CITY OF HOUSTON

PUBLIC WORKS AND ENGINEERING
PLANNING & DEVELOPMENT DIVISION

EXECUTIVE SUMMARY

Designated Property Location

The "Designated Property" for which this Municipal Setting Designation (MSD) Application has been developed is KBR – Clinton Drive Facility. The Designated Property consists of eight tracts of land with a primary address of 4100 Clinton Drive, Houston, Harris County, Texas (Site). In addition to the eight tracts of land, City of Houston rights-of-way along Clinton Drive between Jensen Drive and Hirsch Road, Hirsch Road from Clinton Drive to Buffalo Bayou, Foote Street, and Jensen Drive from Roanoke Street to Buffalo Bayou are included.

The location of the Designated Property is shown on **Figure 1** in **Appendix B** and the layout of the Designated Property is shown on **Figure 2** in **Appendix B**. The Designated Property contains approximately 153 acres.

The Designated Property currently has 28 buildings used for general office purposes, medical offices, storage, City of Houston Sheriff's offices, and light construction/carpentry. The buildings were constructed in the 1970s and 1980s.

Property Ownership

KBR Technical Services, Inc.
601 Jefferson Street
Houston, Texas 77002

Environmental Conditions

Historical operations at the Site include asphalt mixing, military tank manufacturing and maintenance, vehicle maintenance, fleet refueling, pipe fabrication, and a landfill. From June 2008 to June 2009 a complete assessment of all historical and current source areas was conducted to determine the current levels of chemicals of concern (COCs) in soil and groundwater at the Site. During this time, 487 sampling points were placed throughout the Site including 50 monitoring wells, 123 temporary monitoring wells, and 314 soil borings by W&M Environmental Group, Inc. (W&M), Terracon, ESE Partners, and Four Star Environmental, Inc. These sampling points are shown on **Figure 4** in **Appendix B**. Groundwater elevations, gradient, and approximate flow direction are presented on **Figure 5** in **Appendix B**. The groundwater gradient is predominantly to the south towards Buffalo Bayou; however, the impacted groundwater does not migrate off the Site.

CITY OF HOUSTON

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EXECUTIVE SUMMARY

The following COCs were detected in soil samples at concentrations above the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 protective concentration levels (PCLs) for soil (ingestion PCL): antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc, benzene, chlorobenzene, cis-1,2-dichloroethylene (cis-1,2-DCE), cis-1,3-dichloropropane, ethylbenzene, tetrachloroethene (PCE), trichloroethene (TCE), methylene chloride, 1,2,3-trichloropropane, benzo(a)pyrene, benzidine, 2,4,-dinitrophenol, bis(2-chloroethoxy)methane, 2,6-dinitrophenol, pentachlorophenol, and total petroleum hydrocarbons (TPH). The zones of impacted soil above ingestion PCLs (also referred to as the ingestion PCL exceedance [PCLE] zone) are depicted on **Figures 6-1 to 6-33** in **Appendix B**.

The COCs detected in groundwater at concentrations above the TCEQ TRRP Tier 1 PCLs for groundwater ingestion include: arsenic, beryllium, cadmium, chromium, lead, selenium, benzene, 1,2,4-trimethylbenzene, ethylbenzene, vinyl chloride, cis-1,2-DCE , 1-methylnaphthalene, and TPH. The PCLE zone of impacted groundwater above ingestion PCLs is depicted on **Figures 7-1 to 7-9** in **Appendix B**. No COCs were identified in groundwater with concentrations exceeding the non-ingestion PCL.

The COCs detected in soil at concentrations above the TCEQ TRRP Tier 1 PCLs for total soil combined (non-ingestion PCL) include: antimony, arsenic, cadmium, copper, lead, mercury, thallium, zinc, 1,2,3-trichloropropane, benzo(a)pyrene, benzidine, and TPH. **Figures 8-1 to 8-12** in **Appendix D** depict the horizontal extents of the above listed COCs in soil that exceed non-ingestion PCLs. The non-ingestion PCLE zone is fully delineated and contained within the Designated Property. Areas that contain soil with COC concentrations exceeding the non-ingestion PCL will require remedial actions through the TCEQ Voluntary Cleanup Program (VCP).

Refer to **Tables 1 and 2** in **Appendix F** for specific values and assessment levels for concentrations of COCs above soil and groundwater ingestion and non-ingestion PCLs.

Based upon a review of registered water wells within 5 miles of the Designated Property and a 500-foot walking receptor survey, no sensitive groundwater receptors were identified in the Designated Property area. The City of Houston provides municipal drinking water service to the Designated Property and a public water supply is available for the entire 5-mile area. There are a number of Municipal water supply wells and residential supply wells within the 5-mile area reviewed. Additionally, Buffalo Bayou, which forms the southern boundary of the Designated Property, is designated for navigational use only and was not identified as a sensitive receptor.

CITY OF HOUSTON

PUBLIC WORKS AND ENGINEERING
PLANNING & DEVELOPMENT DIVISION

EXECUTIVE SUMMARY

There are 797 State-registered water wells located within approximately 5 miles of the Designated Property. Twenty two water wells are located with 0.5 miles of the Designated Property. The jurisdictional boundaries of the City of Houston, City of Jacinto City, and Galena Park are located within 5 miles of the Designated Property. The City of Jacinto City has one Water Utility Database (WUD) drinking water well and the City of Houston has 13 drinking water wells operating within 5 miles of the Designated Property. No WUD water wells are reported to be within 0.5 miles of the Designated Property.

Regulatory Setting

The Site was entered into the TCEQ VCP (ID No. 1719) on July 7, 2004. The VCP Application and Agreement were last updated in November 2008.

Appendix B

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

SITE MAPS

Seven sets of maps are attached in this section depicting relevant Designated Property information. The Designated Property is located east of downtown Houston, Texas, as presented on **Figure 1**. There are currently 28 buildings and associated parking areas, paved and unpaved areas, and City of Houston right-of-ways that encompass a majority of the Site. **Figure 2** depicts the local topography around the Designated Property, which is generally level, sloping slightly to the south towards Buffalo Bayou, which forms the southern boundary of the Site and Designated Property. **Figure 3** is a Federal Emergency Management Agency (FEMA) flood map showing that the Designated Property is in Flood Zone X, which implies "an area of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees for 1% annual chance flood." **Figure 4** presents the Site layout, Designated Property boundaries, and the locations of all sampling locations on the Designated Property.

From June 2008 to June 2009 a complete assessment of all historical and current source was conducted to determine the current levels of chemicals of concern (COCs) in soil and groundwater at the Site. During this time 487 sampling points were placed throughout the Site including 50 monitoring wells, 123 temporary monitoring wells, and 314 soil borings by W&M Environmental Group, Inc. (W&M), Terracon, ESE Partners, and Four Star Environmental, Inc. These sampling points are depicted on **Figure 4**. Groundwater elevations, gradient, and approximate flow direction are presented on **Figure 5**. The groundwater gradient is predominantly to the south towards Buffalo Bayou; however, the impacted groundwater does not migrate off the Site.

