Ing, Con	10.22 eV	60%/4%
Formaldehyde	4,900	0.016 ppm	CA 20 ppm	Inh, Con	10.88 eV	73%/7.0%
Hexanal	17,000	NE				
m-Tolualdehyde	17,000	NE				

Footnotes on Page 6.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Maximum Concentrations (µg/kg)	OSHA PEL	IDLH	Potential Exposure Route	Ioniation Potential	UEL/LEL
ALDEHYDES (continued)						
Paraldehyde	1,100	NE				
Pentanal	8,000	NE				
Propanal	10,000	200 ppm	800 ppm	Inh, Abs, Ing, Con	10.15 eV	13.7%/2.2%
METALS						
Aluminum	14,300,000 J	2.0 ppm	ND	Inh, Ing, Con	Varies	ND
Antimony	35,000 J	0.5 ppm	50 ppm	Inh, Ing, Con	NA	ND
Arsenic	7,500 J	0.01 ppm	5 ppm	Inh, Abs, Ing, Con	NA	ND
Barium	291,000	NE				
Beryllium	620 B	0.0005 mg/m^3	CA 4 mg/m^3	Inh, Con	NA	NA/NA
Cadmium	1,000	0.005 mg/m^3 (OSHA)	CA 9 mg/m^3	Inh, Ing	NA	NA/NA
Calcium	98,300,000	NE				
Chromium	40,000	0.5 ppm	25 ppm	Inh, Ing, Con	NA	ND
Cobalt	9,600	0.05 ppm	20 ppm	Inh, Ing, Con	NA	ND
Copper	2,400,000	1.0 ppm	100 ppm	Inh, Ing, Con	NA	ND
Cyanide	1,500 J	NE				
Iron	20,500,000	5.0 ppm	2,500 ppm	Inh	NA	ND
Lead	150,000	0.05 ppm	100 ppm	Inh, Ing, Con	NA	ND
Magnesium	17,200,000 J	15.0 ppm	750 ppm	Inh, Con	NA	ND
Manganese	690,000	1 ppm	500 ppm	Inh, Ing, Con	NA	ND
Mercury	380	0.05 mg/m^3	10 mg/m^3	Inh, Abs, Ing, Con	ND	NA/NA

Footnotes on Page 6.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

	Maximum Concentrations (µg/kg)	OSHA PEL	IDLH	Potential Exposure Route	Ioniation Potential	UEL/LEL
METALS (continued)						
Molybdenum	1,200 B	5.0 ppm	1,000 ppm	Inh, Ing, Con	NA	ND
Nickel	121,000	0.015 ppm	10 ppm	Inh, Ing, Con	NA	ND
Potassium	2,340,000 J	NE				
Selenium	4,100 J	0.2 ppm	1.0 ppm	Inh, Ing, Con	NA	ND
Silver	1,400 BN	0.01 mg/m^3	10 mg/m^3	Inh, Ing, Con	NA	NA/NA
Sodium	4,100,000	CA (2.0 ppm)	10 ppm	Inh, Ing, Con	NA	ND
Thallium	580 B	NE				
Titanium	510,000	NE				
Vanadium	13,600	0.05 mg/m^3	35 mg/m^3	Inh, Ing, Con	NA	NA/NA
Zinc	220,000	NE				
OTHER						
Acetic Acid/Acetate	18,000,000	10 ppm	50 ppm	Inh, Con	10.66 eV	19.9%/4%
Sulfur	27,000 NJ	NE				

µg/kg	Micrograms per kilogram.
µg/L	Miccrograms per liter.
Abs	Skin Absorption.
B	Constituent also detected in laboratory blank.
Con	Skin or eye contact.
D	Result was obtained from analysis of a dilution.
eV	Electron volts.
F	Degrees farenheit.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Ing	Ingestion.
Inh	Inhalation.
J	Estimated result.
LEL	Lower Explosive Limit.
mg/L	Miligrams per liter.
mg/m^3	Miligrams per cubic meter.
N	Spike sample recovery is not within control limits.
NA	Not Applicable.
ND	Not Determined.
NE	Not established.
NIOSH	National Institute for Occupational Safety and Health.
OSHA	Occupational Safety & Health Administration.
PCBs	Polychlorinated biphenyls.
PEL	Permissible Exposure Limit, based on 8 Hour Time-Weighted Averaged.
ppb	Parts Per Billion = µg/L.
ppm	Part Per Million = mg/L.
R	Rejected result.
SVOC	Semi-volatile organic compound.
TBAL	To be added later.
UEL	Upper Explosive Limit.
VOC	Volatile Organic Compound.
IDLH	Immediately Dangerous to Life or Health. In the event of respitor failure, one could escape within 30 minutes without experiencing any irreversible health effects.
CA	NIOSH has recommeded the substance be treated as a potential human carcinogen. IDLH not listed.
1	Level of protection criteria for benzene obtained from OSHA 29 CFR 1910.1028/Benzene/Z/Toxic and Hazardous Substances.

Table F4-1. Chemical Constituents of Potential Concern and Health and Safety Information, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

References:

NIOSH Pocket Guide to Chemical Hazards.

Groundwater Chemicals Desk Reference Montgomery and Welkom.

Dangerous Properties of Industrial Chemicals, Sat and Lewis.

Table F6-1. Signs and Symptoms of Chemical Exposure and Heat Stress that Indicate Potential Medical Emergencies, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Type of Hazad	Signs and Symptoms
Chemical Hazard	Behavioral changes Breathing difficulties Changes in complexion or skin color Coordination difficulties Coughing Dizziness Diarhea Fatigue and/or weakness Irritability Irritation of eyes, nose, respiratory tract, skin, or throat Headache Light-headedness Nausea Sneezing Sweating Tearing Tightness in the chest
Heat Exhaustion	Clammy skin Confusion Dizziness Fainting Fatigue Heat Rash Light-headedness Nausea Profuse sweating Slurred speech Weak pulse
Heat Stroke *(may be fatal)*	Confusion Convulsions Hot skin, high temperature (yet may feel chilled) Incoherent speech Staggering gait Sweating stops (yet residual sweat may be present) Unconsciousness

Table F7-1. Action Levels, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Instrument	Reading	Action
PID	< 10 ppm or = 10 ppm	Level D
	>10 ppm, <50 ppm	Level C
	>50 ppm	Stop Work
MIE Miniram	<1.0 mg/m^3	Continue work
	>1.0 mg/m^3, < 2.5 mg/m^3	Level C or implement dust suppression
	>2.5 mg/m^3	Stop work
Combustible Gas Indicator	<20% or = 20% LEL	Continue Work
	>20% LEL	Stop Work. Allow to ventilate
Oygen Analyzer	<19.5% or =19.5%	Stop work, raise oxygen content with forced ventilation
	> 23% or = 23%	Stop work, allow area to ventilate

LEL	Lower explosive limit.
mg/L	Milligram per liter.
mg/m^3	Milligram per cubic meter.
ppm	Parts per million = mg/L.

Table F10-1. Emergency Telephone Numbers and Directions to Dickinson County Memorial Hospital, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

Area Code	906
Police Emergency	911
Police Non-Emergency	774-2525
Fire Emergency	911
Fire Non-Emergency	774-1265
Ambulance	911
Beacon Ambulance Service	779-5050
Rescue Squad	911
Dickinson County Sheriff	774-6262
Hospital Emergency	779-4555
Hospital Non-Emergency	774-1313
Poison Control Center	1 (800) 562-9781
Toxic Substances Center	1 (404) 452-4100
for Disease Control (CDC)	1 (202) 554-1404
CDC Hotline	1 (404) 329-2888
Contractor Project Manager	Insert Contact Numbers
ARCADIS Project Manager	Ric Studebaker (414) 276-7742
ARCADIS Coorporate Health & Safety Manager	Sam Moyers, (423) 481-3000
Contractor Corporate Health & Safety	Insert Contact Numbers
Miss Dig	1 (800) 482-7171

Dickinson County Memorial Hospital - South US Highway 2, Iron Mountain, Michigan.

Directions to Hospital:

East on Breitung Avenue to Hydraulic Falls Road. North (left) on Hydraulic Falls Road to US Highway 2 (Stephenson Avenue). South (right) on US Highway 2 for approximately 1 mile to Dickinson Memorial Hospital.