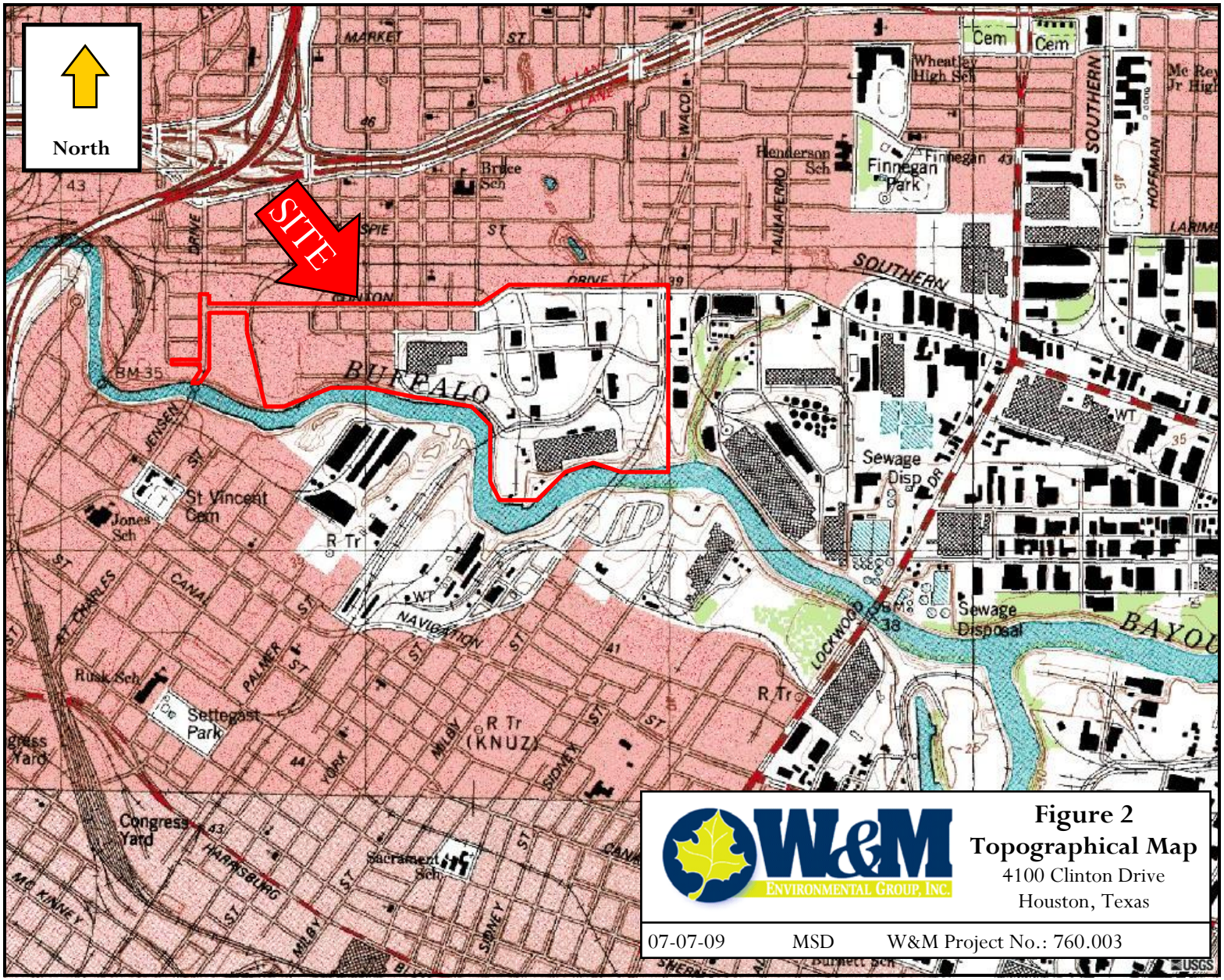
The following COCs were detected in soil samples at concentration above the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 protective concentration levels (PCLs) for soil (ingestion PCL): antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc, benzene, chlorobenzene, cis-1,2-dichloroethylene (cis-1,2-DCE), cis-1,3-dichloropropane, ethylbenzene, tetrachloroethene (PCE), trichloroethene (TCE), methylene chloride, 1,2,3-trichloropropane, benzo(a)pyrene, benzidine, 2,4,-dinitrophenol, bis(2-chloroethoxy)methane, 2,6-dinitrophenol, pentachlorophenol, and total petroleum hydrocarbons (TPH). The zones of impacted soil above ingestion PCLs (also referred to as the ingestion PCL exceedance [PCLE] zone) are depicted on **Figures 6-1 to 6-33.** [Note: The TRRP PCLs for metals and TPH concentrations in soil at the Site are the 30-acre source area PCLs]

Appendix B

The COCs detected in groundwater at concentrations above the TCEQ TRRP Tier 1 PCLs for groundwater ingestion include: arsenic, beryllium, cadmium, chromium, lead, selenium, benzene, 1,2,4-trimethylbenzene, ethylbenzene, vinyl chloride, cis-1,2-DCE , 1-methylnaphthalene, and TPH. The PCLE zones of impacted groundwater above ingestion PCLs are depicted on **Figures 7-1 to 7-9.**

Figure 1
Site Location
4100 Clinton Drive
Houston, Texas

07-07-09 MSD W&M Project No.: 760.002

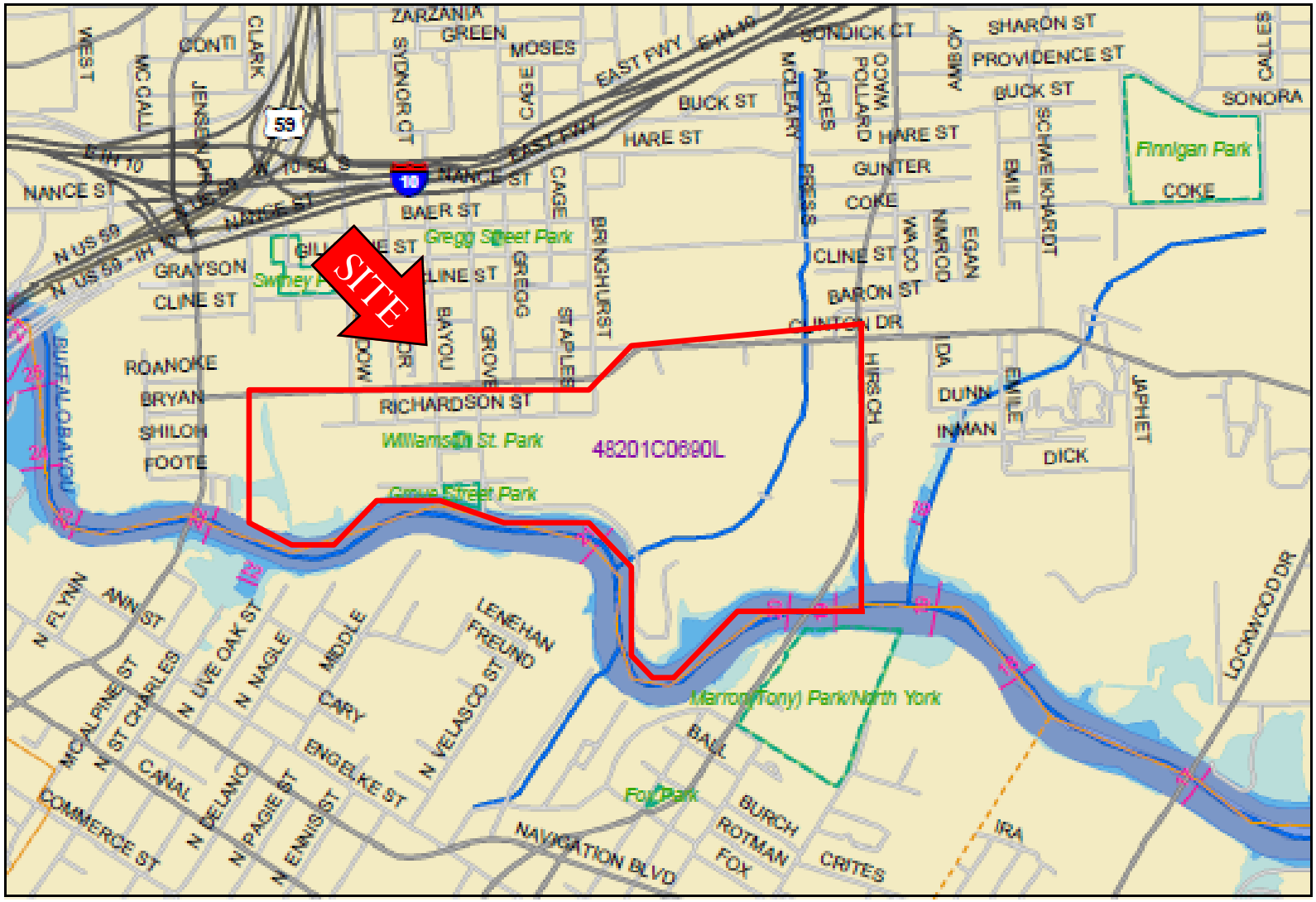


W&M ENVIRONMENTAL GROUP, INC.