Figures

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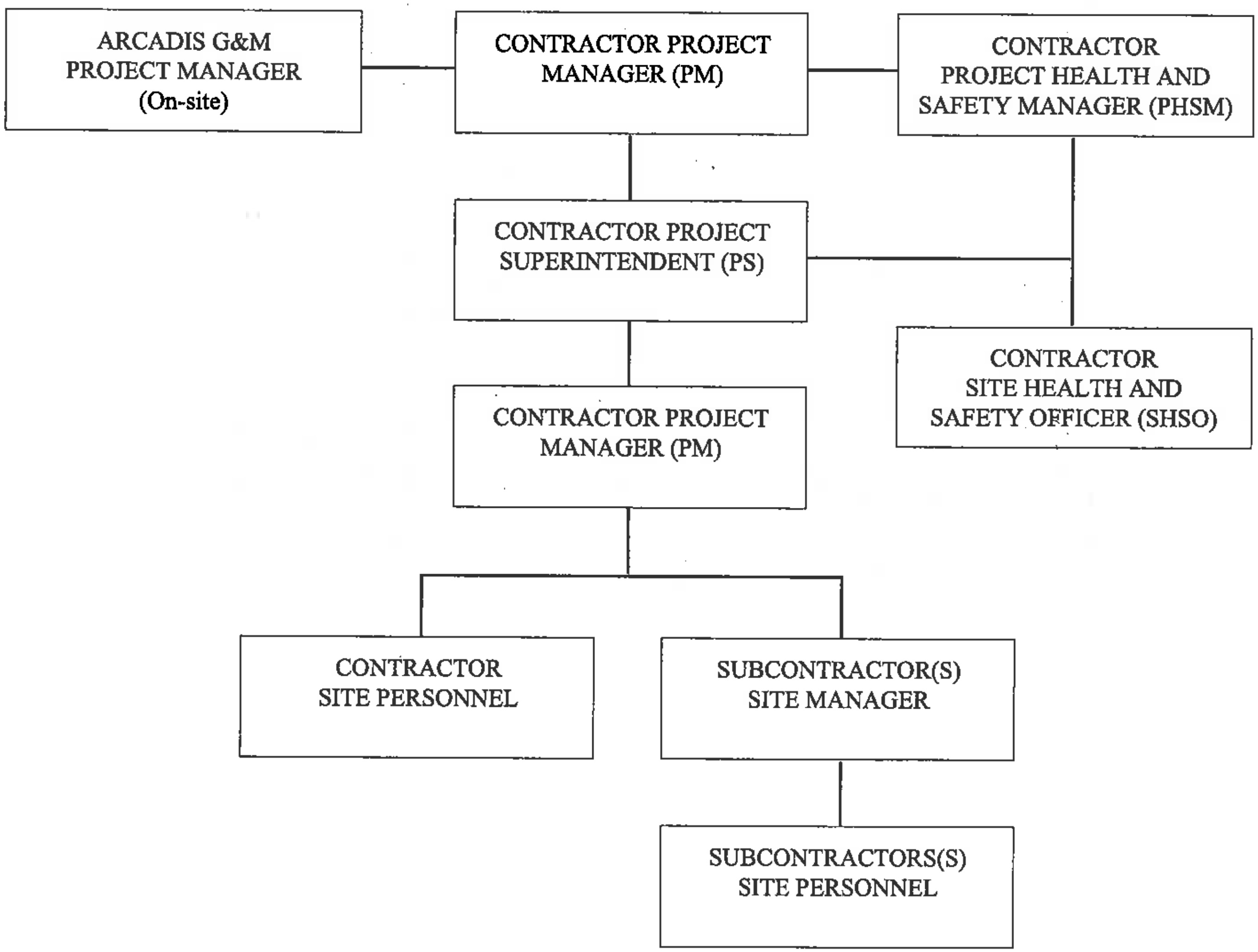

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PROJECT HEALTH AND SAFETY ORGANIZATION AND REPORTING

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

F2-1

Figure F2-2. Sample Health and Safety Meeting Form, Former Northeast Pit IRAP, Ford/ Kinsford Site, Kingsford, Michigan.

SITE Ford/Kingsford LOCATION Kingsford, Michigan

WORK LOCATION AT SITE ____________________

PREPARED BY ____________________

PROJECT MANAGER ____________________

TYPE OF WORK ____________________

SAFETY TOPICS PRESENTED

CHEMICAL HAZARDS AND EXPOSURE ROUTES ____________________

PHYSICAL HAZARDS AT SITE AND HAZARDS RELATED TO TYPE OF WORK ____________________

PROTECTIVE CLOTHING/MONITORING EQUIPMENT REQUIRED ____________________

____ STEEL TOE BOOTS

____ HARD HAT

____ SAFETY GLASSES/GOGGLES

____ SPECIAL EQUIPMENT

____ GLOVES (SPECIFIC TYPE)

____ TYVEK

____ RESPIRATOR (Specify Cartridge Selection)

EMERGENCY INFORMATION

AMBULANCE/PARAMEDIC PHONE ( ) HOSPITAL ( )

ROUTE TO HOSPITAL (Attach Map if Necessary) ____________________

ATTENDEES

MEETING GIVEN BY ____________ DATE ____________ TIME ____________

SIGNATURES ____________ ____________ ____________

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Figure F2-3. Sample Field Team Review Sheet, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

I have been trained in the contents of the Former Northeast Pit Construction Health and Safety Plan and I have been advised of the locations of copies available for review. I will comply with the provisions contained therein.

NAME	DATE	NAME	DATE

ford/wi0637/kingsford/tables/nepitiraphaspfigures2.xls (Figure 3)
01/07/03 9:01 AM

Figure F2-4. Sample Visitor Review of Site Health and Safety Plan, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michgian.

The undersigned visitors of the Former Northeast Pit site require entrance to the exclusion zone and have thoroughly read the Health and Safety Plan, understand the potential hazards and the procedures to minimize exposure to the hazards, will follow the direction of the Site Health and Safety Officer, and will abide by the Health and Safety Plan.

NAME	COMPANY	DATE	SIGNATURE

Figure F2-5. Sample Emergency Medical Data Sheet, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Project: ______________________________

Name: ______________________________ Home Telephone ______________

Address: ______________________________

Age: ________ Height: ________ Weight: ________ Blood Type: ______

Emergency Contact: ______________________________

Drugs or other allergies: ______________________________

Particular sensitivities: ______________________________

____

Do you wear contacts? ______________________________

Provide checklist of previous illnesses. ______________________________

Have you ever had any previous exposures to hazardous chemicals? Please Detail. ______________

____

____

What medications are you currently using? ______________________________

____

____

Do you have any medical restrictions? Please detail. ______________________________

____

____

Name, address, and phone number of personal physician: ______________________________

____

____

Figure F2-6. Sample Emergency Report Form, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

---

1. DATE ____
2. TIME OF ACCIDENT ________________________________
   CLIMATIC CONDITIONS ________________________________
3. ON-SITE COORDINATOR ________________________________
4. EMPLOYEE INJURED ________________________________
5. COMPANY AFFILIATION ________________________________
6. SOCIAL SECURITY NUMBER ______________________________
7. INSURANCE COMPANY ________________________________
8. NUMBER OF WORKERS AT SITE ___________________________

NAMES OF WORKERS	COMPANY AFFILIATION

9. CIRCUMSTANCES OF THE INJURY/EMERGENCY ACTION ________________
10. EMERGENCY ACTIONS TAKEN ____________________________
11. WAS FIRST AID PROVIDED? ____________________________
12. WAS AN EMERGENCY PHONE CALL MADE TO THE PROJECT SAFETY OFFICER? ________________________
    IF SO, TIME: __________________________________
13. AMBULANCE SEVICE USED ____________________________
14. HOSPITAL USED ________________________________
15. ATTENDING PHYSICIAN ______________________________
16. COMPANY REPRESENTATIVE CONTACTED ______________________
17. CONTRACTOR REPRESENTATIVE CONTACTED ____________________

Figure F2-7. Construction Health and Safety Plan (CHASP) Approvals, Former Northeast Pit, Ford/Kingsford Site, Kingsford, Michigan.

By their signature, the undersigned certify that this CHASP is approved and will be utilized for operations to be conducted under this plan.

Contractor Project Manager — Date

Contractor Project Superintendent — Date

Contractor PHSM — Date

Ford Motor Company Project Manager — Date

Kingsford Products Company Project Manager — Date

Contractor Occupational Safety and Health Representative — Date

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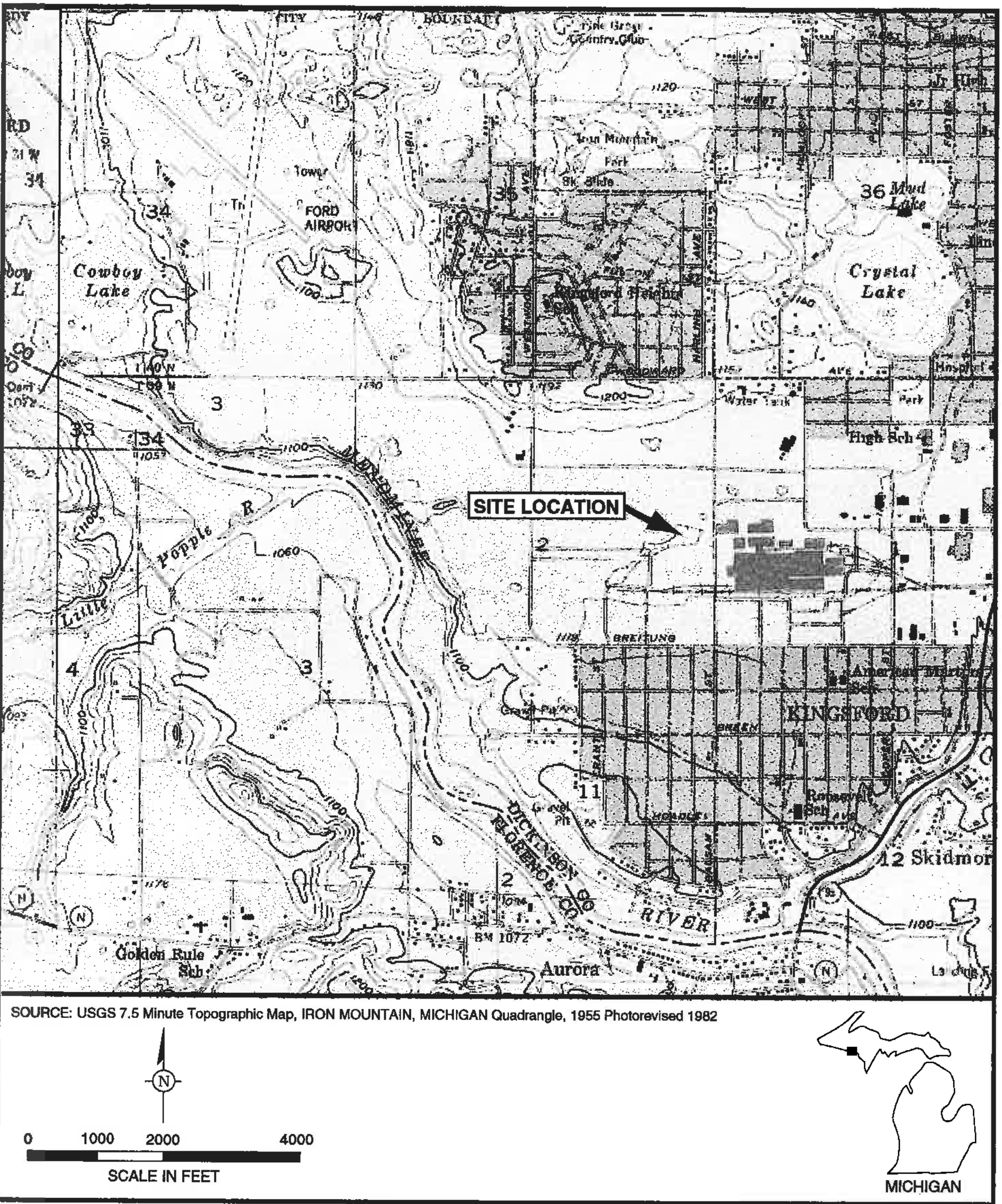

SOURCE: USGS 7.5 Minute Topographic Map, IRON MOUNTAIN, MICHIGAN Quadrangle, 1955 Photorevised 1982

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SITE LOCATION MAP

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

F3-1

Appendix G

Operation and Maintenance (O&M) Plan

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Appendix G
Operation and Maintenance (O&M) Plan

Former Northeast Pit Interim
Response Action Plan,
Ford/Kingsford Site,
Kingsford, Michigan

PREPARED FOR

Ford Motor Company
The Kingsford Products Company

Attachment

Appendix G Operation and Maintenance (O&M) Plan

Former Northeast Pit
Interim Response Action
Plan, Ford/Kingsford Site
Kingsford, Michigan

Introduction

This Operation and Maintenance (O&M) Plan has been prepared for the former Northeast Pit (NE Pit) facility at the Ford/Kingsford site in Kingsford, Michigan. The O&M Plan describes the strategy for maintaining the post-closure integrity of the cover system implemented in accordance with the Interim Response Action Plan (IRAP) for the site. O&M activities are essential for preservation of the cover system response action. This document is submitted prior to design completion to provide an approach to O&M in the NE Pit IRAP. This O&M Plan may require modification following completion of design activities, and will be finalized at least 60 days prior to completion of construction.

As identified in the NE Pit IRAP, the NE Pit cover system consists of consolidated waste material covered by impacted and non-impacted soil, a high-density polyethylene liner (HDPE) or equal material, and a geocomposite drainage layer. A protective soil layer is above the geocomposite drainage larger, followed by an asphalt layer at surface level. The cover system will be approximately 5 acres in size. Another component of the cover system is a passive venting system to route methane, that may otherwise accumulate below the cover, to the atmosphere. Methane production is a potential by-product of degradation of site constituents present in waste material below the liner.

Objectives

The objectives of this O&M Plan are to:

- Describe procedures for post-closure maintenance and monitoring of the cover system at the former NE Pit.

- Identify a contingency plan regarding potential failure of the cover system.

This O&M Plan is prepared to guide field personnel through maintenance procedures for the cover system to maximize effectiveness of the system. Implementation of the O&M Plan will assist in achieving the following objectives:

- Minimize migration of liquids through the closed NE Pit.

- Promote drainage and minimize erosion or abrasion of the cover system.

- Verify that any settling or subsidence does not affect integrity of the cover system.
- Verify compliance and effectiveness of the response action.
- Ensure protection of human health and the environment.
- Verify that the methane venting system is functioning as designed, to prevent a potential methane build-up under the cover system.

Elements of this O&M Plan address the following:

- Site Background.
- Performance and Compliance Monitoring Program.
- Contingency Plan.
- Reporting Requirements.

Site Background

The NE Pit is approximately 35 feet deep and 3 acres in size, located in the city of Kingsford, Dickinson County, Michigan as illustrated on Figure G-1. An IRAP has been developed to address impacts to the soil and groundwater at the NE Pit, which resulted in the selection of the cover system described above as a response action. This O&M Plan is an appendix to the NE Pit IRAP. The primary focus of the IRAP is to prevent direct contact with impacted soil/waste material, and to minimize groundwater infiltration to prevent leaching of waste constituents.

Performance and Compliance Monitoring Plan

Routine post-closure care of the cover system is required to maintain the integrity of the cover system. Performance and compliance monitoring provides a way to verify that the cover/methane venting system is performing satisfactorily, and is in compliance with regulatory requirements. On-site care will include visual inspection of the site to identify disruptions of the surface cover, monitoring for settlement, maintenance of the final cover depending on the results of inspection, inspection of site permanent markers, and erosion control prevention. These topics are discussed in further detail in the subsequent sections.

Inspection

In the post-closure period, an on-site inspection will be conducted to document the activities identified in this O&M Plan. Inspection forms will be used to record findings, unusual conditions, and corrective action(s) taken. Examples of the inspection forms are included in Attachment A. These example inspection forms may change in format throughout the post-closure period, however the substance will remain the same. Conditions requiring corrective action will be rectified, and the repair will be documented on a Corrective Action Form. Table G-1 summarizes the specific post-closure activities and frequencies. Records of corrective actions will be maintained in the site files.

Post-closure care of the cover system will require inspection and maintenance of the areas at the edges of the cover system, as well as the cover system itself to ensure integrity. The O&M Plan will be amended if any changes in the closure design, implementation of the selected interim response action, or other events occur during the post-closure period that affect the monitoring requirements. Changes to the O&M Plan will require Michigan Department of Environmental Quality (MDEQ) approval.

Erosion Prevention

The final cover system layer has been designed to promote run-off of precipitation, to eliminate ponding on or around the cover system, and to minimize run-on from the adjacent property. Areas surrounding the cover system are to be vegetated to prevent erosion at the cover system edges. If the final cover system layer is to be constructed of asphalt, the effects of the weather on this type of material, such as freeze-thaw, will be incorporated in the inspection section for the determination of settling, buckling, or crack development.

Should the finished response action include a retention basin, the cover system outfall and receiving structure (whether basin or stormwater drain) will be kept clear of debris or overgrown vegetation that may inhibit or block the flow of run-off. Inspections should be conducted after extreme weather events (e.g., tornadoes, 10-year/24-hour precipitation events) as determined by Ford Motor Company (Ford) and The Kingsford Products Company (KPC).

Inspections to the final cover system and cover system perimeter will include, but not be limited to the following: obstructions to flow; erosion; excessive siltation or debris accumulations; inadequate vegetation; and loose or missing rip-rap. Should any vegetated area show significant washout or gullying (greater than 4 inches), the eroded area will be filled when the weather conditions permit or within 30 days, whichever occurs first. If results of the inspection indicate that any drainage patterns have changed resulting in ponding or excessive run-off, the affected area will be appropriately repaired to re-establish correct flow direction.

Accumulated sediment in the drainage system will be removed when its depth restricts flow. If more than 20 percent of the vegetated perimeter is devoid of vegetation, the area will be re-vegetated as weather conditions permit. Steps will be taken to ensure that drainage pathways are maintained throughout the post-closure period. During inspection, any tree or scrub brush seedling that is present at the vegetated perimeter will be removed to prevent potential deep root growth that might compromise the integrity of the cover system. Baiting for rodents and treating for burrowing animals will also be administered, if the need is observed during inspection

Settlement Detection Monitoring

Inspection for excessive settlement will be performed annually by visually inspecting the cover system. Should inspection indicate that damage or disturbance has occurred to the cover system, surveying of the elevations of the constructed settlement markers will be conducted to check the benchmark or settlement marker accuracy. Surveyed settlement elevations will be used to calculate the vertical change compared with an established benchmark. An inspection of the benchmark and settlement markers will be performed annually to assess their integrity, or if there is evidence of damage. All surveying will be performed by a Michigan Registered Land Surveyor, and the survey activities will be documented. If the vertical movement of the settlement markers exceeds the allowable amount (to be dictated by the cover design), Ford/KPC will prepare and submit an assessment or investigation plan, and schedule action within 60 days. After implementing the assessment or investigation, Ford/KPC will prepare and submit a corrective action plan following any necessary communication with MDEQ.

Cover System Effectiveness

Groundwater sampling will be performed as part of the compliance monitoring plan for the NE Pit response action. This sampling will be performed quarterly for the first year and annually thereafter at Monitoring Well GM-72, which will be designated as the compliance well. All known constituents on the site will be included in the compliance monitoring plan.. Concentration trends for the known constituents from Monitoring Well GM-72 will be compared to Monitoring Well GM-72concentration trends to judge cover system performance. An increasing trend in a concentration might be attributed to leakage through the cover system, and the cover system would be further evaluated under a corrective action plan. Care will be taken to compare trends of the constituents, as they are more indicative of performance over time than individual data points. The results of groundwater sampling and evaluation will be reported to MDEQ annually by a letter report. Figure G-2 identifies the proposed compliance well and cover system.