Figure 2
Topographical Map
4100 Clinton Drive
Houston, Texas

07-07-09 MSD W&M Project No.: 760.003

FEMA Floodplains Effective June 18, 2007



All Elevation Data Based on NAVD 1988 2001 Adjustment

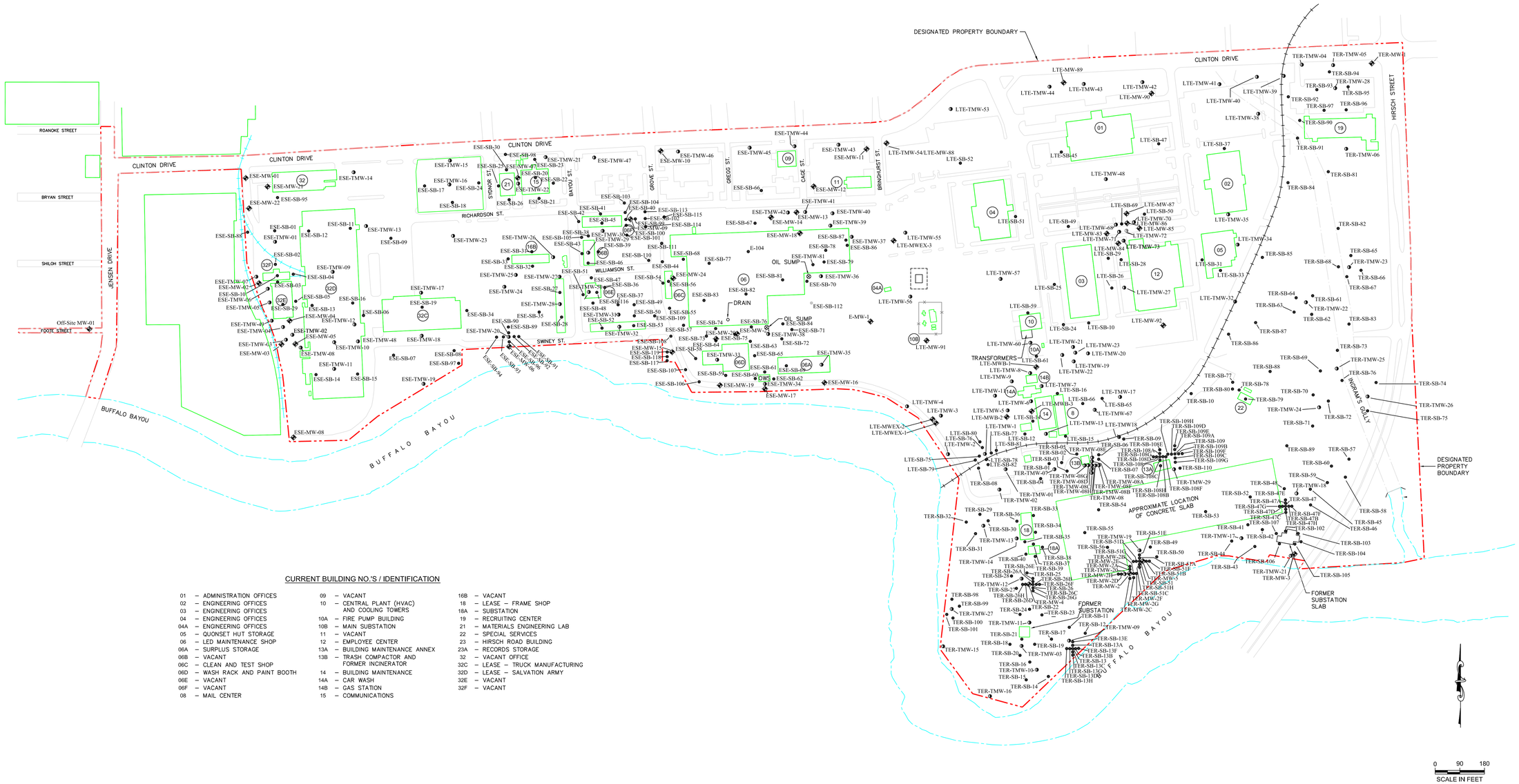
Legend

Highways	Base Flood Elevation	Watershed Boundaries
Streets/Railroads	Floodway (FEMA Zone AE)	Parcels
Major Roads	1% Floodplains (100 YR or FEMA Zone AE)	City Boundaries
10' contours	Coastal Floodplains (100 YR or FEMA Zone VE)	Zip Code Boundaries
2' contours	0.2% Floodplains (500 YR or FEMA Zone X)	FIRM Panel
Streams	Areas of Lowest Risk (FEMA Zone X)	Parks

W&M ENVIRONMENTAL GROUP, INC.

Figure 3
Flood Map
4100 Clinton Drive
Houston, Texas

7-06-09 MSD W&M Project No.: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

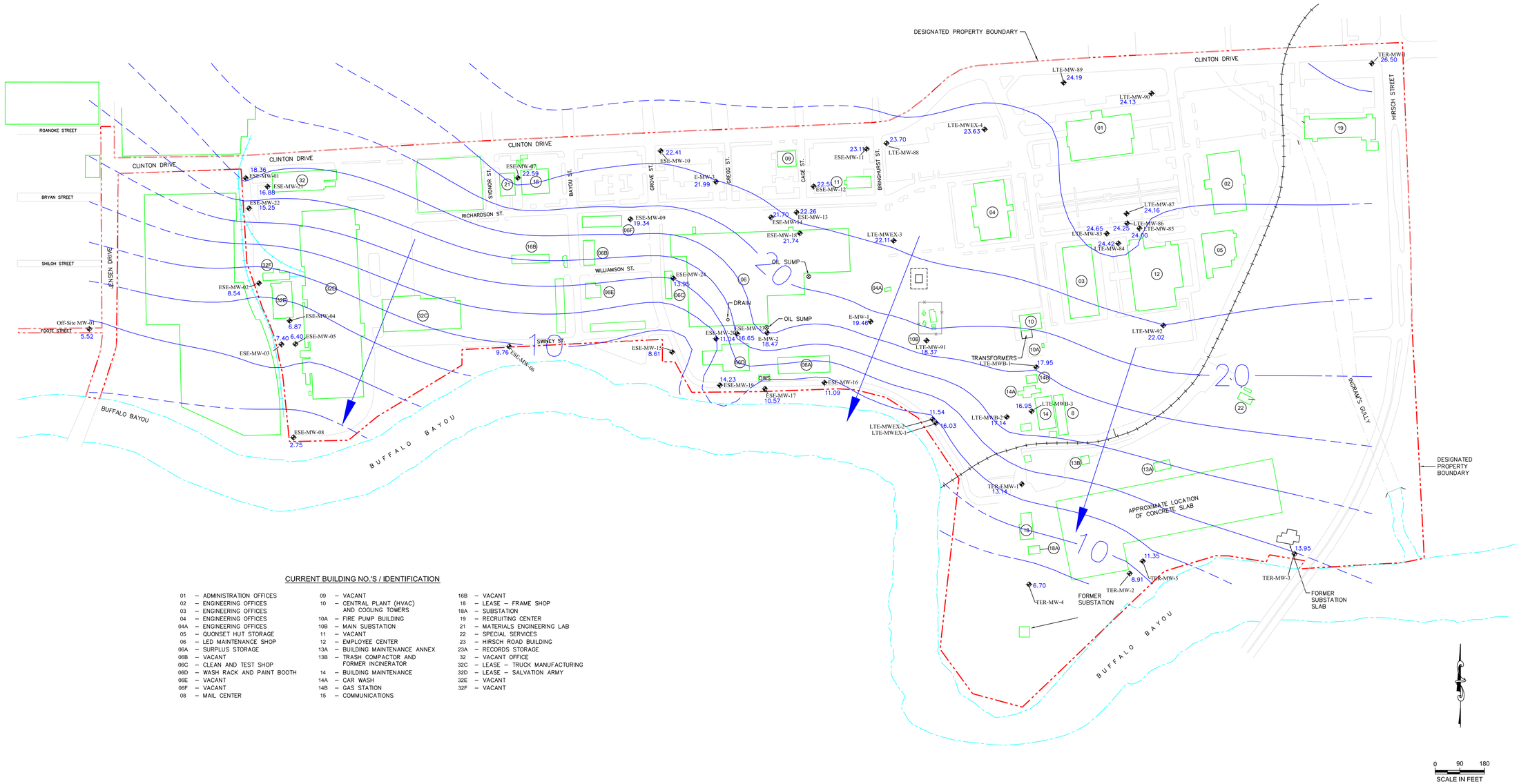
- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL

FIGURE 4
SAMPLE LOCATION MAP

KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

Date: July 1, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	18A	– SUBSTATION
04	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	11	– VACANT	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	12	– EMPLOYEE CENTER	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	13A	– BUILDING MAINTENANCE ANNEX	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	23A	– RECORDS STORAGE
06B	– VACANT	14	– BUILDING MAINTENANCE	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP	14A	– CAR WASH	32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14B	– GAS STATION	32D	– LEASE – SALVATION ARMY
06E	– VACANT	15	– COMMUNICATIONS	32E	– VACANT
06F	– VACANT			32F	– VACANT
08	– MAIL CENTER				

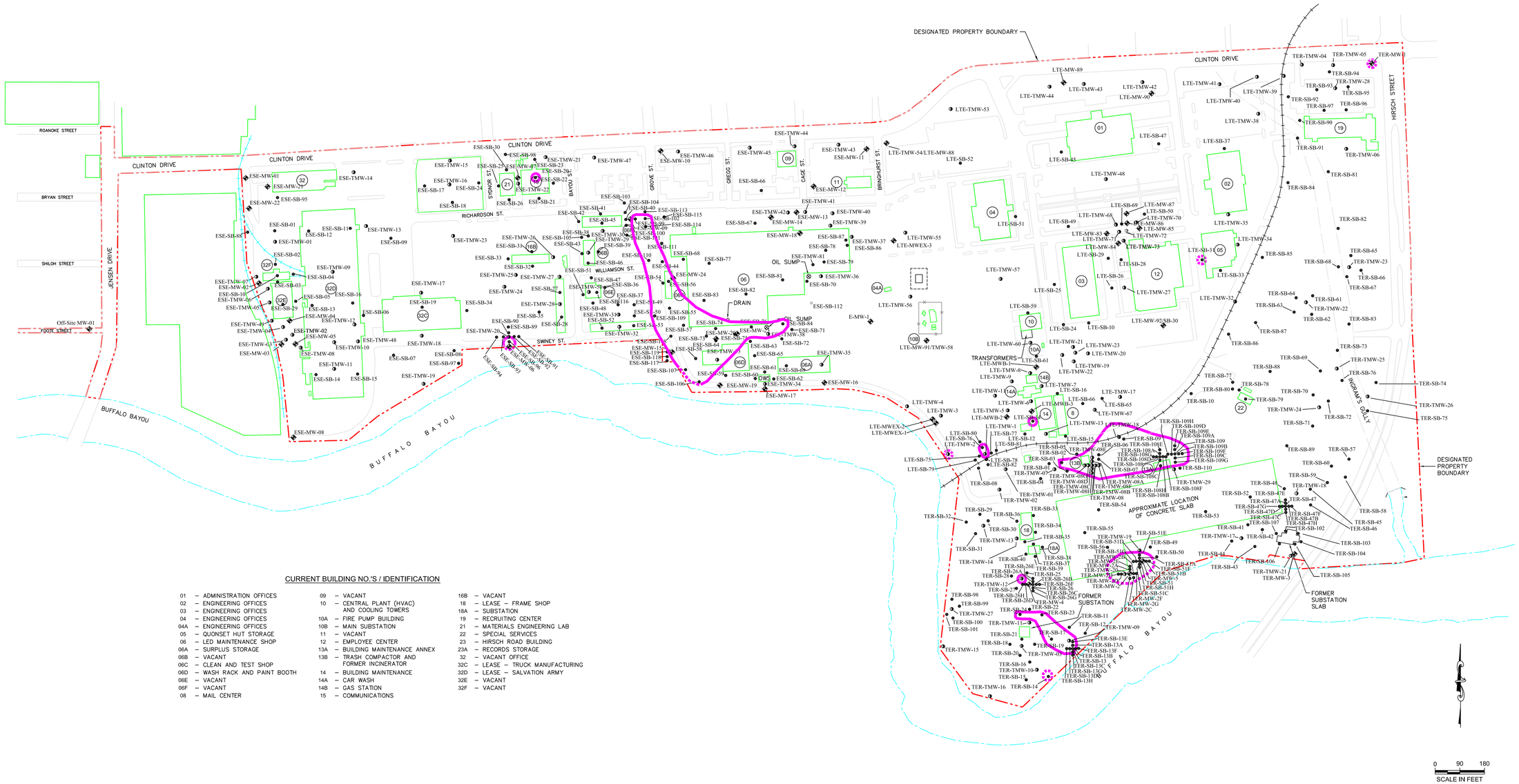
LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (2 FT CONTOURS)
- GROUNDWATER FLOW DIRECTION

Date: August 16, 2009 | Edited by: PTF | MSD | W&M Project Number: 760.003

FIGURE 5
GROUNDWATER FLOW MAP
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

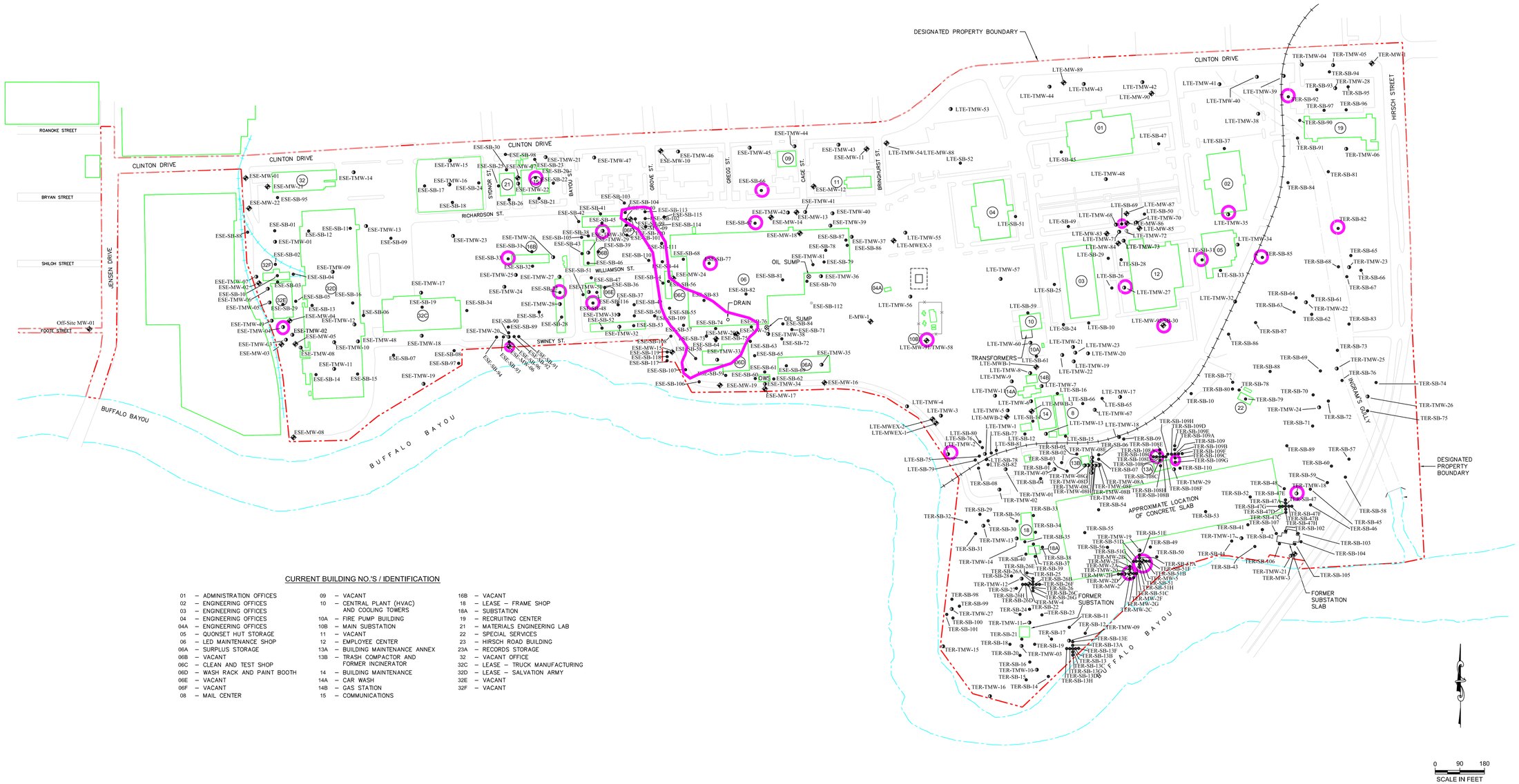
LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Antimony in soil with concentrations exceeding the ingestion PCL of 2.7 mg/kg.