Site Security

Signage will be posted identifying the site and response action by name, with access granted by Ford/KPC authorization. Inspection of the signage is included in the inspection activities and on the documentation forms. These inspections will include checking for damage to posts and signs. If deficiencies are noted, Ford/KPC will submit a corrective action plan detailing how the problem will be repaired to original conditions, or as necessary, to function as first designed within 30 days of noting a problem.

It is possible that the cover system could be used for materials storage by a third party. If this is the case, then workers will be instructed regarding the cover system, the methane venting system, and the allowable types of activities/equipment at the site. This instruction will be documented by Ford/KPC, and spot inspections will include a determination of compliance.

Maintenance Schedule

Site inspections will be performed quarterly during the first year after construction of the cover system. After the first year, inspections will be conducted annually. Active maintenance will be performed as necessary based on the observations reported during routine inspections of the cover system. If there is rapid grass growth in areas surrounding the cover system, regularly scheduled grass mowing may be necessary.

Contingency Plan

In the unlikely event that it is determined that the cover system has failed and there has been a release to the environment, specific actions are necessary. This section provides direction regarding this potential, and is organized into two sections: Contingency Plan – Response and Contingency Plan – Procedures.

Contingency Plan – Response

Potential incidents that might require a contingency plan response include 1) fire/explosion, and 2) release of waste material.

The soil and consolidated waste material do not present a fire hazard themselves. The soil does not contain concentrations of combustible material sufficient to ignite, and the waste material below the geotextile liner will not be exposed to an ignition source. However, if confined enough to concentrate, the methane gas potentially produced by degradation of the waste material could ignite, if an ignition source would be present. The methane venting system will route any methane produced to the surface, where it can be safely dissipated. Waste material at the NE Pit is comprised of material placed under the cover system liner including wood, tar-like waste, impacted soil, wood chips, and charcoal. Spontaneous failure of the cover system with release of material to the surface is highly unlikely. The cover system will be completed at grade, and there are no slopes that might become unstable. Use of a liner material will maintain the consolidation of waste material at a distance well below the land surface. Proper construction with uniform loading across the cover system will prevent localized liner seam failure. However, should cover system failure occur, there exists the possibility of impacted groundwater being generated as a result of surface water infiltration and leaching of waste material constituents. Cover system repairs and/or modifications would then take place to prevent further leaching.

Contingency Plan - Procedures

Should there be physical or analytical evidence that the cover system has failed, a determination will be made of the potential threat to public health and the environment. Any and all actions needed to secure, contain, and remediate the release will be taken. In any instance of a reportable release/failure, fire, or explosion, Ford/KPC will notify the MDEQ. The time, date, and details of any incident that requires emergency response implementation will be noted in the site log book. Within 15 days after the emergency at the site, a written report on the incident will be submitted to MDEQ. The report will include:

- Name, address, and telephone number of owner.
- Name and address of the site.
- Date, time, and type of incident or observation.

- Name and quantity of material(s) involved.
- Extent of injuries (if any).
- An assessment of actual or potential hazards to human health or the environment, where this is applicable.
- Estimated quantity and disposition of recovered material that resulted from the incident.

Identification of Hazardous Material and Assessment of Possible Hazards

The hazardous material that could potentially be released are from impacted soil and waste material, and possible leachate generated by surface water infiltration in contact with these materials. The possible hazards associated with the soil is minimal, but include risks from ingestion and dermal contact.

Assessment and Control Procedures

In the unusual event of a release or creation of leachate, the appropriate containment procedures and repairs would be implemented immediately.

If it is suspected that a release may have occurred as a result of the incident, the following steps will be taken:

- Sample and analyze soil, surface water, or sediments potentially impacted by the release.
- Evaluate the data to determine whether constituents have entered the environment at levels above risk-based standards.
- If it is suspected that groundwater impacts may have occurred as a result of the incident, groundwater monitoring will be performed at two times the standard frequency at the compliance well.

Reporting Requirements

Records Retainage

Records will be managed by Ford/KPC or their designee, and be maintained for a minimum of 3 years.

Operation and Maintenance Records

O&M activities for the cover system will be recorded in the appropriate logbook or computer system. Notations will be made when the cover system is inspected and maintained, engineering measurements are taken, and when corrective measures are implemented. As indicated, inspection forms are included in Attachment A of this report. Corrective action measures and re-inspection forms will be completed during the period that the corrective measures take place.

Reporting

O&M reports will be prepared annually that will include at a minimum: a discussion of the cover system monitoring activities performed during the reporting period; sampling results and cover system performance evaluation; maintenance performed that is other than preventative maintenance; key personnel changes; and coordination activities. Any proposed modifications to the configuration or operation of the cover system will be included.

Tables

Table G-1. Facility Inspection Activities, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Item	Types of Problems	Frequency of Inspection	Circumstance or Trigger Level (if applicable)	Corrective Action
Benchmark	Integrity of benchmark	Annually	Evidence of damage or movement	Repair or replace benchmark
Settlement Markers	Excessive settlement, subsidence	Annually	Vertical movement of the settlement markers exceed design directed allowance	Evaluate cause of settlement. Prepare corrective action plan and submit to MDEQ
Cover	Slumping, cracking, damage, or buckling	Annually	Visual evidence of discontinuity of surface - by way of depressions or cracks	Evaluate and prepare corrective action plan and submit to MDEQ
	Softening or deteriorating of cover	Annually	Visual evidence	Evaluate and prepare corrective action plan and submit to MDEQ
	Presence of material of petroleum products	Annually	Visual evidence	Clean
	Rodents and burrowing animals	Annually	Evidence of rodents or burrowing animals	Remove animals by acceptable means

Table G-1. Facility Inspection Activities, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Item	Types of Problems	Frequency of Inspection	Circumstance or Trigger Level (if applicable)	Corrective Action
Cover Perimeter Outlet/Drainage System	Excessive growth at cover perimeter (mowing required)	Annually	Evidence of excessive growth which hinders visual inspection of cover	Mow vegetation
	Tree and scrub oak seedlings or other deep-rooted vegetation	Annually	Evidence of growth	Remove unwanted vegetation
	Erosion, obstructions to flow, deterioration, excessive siltation, inadequate protective vegetation, loose or missing riprap	Annually and after extreme weather events	Any obstructions to flow; silt buildup in excess of 50% of design freeboard; greater than 20% of area devoid of vegetation	Remove obstruction and/or silt. Revegetate as required
	Standing water on asphalt cover	Annually	Visual evidence of water or softening asphalt	Evaluate and prepare corrective action plan and submit to MDEQ
Methane Venting System	Methane gas at vent outlet	Annually	Measurement of vapor, compare to previous trend information	Evaluate patency of vent system, prepare corrective action and submit to MDEQ.

Table G-1. Facility Inspection Activities, Former Northeast Pit IRAP, Ford/Kingsford Site, Kingsford, Michigan.

Item	Types of Problems	Frequency of Inspection	Circumstance or Trigger Level (if applicable)	Corrective Action
Methane Venting System (continued)	Vegetative overgrowth or obstruction	Annually	Visual observance	Mow/Remove
Groundwater Compliance Monitoring	Leachate formation, poor cover performance	Annually	Concentration trends for signature compounds are increasing	Notify MDEQ. Implement Contingency Plan and Corrective Measures
Signage	Damaged, illegible	Annually	Impacted by construction or vandalism	Replace Signs

Figures

DRAFTE ELS

APPROVED:

CHECKED: BELB

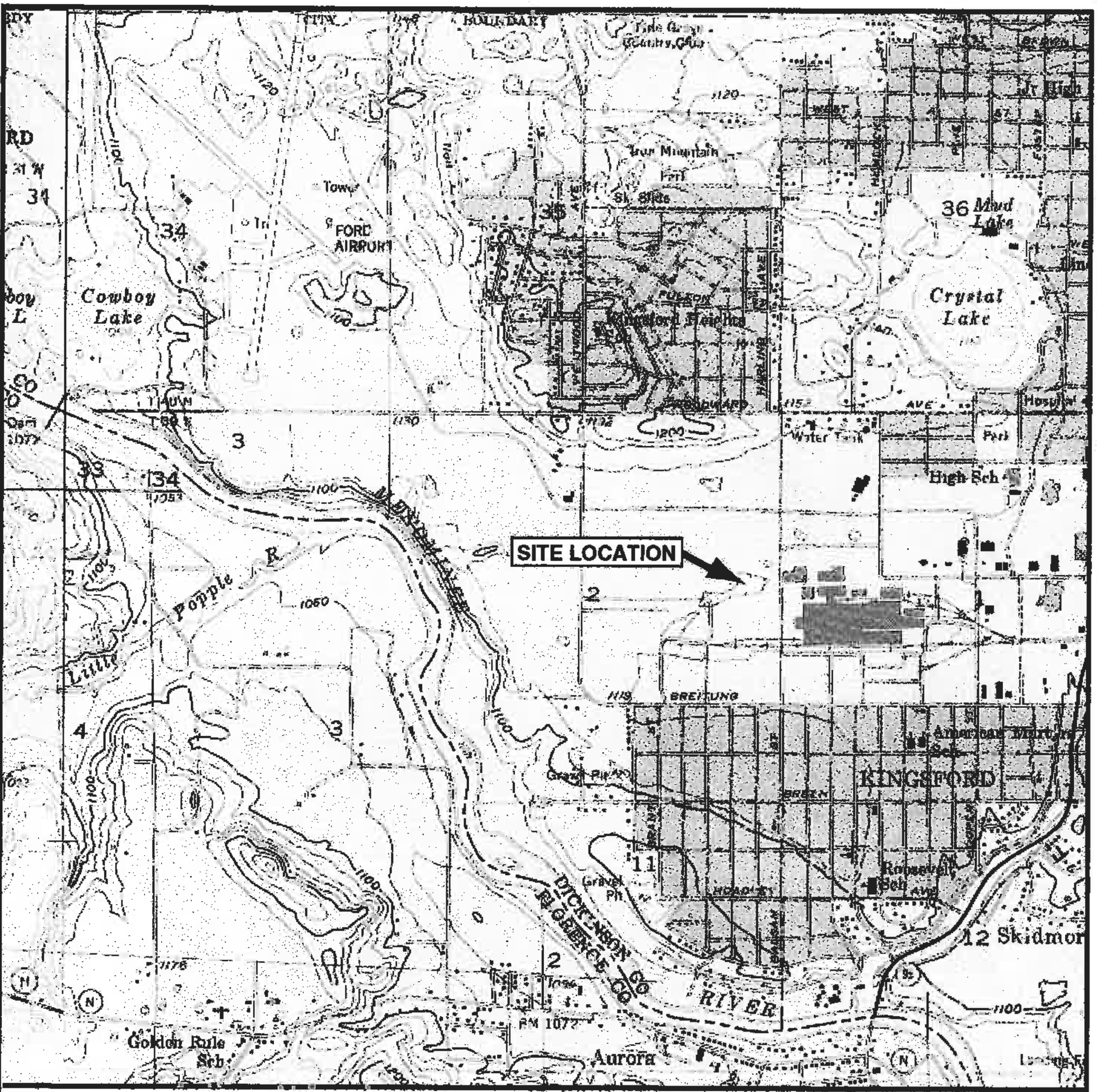
RAWING: SITE_LOCE1.AI

FILE NO.: GRAPHICS\H&SAFETY

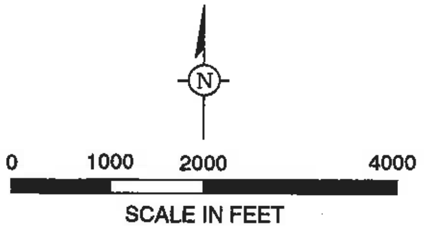
PN: FORD\WI0637\KINGSFOR

E: 04JAN02

DWG



SOURCE: USGS 7.5 Minute Topographic Map, IRON MOUNTAIN, MICHIGAN Quadrangle, 1955 Photorevised 1982



ARCADIS

SITE LOCATION MAP

FORMER NORTHEAST PIT IRAP
FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

FIGURE

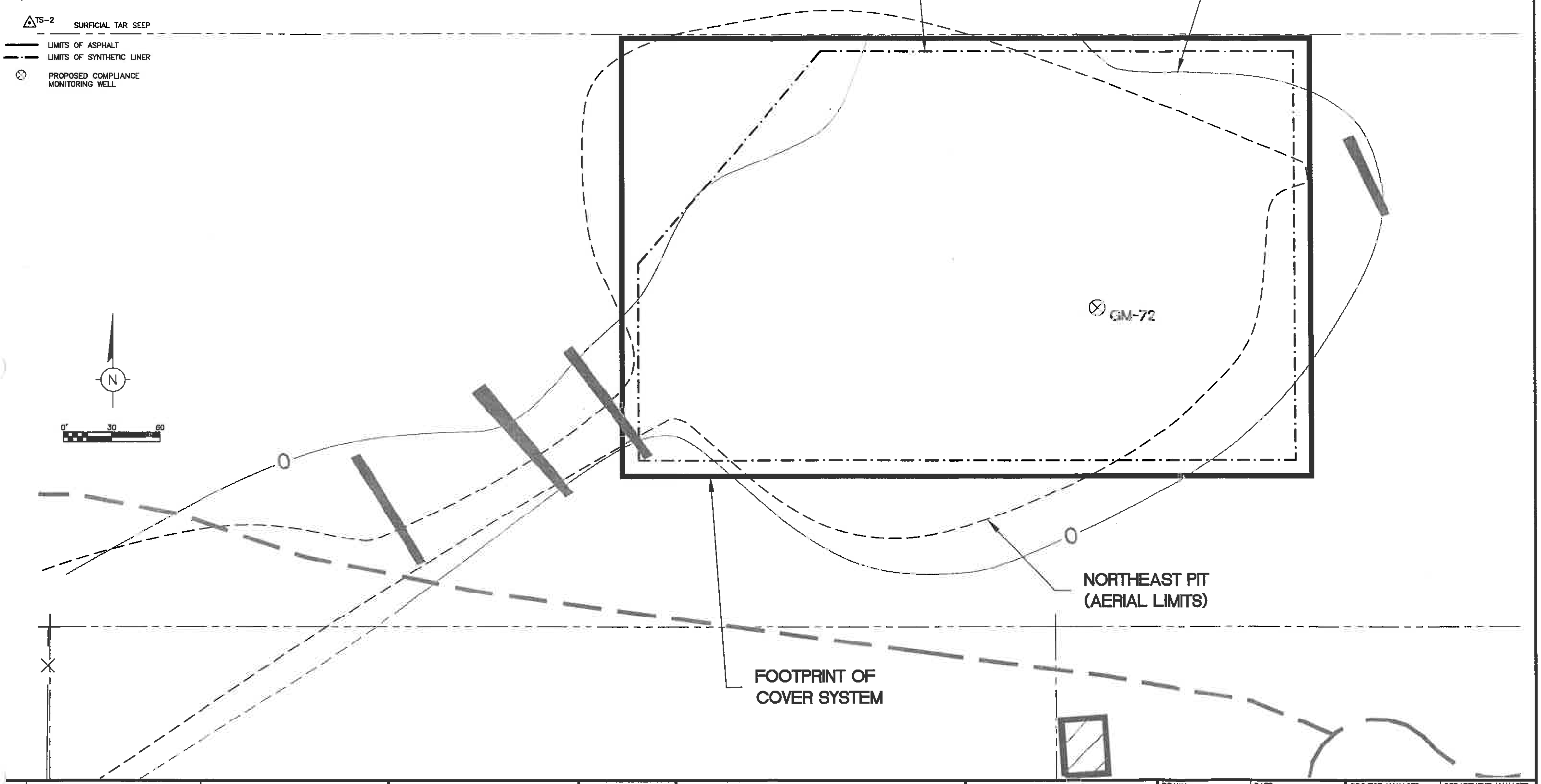
G-1

LEGEND

⬭	FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL PHOTOS AERIAL
-•-•-	FENCE
═	ROADWAYS
▨	BUILDING
- - -	TRAIL OR PATH
P/A	PARKING AREA
△TS-2	SURFICIAL TAR SEEP
━━	LIMITS OF ASPHALT
━ · ━	LIMITS OF SYNTHETIC LINER
⊗	PROPOSED COMPLIANCE MONITORING WELL

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS



NO.	DATE	REVISION DESCRIPTION	BY	CKD

ARCADIS
3803 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/27/02

NORTHEAST PIT CONCEPTUAL
COVER FOOTPRINT
AND PROPOSED COMPLIANCE
WELL LOCATION

PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE G-2

G:\CAD\NORTHEAST VESTIGATION REPORT\12/5/02\G-2.DWG

Attachment A

Example Inspection Forms

Example Inspection Form
Security Devices
Closed Former NE Pit
Ford/Kingsford Site

Functional Group Assigned this Inspection Duty: ____________________
Inspector's Name: ____
Date of Inspection: ____
Time of Inspection: ____

Inspection Checklist

1. Fence

   Inspect the perimeter of the site fence.
   - Are there any signs of breaches, severe corrosion, or damage?____
   - Is the gate locked and operable?_________________________
   - Is there any sign of damage to the lock?___________________

2. Warning Signs
   - Are signs visible from all approaches?_____________________
   - Are the signs legible at a 25-foot sighting distance?____________
   - What is the condition of the signs?_________________________

3. Any deficiencies?____

   ____

4. Comments: ____

5. Corrective Action Required (Complete Correction Action Form): ______

   ____

   ____

6. Inspector's Signature: _________________________________

Send completed form to Ford/Kingsford for required records maintenance.

Example Inspection Form
Final Cover and Cover Perimeter Outlet
Closed Former NE Pit
Ford/Kingsford Site
(Page 1 of 3)

Functional Group Assigned This Inspection Duty: ______________________
Inspector's Name: ____
Date of Inspection: ____
Time of Inspection: ____

Note: Perform this inspection on a quarterly basis and after extreme weather events to inspect erosion.

Inspection Checklist

1. Cover: Walk the entire cover and perimeter.

    - Are there any cracks or breaks in the asphalt cover?________________
    - Are there any signs of uneven surfaces (depressions or bumps) or asphalt breakdown?____
    - Are there any signs of excessive erosion of cover or vegetated perimeter? ____
    - Are there any deep-rooted or woody plants established on the cover or at the perimeter?____
    - Are there any signs of burrowing animals?_______________________

2. Settlement or subsidence:

    - Does movement (elevation change) exceed allowable as determined by surveyor's calculations (Page 3 of 3)? _________________________
    - Are there any physical signs of settlement or subsidence? ___________

Date of Inspection: ____________________

Final Cover and Cover Perimeter Outlet
Closed Former NE Pit
Ford/Kingsford Site
(Page 2 of 3)

3. Cover Perimeter Outlet

Walk the cover perimeter outlet.