FIGURE 6–1
SOIL INGESTION PCLE ZONE MAP
ANTIMONY
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Arsenic in soil with concentrations exceeding the ingestion PCL of 5.9 mg/kg.

FIGURE 6–2
SOIL INGESTION PCLE ZONE MAP
ARSENIC
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
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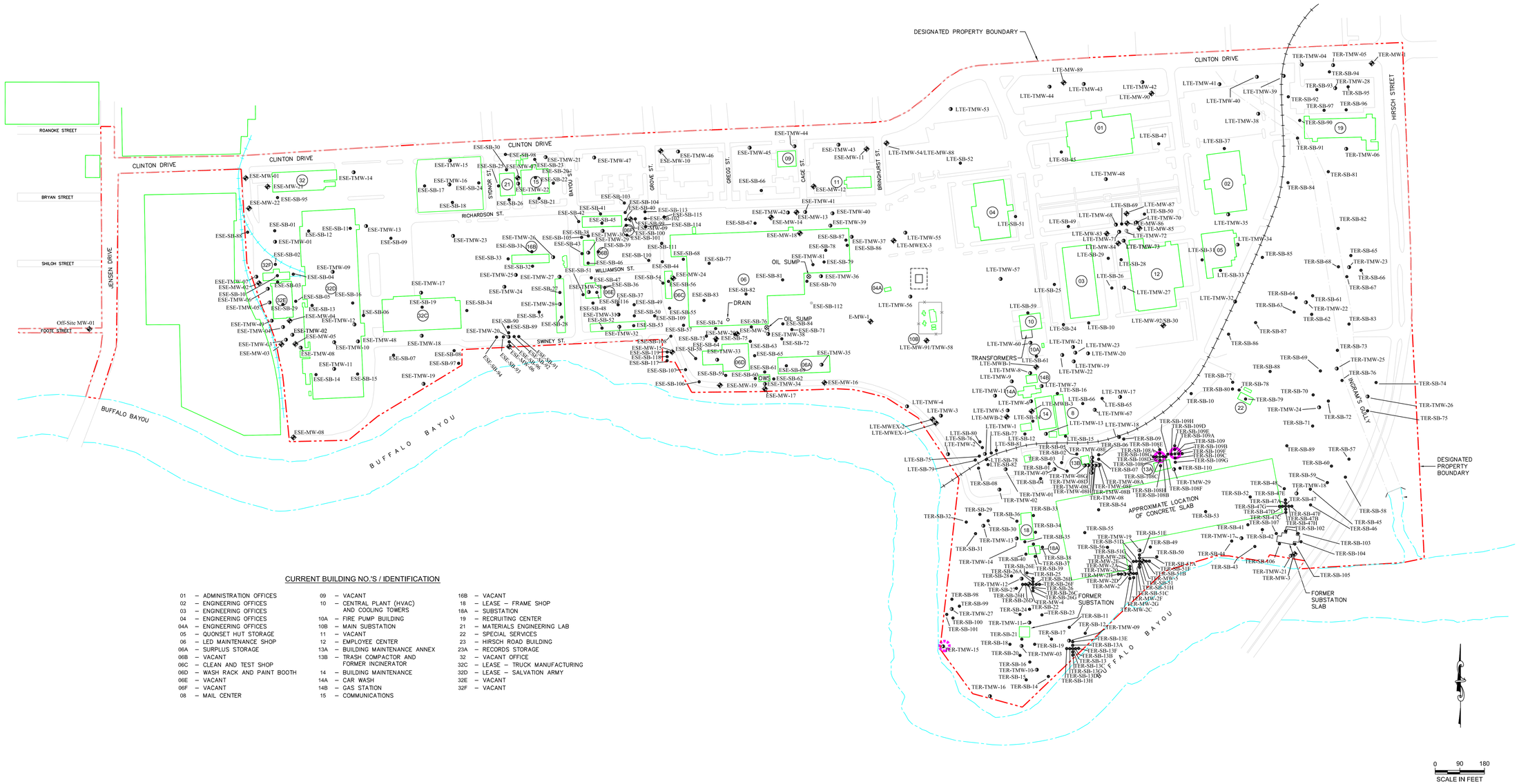
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Barium in soil with concentrations exceeding the ingestion PCL of 300 mg/kg.

FIGURE 6–3
SOIL INGESTION PCLE ZONE MAP
BARIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
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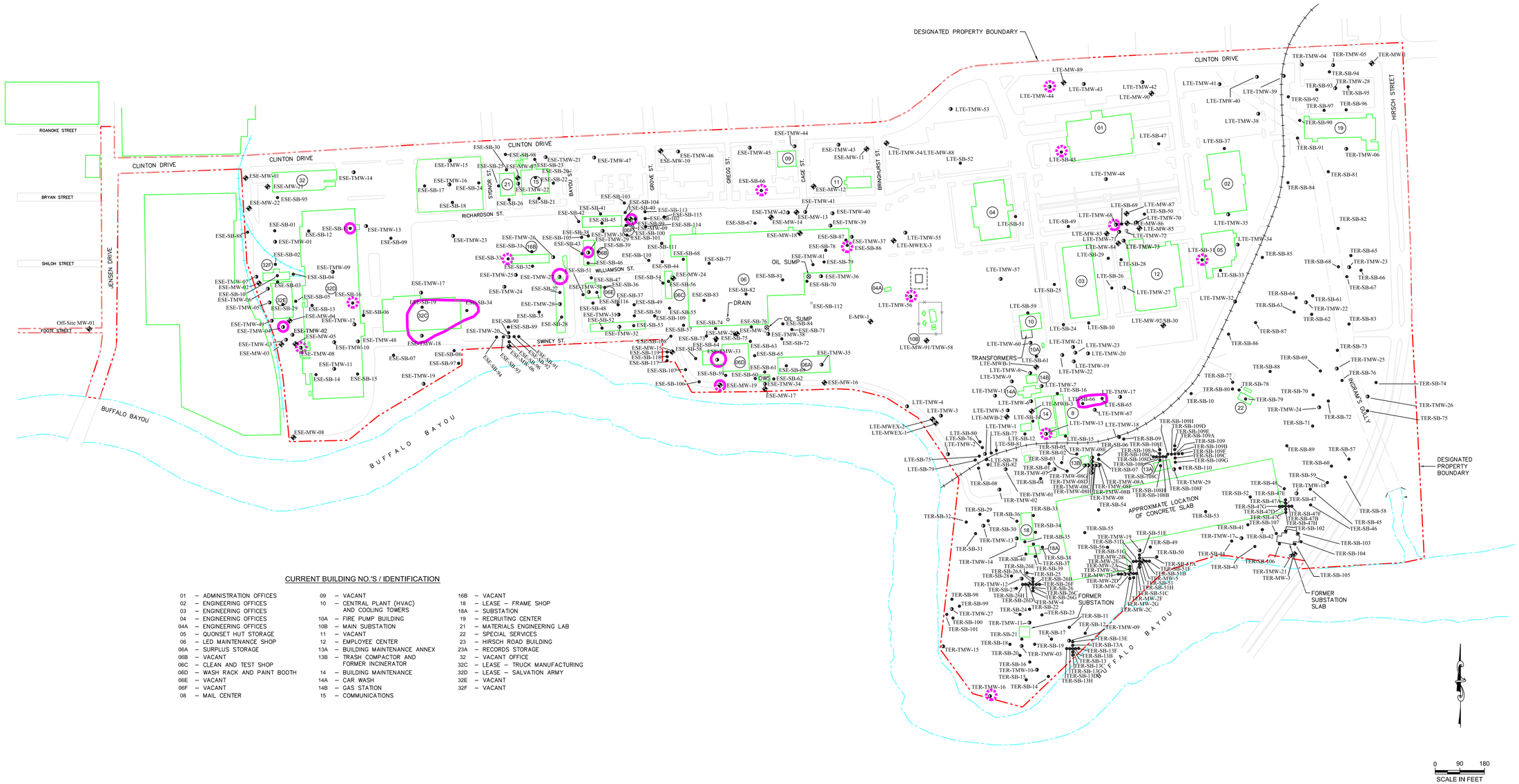
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

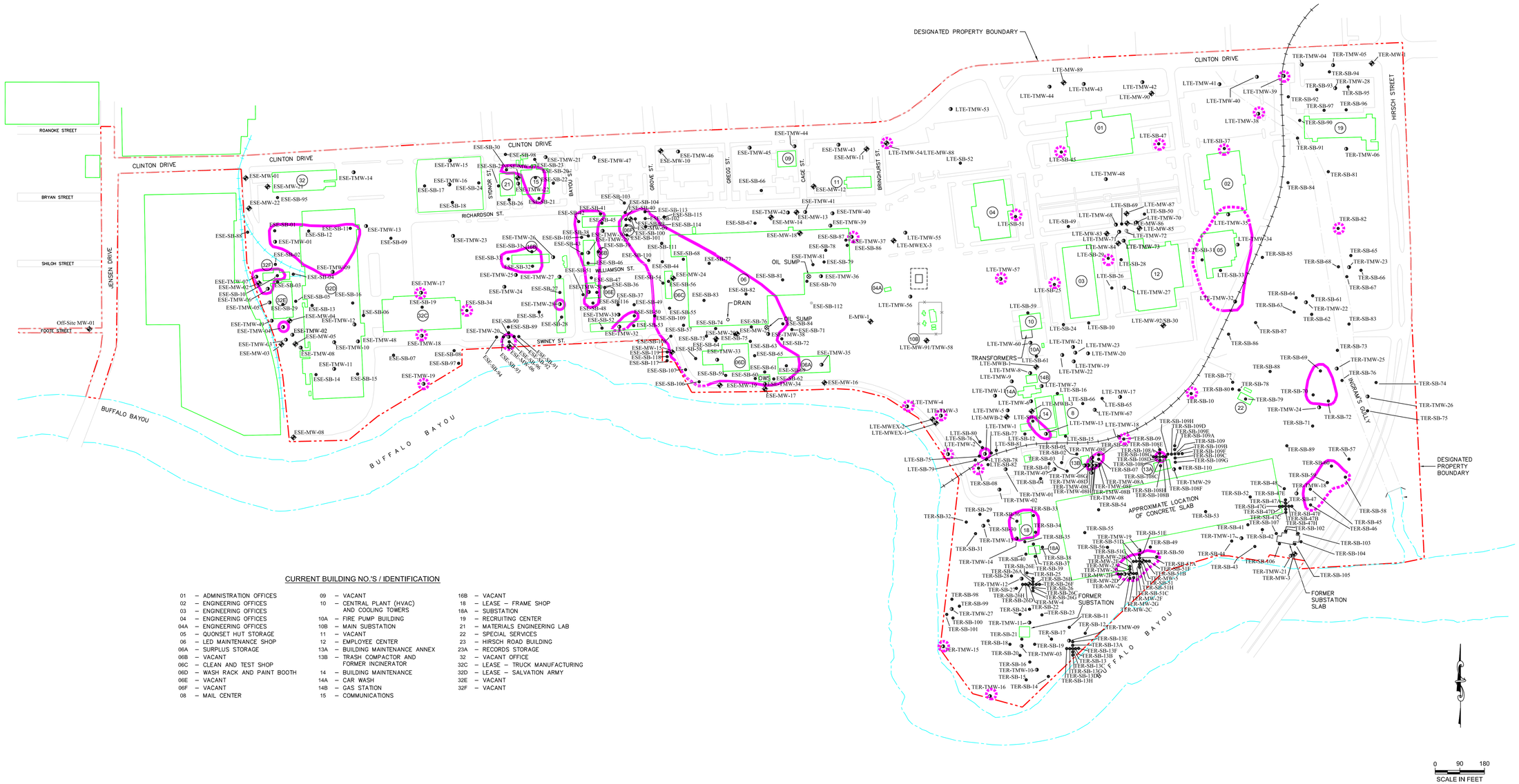
LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Beryllium in soil with concentrations exceeding the ingestion PCL of 1.5 mg/kg.

FIGURE 6–4
SOIL INGESTION PCLE ZONE MAP
BERYLLIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Cadmium in soil with concentrations exceeding the ingestion PCL of 0.75 mg/kg.

FIGURE 6–5
SOIL INGESTION PCLE ZONE MAP
CADMIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
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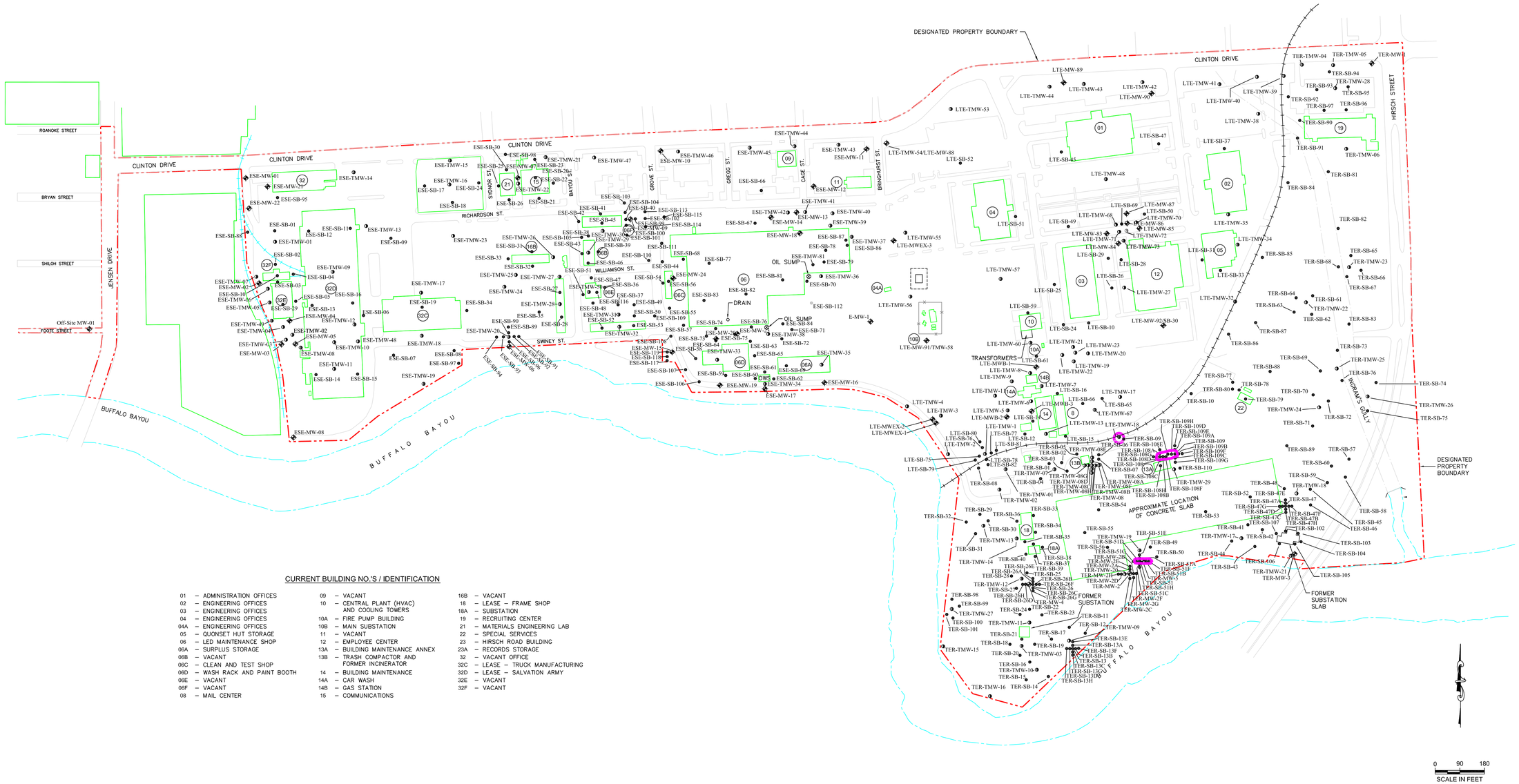
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Chromium in soil with concentrations exceeding the ingestion PCL of 1,200 mg/kg.