- Is there evidence of erosion? ____________________
- Does silt accumulation prevent run-off? ____________________
- Are there signs of ponding? ____________________

4. Any deficiencies? ____________________

____

5. Comments: ____________________

____

____

6. Corrective Action Required (Complete Corrective Action Form): ____________________

____

____

____

7. Inspector's Signature: ____________________

Send completed form to Ford/Kingsford for required records maintenance.

Date of Inspection: ____________________

Example Inspection Form
Final Cover and Cover Perimeter Outlet
Closed Former NE Pit
Ford/Kingsford Site
(Page 3 of 3)

SETTLEMENT MARKERS MEASUREMENT AND MOVEMENT CALCULATIONS:

Survey contracted to: ____

Date/Time of Survey: ____

Using the benchmark elevation and the placement of benchmark, which is yet to be determined (TBD), survey the settlement markers and note their Current Elevations and Placements to within ±0.01 foot.

	Current Elevations (CE)	Current Placements (CP)	
1.			
2.			

	Established Elevations (EE)	Established Placements (EP)		Movements (M)		
		Northing	Easting	Elevation	Northing	Easting
1.						
2.						

Calculate the vertical movement for the settlement markers using the following formulas:

$M_{elevation}$ = abs (CE-EE) (Where abs = absolute value.)

If any of the calculated movement exceed allowable (TBD), contact Ford/Kingsford immediately.

Send completed form to Ford/Kingsford for required records maintenance.

Example Inspection Form
Benchmark and Settlement Markers
Closed Former NE Pit
Ford/Kingsford Site

Functional Group Assigned This Inspection Duty: ______________________________

Inspector's Name: ______________________________

Date of Inspection: ______________________________

Time of Inspection: ______________________________

Note: Perform benchmark inspection semiannually and settlement marker inspection quarterly.

Inspection Checklist

1. Check benchmark (TBD) located (TBD) for any evidence of damage or disturbance.
Findings (discuss): ______________________________
____
____

2. Check the Settlement Markers on the Closed Former NE Pit for any evidence of damage or disturbance.
Findings (discuss): ______________________________
____
____

3. Corrective Action Required (Complete Corrective Action form):
____
____
____

4. Inspector's Signature: ______________________________
____
____

If any damage or disturbance is noted contact Ford/Kingsford immediately.

Send completed form to Ford/Kingsford for required records maintenance.

Example Inspection Form
Groundwater Monitoring System
Closed Former NE Pit
Ford/Kingsford Site

Functional Group Assigned This Inspection Duty: ______________________

Inspector' Name: ______________________

Date of Inspection: ______________________

Time of Inspection: ______________________

Note: Perform this inspection on a quarterly basis.

Inspection Checklist

Monitoring Well Numbers: ______________________

Collect groundwater samples from wells and during sample collection. Note if:

There is any physical damage to the well casing: ______________________

The cap locking system is operable: ______________________

There is any damage to the lock: ______________________

The well cap is locked and secure: ______________________

Comments: ______________________

____

____

____

Corrective Action Required (Complete Corrective Action Form): ______________________

____

____

____

____

Inspector's Signature: ______________________

Send completed form to Ford/Kingsford for required records maintenance.

Example Corrective Action Form
Closed Former NE Pit
Ford/Kingsford Site

Report Number: ______________________
Date of Initial Inspection: ______________
Name of Inspector: ___________________

Note: If Corrective Action cannot be completed within 30 days of the Initial Inspection Date, a Corrective Action Plan must be prepared and maintained in the operating record.

Corrective Action Work Order

Type of problem: ____
____
Required upgrade: ____
____
Corrective action assigned to: ___________________________ ____________
Name Date

Corrective Action Completion Report

Received on: _________________________ By: ___________________________
Completed on: ____
Comments: ____
____
____
By: ____ ____________
Name Date

Reinspection Report

Observations: ____
____
Comments: ____
____
____
Inspector: ____
Signature Date

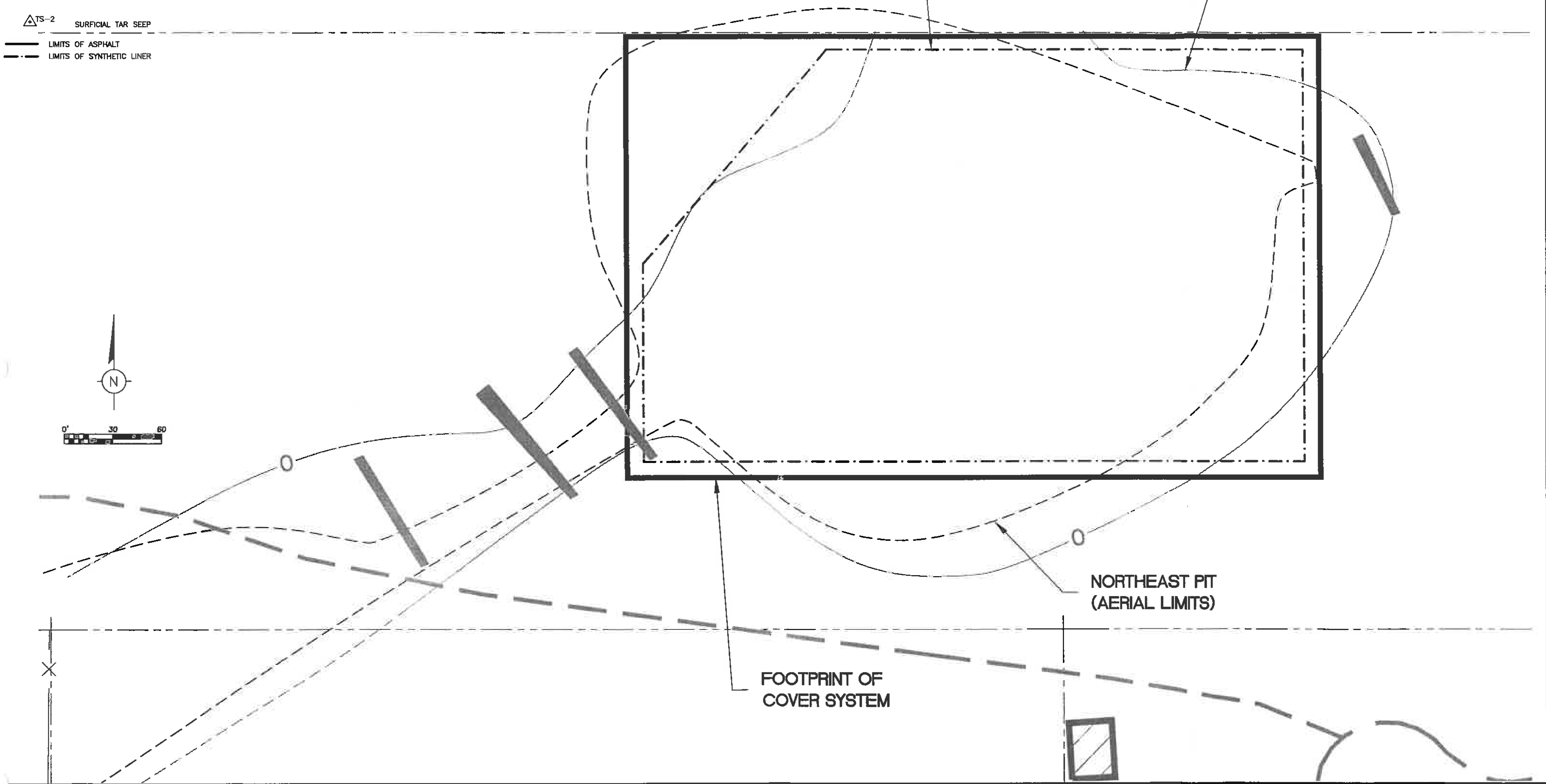
Send completed form to Ford/Kingsford for required records maintenance.

LEGEND

⬭	FORMER DISPOSAL PIT BOUNDARIES BASED ON HISTORICAL PHOTOS AERIAL
	FENCE
	ROADWAYS
▨	BUILDING
	TRAIL OR PATH
P/A	PARKING AREA
△TS-2	SURFICIAL TAR SEEP
—	LIMITS OF ASPHALT
—·—	LIMITS OF SYNTHETIC LINER

NOTES

1. HORIZONTAL DATUM BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM.
   DATE OF PHOTOGRAPHY: 05/04/97
   ABRAMS AERIAL SURVEY CORPORATION # 26994.2
2. ACCURACIES NOT GUARANTEED IN OBSCURED AREAS SHOWN BY DASHED CONTOURS AND UNDERLINED ELEVATIONS



G:\CAD\NORTHEAST

VESTIGATION REPORT\12/5/02\anotherfigure

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

EXAMPLE INSPECTION
FORM

DRAWN JMG
DATE 09/27/02
PROJECT MANAGER EC
DEPARTMENT MANAGER BE
LEAD DESIGN PROF. BE
CHECKED BE
PROJECT NUMBER WI00975.0012
FIGURE 1

Appendix H

Restrictive Covenant

DECLARATION OF RESTRICTIVE COVENANT

This Restrictive Covenant has been recorded with the Dickinson County Register of Deeds for the purpose of protecting the public health, safety and welfare, and the environment.

[DESIGNEE] has received notice of approval from the Michigan Department of Environmental Quality ("MDEQ") for an Interim Response Action Plan ("IRAP") dated January 8, 2003, that includes land use-based cleanup criteria as defined and set forth in Section 20120a(1) of Part 201 of the Natural Resources and Environmental Protection Act ("NREPA"), 1994 PA 451, as amended, MCL 324.20101 *et seq.*, for the environmental remediation associated with property located in the City of Kingsford, County of Dickinson, State of Michigan, which property is often referred to as the former Northeast Pit Area ("Property"). Please see Exhibit A for a legal description of the Property. The tax identification number for the Property is 22052-002-012-00.

A portion of the Property has a Cover System constructed upon it. Please see Figure 1, which illustrates the Property, including the Cover System. The Cover System may be enhanced and/or modified from time to time, and a revised Figure 1 will be recorded to reflect such enhancements and/or modifications. The submission of a revised Figure 1 shall not require approval or an amendment to this Restrictive Covenant.

[Designee] is the current owner of the Property. As used herein, the term "Owner" shall mean at any given time the then current titleholder of the Property or any parcels of the Property.

NOW THEREFORE, the Owner hereby imposes restrictions on the Property and covenants and agrees that:

1. The Property shall be restricted to the land use categories of Industrial and Commercial II, III and IV, as defined in Section 20120a(1) of Part 201 of NREPA, and the Michigan Department of Environmental Quality ("MDEQ"), Operational Memorandum #18, Revision 1, dated June 7, 2000. See Exhibit B for descriptions of the land use categories of Industrial and Commercial II, III and IV. Cleanup criteria and associated land-use descriptions are located in the Government Documents section of the State of Michigan Library.

2. The Cover System shall not be removed, all or in part, unless strictly performed in conformance with the restrictions in this Restrictive Covenant, or unless otherwise approved by the MDEQ. The Cover System shall be maintained in perpetuity, in accordance with the Operation and Maintenance Plan, attached as Exhibit C. Permanent markers shall be maintained that describe the restricted area of the NE Pit and the nature of the restrictions.

3. For the entire Property, the Owner declares the following restrictions:

- The use of any groundwater located beneath the Property for any purpose shall be prohibited.
- Any and all use of the Cover System for storage purposes shall be subject to weight limitations consistent with a standard passenger car asphalt parking lot.

- All excavation and digging activities on the Property shall be conducted in accordance with the Property's Waste Management Plan and Construction Health and Safety Plan Guideline, attached as Exhibits D and E.

4. Upon the portion of the Property that is not a part of the Cover System, the Owner declares the following additional restriction:

- Any confined structures built shall be built with a methane barrier system and a methane ventilation system.

5. Upon the portion of the Property where the Cover System is located, the Owner declares that any and all construction activities upon such areas shall be prohibited except for paving which must be conducted in conformance with the Property's Waste Management Plan and shall not interfere with the Cover System, its operation and maintenance or monitoring.

6. The Owner shall provide notice to the MDEQ of the Owner's intent to convey any interest in the Property fourteen (14) days prior to consummating the conveyance. A conveyance of title, an easement, or other interest in the Property, shall not be consummated by the Owner without adequate and complete provision for compliance with the terms and conditions of this Covenant.

7. The Owner shall grant to the MDEQ, and its designated representatives, the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the IRAP, including the right to take samples, inspect the operation of the response action measures, and inspect records.

The state may enforce the restrictions set forth in this Restrictive Covenant by legal action in a court of appropriate jurisdiction.

This Restrictive Covenant shall be perpetual, shall run with the land, and shall be binding upon the future owners, successors, lessees or assigns and their authorized agents, employees, or persons acting under their direction and control, of all or any portion of each of the parcels which comprise the Property. It shall be the obligation of each and every Owner of any portion of the Property to provide a copy of this Restrictive Covenant to all of its heirs, successors, lessees, assigns and transferees.

The Owner may amend this Restrictive Covenant by sending written notice to the MDEQ of such proposed amended Restrictive Covenant. If the MDEQ does not object to the amendment within thirty (30) days after receipt of such notice, then the amended Restrictive Covenant may be recorded and shall take effect immediately upon recording.

If any provision of this Restrictive Covenant is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

The undersigned person executing this Restrictive Covenant has the express written permission of the Owner and represents and certifies that he or she is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, the said Owner of the above-described Property has caused this Restrictive Covenant to be executed on this ___ day of __________________, 2002.

Signed in the presence of:

______________________________	By: ______________________________
Name: ______________________________	Name: ______________________________
	Company: ______________________________
______________________________	Its: ______________________________
Name: ______________________________	

ACKNOWLEDGMENT

STATE OF ________________)
) SS.
COUNTY OF _______________)

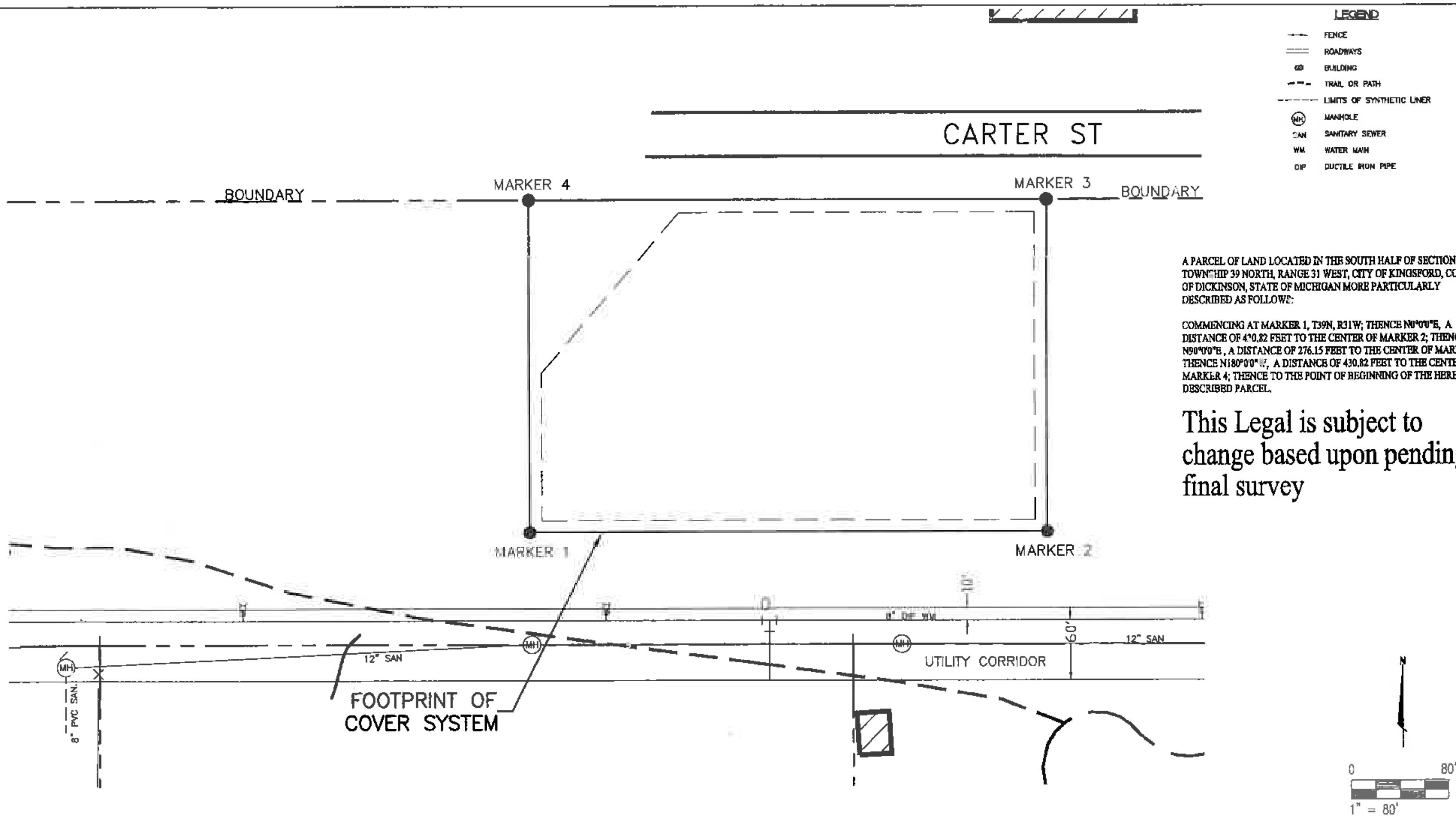
The foregoing instrument was acknowledged before me this ___ day of __________, 2002, by ________________________, the ___________________ of ______________________________, on its behalf.

____
Notary Public, ______________________________
County of ______________________________
State of ______________________________
My commission expires: ______________________________

Prepared by and when recorded return to:
Suzanne T. Croissant
Dickinson Wright PLLC
38525 Woodward Avenue, Suite 2000
Bloomfield Hills, Michigan 48304

EXHIBIT A

LEGAL DESCRIPTION OF THE PROPERTY



A PARCEL OF LAND LOCATED IN THE SOUTH HALF OF SECTION 2 TOWNSHIP 39 NORTH, RANGE 31 WEST, CITY OF KINGSFORD, COUNTY OF DICKINSON, STATE OF MICHIGAN MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT MARKER 1, T39N, R31W; THENCE N0°0'0"E, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 2; THENCE N90°0'0"E , A DISTANCE OF 276.15 FEET TO THE CENTER OF MARKER 3; THENCE N180°0'0"W, A DISTANCE OF 430.82 FEET TO THE CENTER OF MARKER 4; THENCE TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL.