FIGURE 6–6
SOIL INGESTION PCLE ZONE MAP
CHROMIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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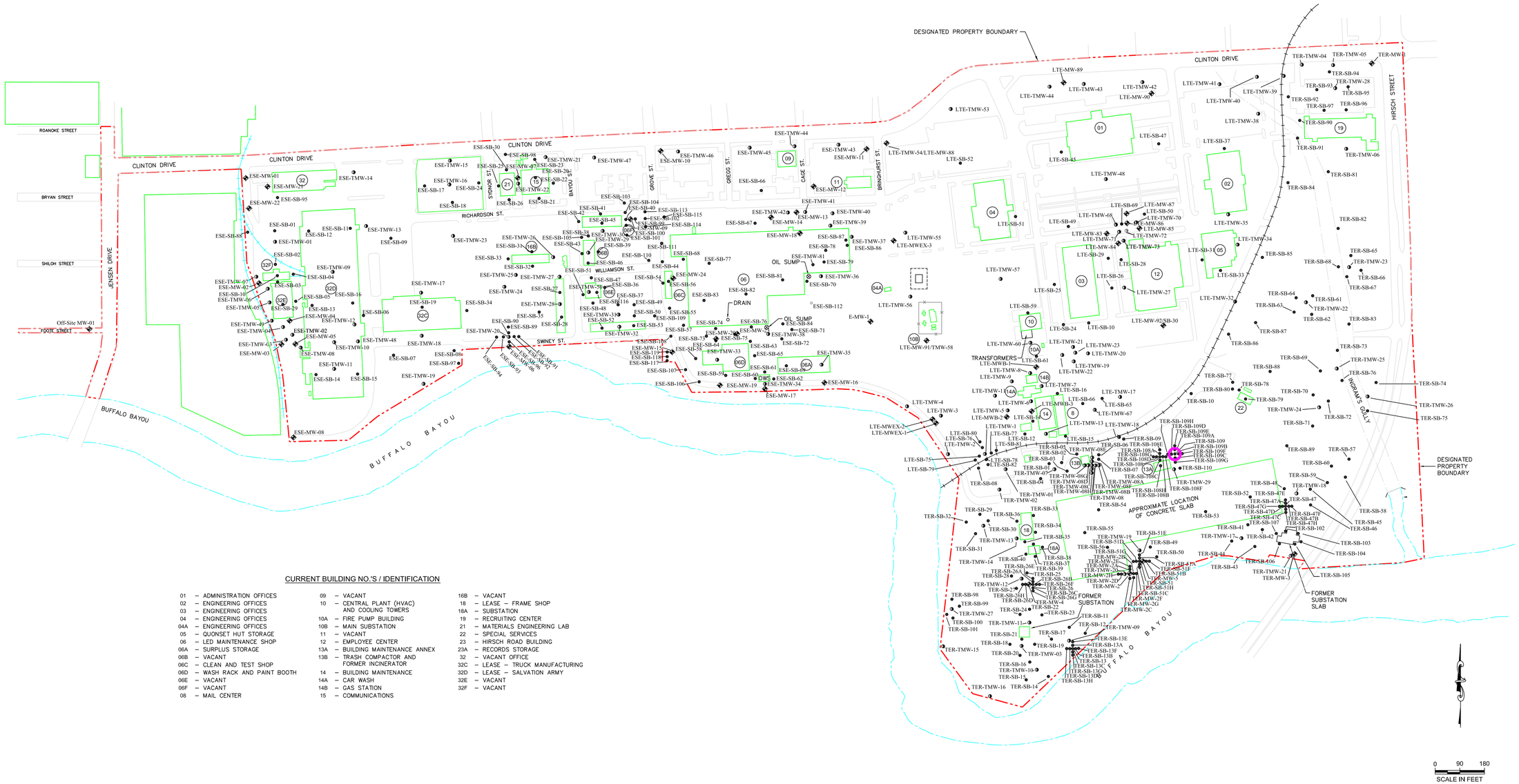

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Hexavalent Chromium in soil with concentrations exceeding the ingestion PCL of 20 mg/kg.

FIGURE 6–7
SOIL INGESTION PCLE ZONE MAP
HEXAVALENT CHROMIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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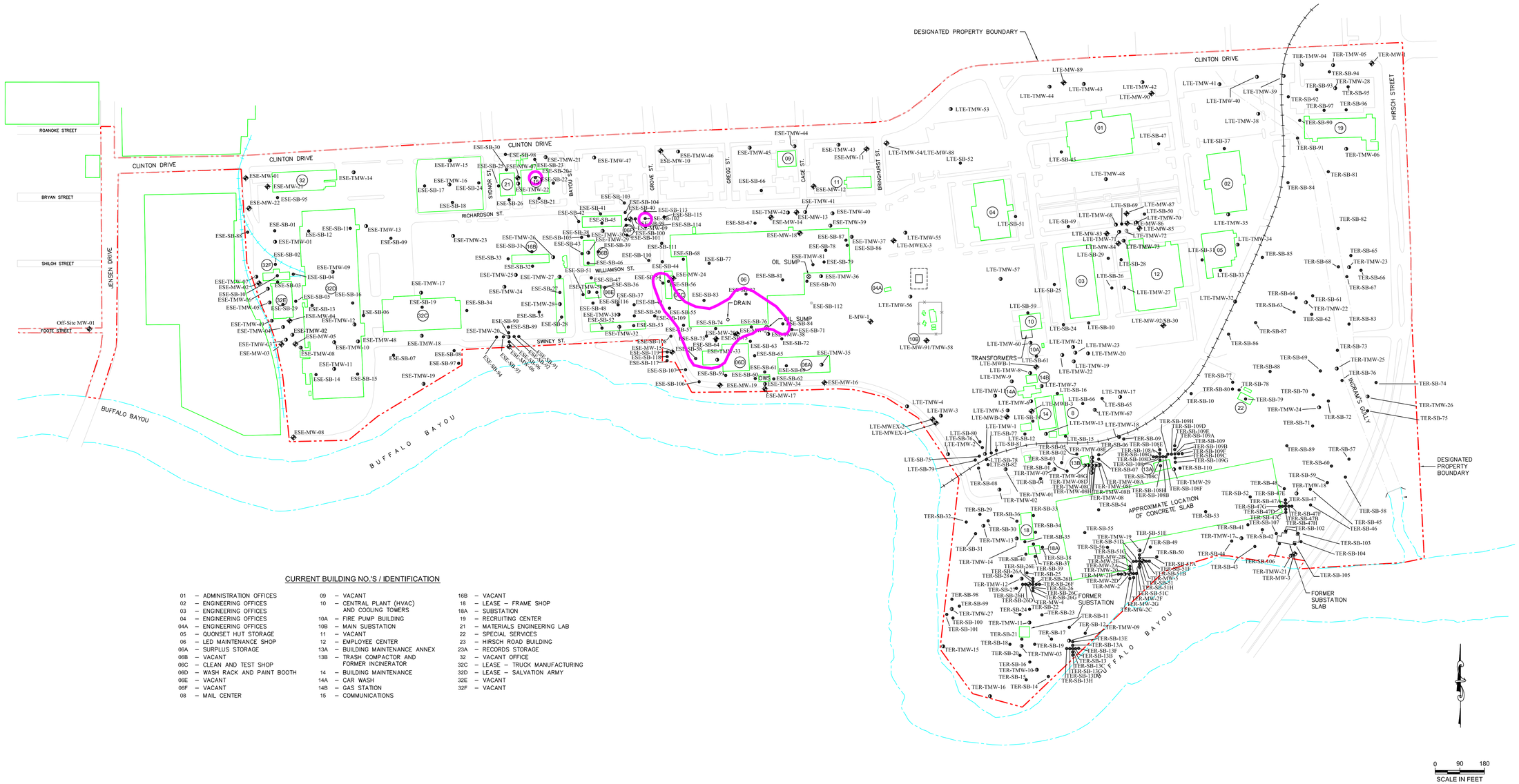

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Copper in soil with concentrations exceeding the ingestion PCL of 520 mg/kg.