This Legal is subject to change based upon pending final survey

G:\CAD\FORD\NORTHEAST PIT DESIGN\WASTE EXCAVATION MEMO\LEGAL DESCRIPTION.DWG

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
3903 Northdale Boulevard, Suite 120
Tampa, Florida 33624
Tel: 813/961-1921 Fax: 813/264-3425

FORMER NORTHEAST PIT IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

DRAWN JMG
DATE 09/12/02

LEGAL DESCRIPTION
NE PIT COVER FOOTPRINT

PROJECT MANAGER RS
DEPARTMENT MANAGER JB
LEAD DESIGN PROF. BZ
CHECKED AV
PROJECT NUMBER WI00950.0013
FIGURE A1

EXHIBIT B

INDUSTRIAL LAND USE CATEGORY

An industrial site will include sites with the following characteristics:

1. The primary activity at the property is and will continue to be industrial in nature (e.g., manufacturing, utilities, industrial research and development, petroleum bulk storage) and access is and will continue to be reliably restricted consistent with its use (e.g., by fences, security personnel, or both). Inactive or abandoned properties can be included in this category if the use was and/or will be industrial, as described above and access is controlled as necessary to assure unacceptable exposures do not occur. The industrial category does not include farms, gasoline service stations, or other commercial establishments where children may commonly be present.

2. The current zoning of the property is industrial, the zoning is anticipated to be industrial or the current industrial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "light industrial" or "heavy industrial."

COMMERCIAL LAND USE CATEGORY

A commercial site would include sites with the following characteristics:

1. The primary activity at the property is and will continue to be commercial in nature (e.g., retail, warehouse, office/business space). This could include abandoned or inactive commercial properties as long as they fit both the definition of a commercial land use and one of the subcategory definitions described below.

2. The current zoning of the property is commercial, future zoning is anticipated to be commercial, or the current commercial use is a legal nonconforming use. This may include different zoning designations, depending on the community, such as "community commercial," "regional commercial," "retail," or "office-business."

Subcategory II: The following features characterize this commercial land use subcategory. Access to the public is reliably restricted, consistent with its use, by fences, security, or both. Affected surficial soils are located in unpaved or landscaped areas that are frequently contacted by worker populations such as groundskeepers, maintenance workers, or other employees whose primary duties are performed outdoors. If groundwater were relied on for drinking water, worker populations would receive half of their total exposure from on-site drinking water. This subcategory could include, but is not limited to, the following uses:

- large-scale commercial warehouse operations
- wholesale lumber yards
- building supply warehouses

The degree of exposure for such employees under subcategory II property is assumed to be equivalent to the exposures used to model outdoor activities in the development of the generic industrial criteria. As a result, a unique set of generic criteria has not been defined for this subcategory of commercial land use. Properties which fall into this subcategory should be addressed through the application of the generic industrial criteria or through a facility-specific risk assessment.

Subcategory III: A subcategory III commercial property is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the property is expected to be intermittent and significantly less in frequency and duration relative to the population working at the facility. Although some of the activities for both worker populations and the general public at a subcategory III commercial property are conducted indoors, a significant component of their activity will likely be outdoors. Affected surficial soils are located in unpaved or landscaped areas that may be contacted frequently, primarily by the worker populations (as may be the cases at gas stations, auto dealerships, or building supply warehouses with unpaved or landscaped areas). If site groundwater were relied on for drinking water, worker populations would receive about half of their total exposure from the site. This subcategory could include, but is not limited to, the following uses:

- Retail gas stations
- Auto service stations
- Auto dealerships
- Retail warehouses selling the majority of their merchandise indoors but including some limited storage or stockpiling of materials in an outdoor yard (building supply, retail flower and garden shops not involving on site plant horticulture and excluding open air nurseries, tree farms, and sod farms which would fall into an agricultural land use).
- Repair and service establishments including but not limited to, lawn mower, boat, snowmobile, or small appliance repair shops that have small outdoor yards.
- Small warehouse operations

Subcategory IV: A subcategory IV commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the facility is intermittent in frequency and of short duration relative to the worker populations resident at the facility (i.e., the frequency and duration of general public occupancy at the property is typified by the time necessary to transact business at a retail establishment or to receive personal services). The predominant activities performed by both workers and the general public at this type of commercial property are conducted indoors. Affected surficial soils are located in unpaved or landscaped areas that are contacted by worker populations on an occasional basis, such as outdoor break or eating areas. General public contact with these areas is anticipated to be significantly less than the worker's contact, both in terms of frequency and duration. If groundwater were relied upon for drinking water, worker populations would receive one-half of their total exposure at the facility. This subcategory could include, but is not limited to, the following uses:

- Professional offices (lawyers, architects, engineers, real estate, insurance, etc.)
- Medical/dental offices and clinics (not including hospitals)
- Banks, credit unions, savings and loan institutions, etc.
- Publicly owned office buildings
- Any retail business whose principal activity is the sale of food or merchandise within and enclosed building
- Personal service establishments which perform services indoors (health clubs, barber/beauty salons, mortuaries, photographic studios, etc.).

EXHIBIT C

OPERATION AND MAINTENANCE PLAN FOR THE PROPERTY

EXHIBIT D

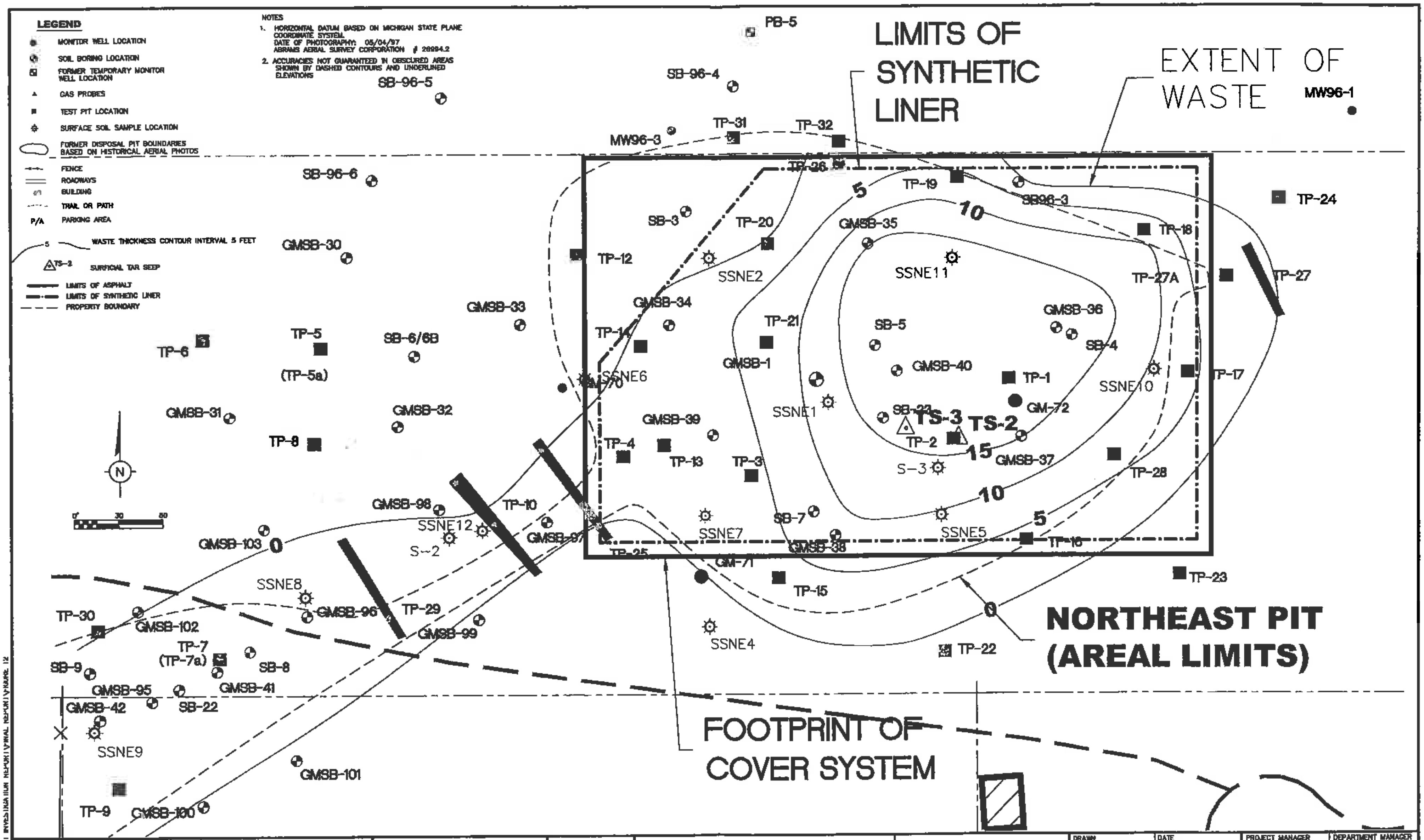
WASTE MANAGEMENT PLAN FOR THE PROPERTY

EXHIBIT E

HEALTH AND SAFETY PLAN GUIDELINE FOR THE PROPERTY

FIGURE 1

MAP OF THE PROPERTY, INCLUDING THE COVER SYSTEM



NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
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Tel: 813/961-1921 Fax: 813/961-2599

FORMER NORTHEAST PIT
IRAP

FORD/KINGSFORD SITE
KINGSFORD, MICHIGAN

CONCEPTUAL FOOTPRINT
OF A COVER SYSTEM

DRAWN: JMG
DATE: 09/27/02
PROJECT MANAGER: EC
DEPARTMENT MANAGER: BE
LEAD DESIGN PROF.: BE
CHECKED: BE
PROJECT NUMBER: WI00975.0012
FIGURE: 12