FIGURE 6–8
SOIL INGESTION PCLE ZONE MAP
COPPER
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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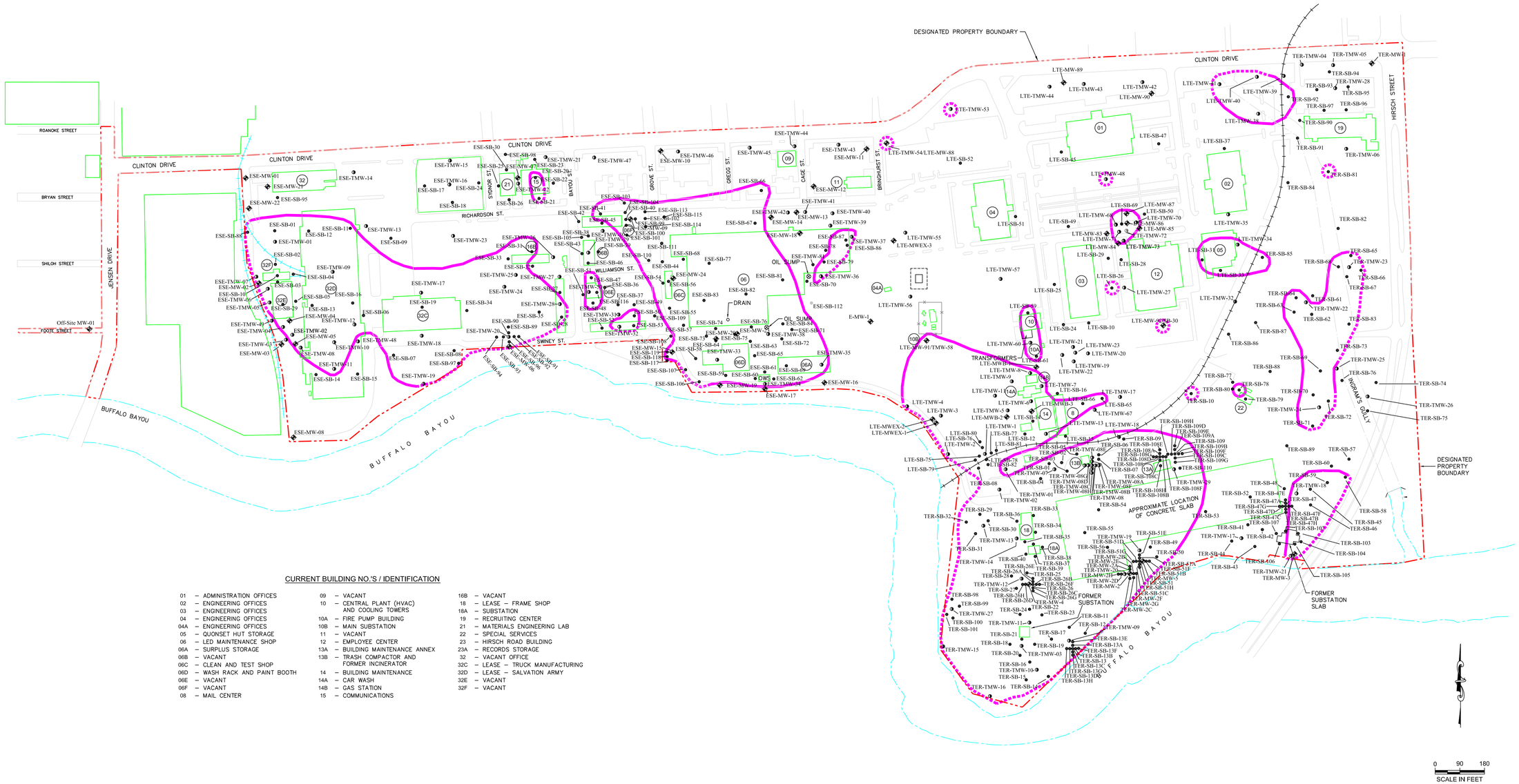

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	18A	– SUBSTATION
04	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	11	– VACANT	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	12	– EMPLOYEE CENTER	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	13A	– BUILDING MAINTENANCE ANNEX	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	23A	– RECORDS STORAGE
06B	– VACANT	14	– BUILDING MAINTENANCE	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP	14A	– CAR WASH	32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14B	– GAS STATION	32D	– LEASE – SALVATION ARMY
06E	– VACANT	15	– COMMUNICATIONS	32E	– VACANT
06F	– VACANT			32F	– VACANT
08	– MAIL CENTER				

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Lead in soil with concentrations exceeding the ingestion PCL of 15 mg/kg.

FIGURE 6–9
SOIL INGESTION PCLE ZONE MAP
LEAD
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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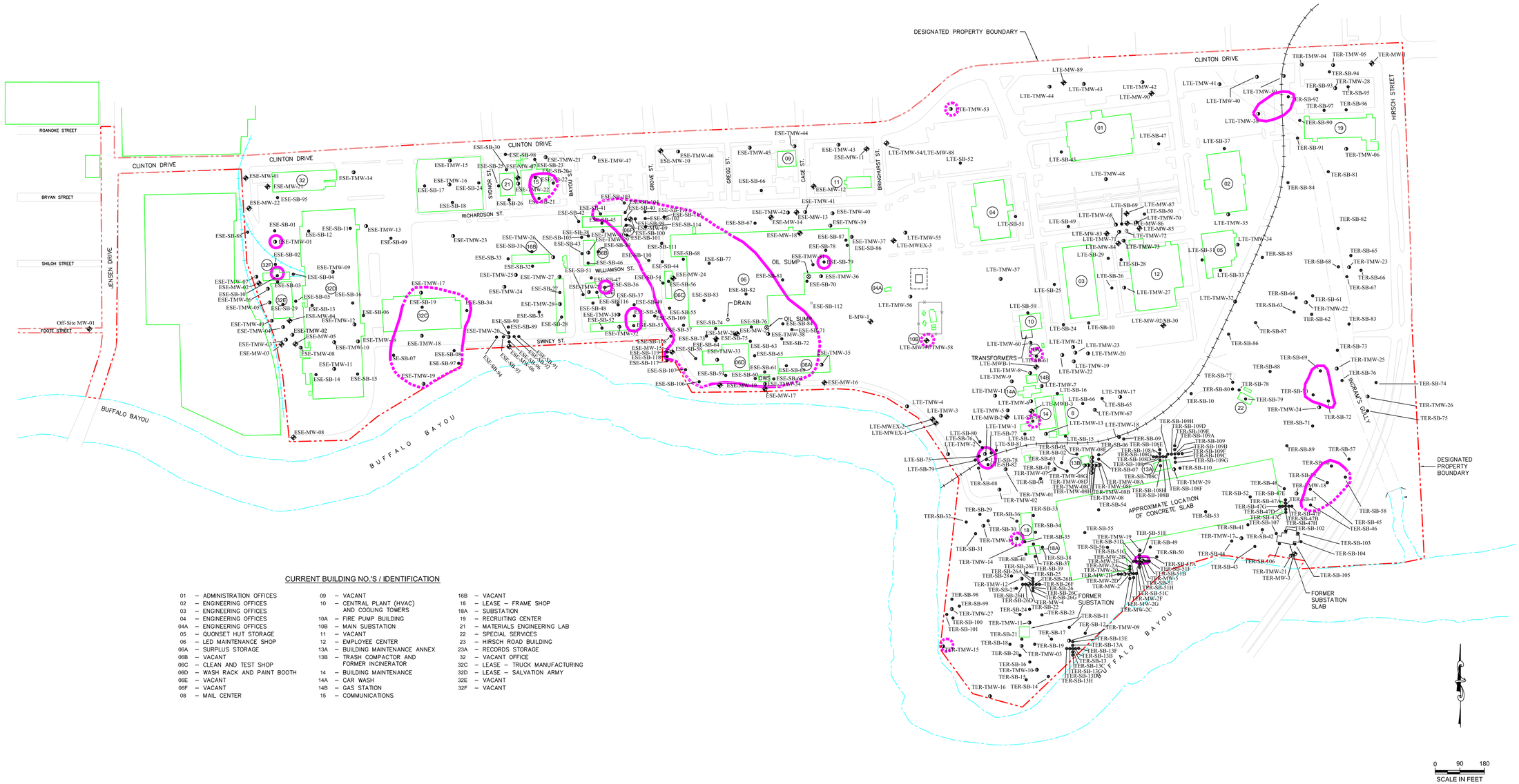

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Mercury in soil with concentrations exceeding the ingestion PCL of 0.04 mg/kg.

FIGURE 6–10
SOIL INGESTION PCLE ZONE MAP
MERCURY
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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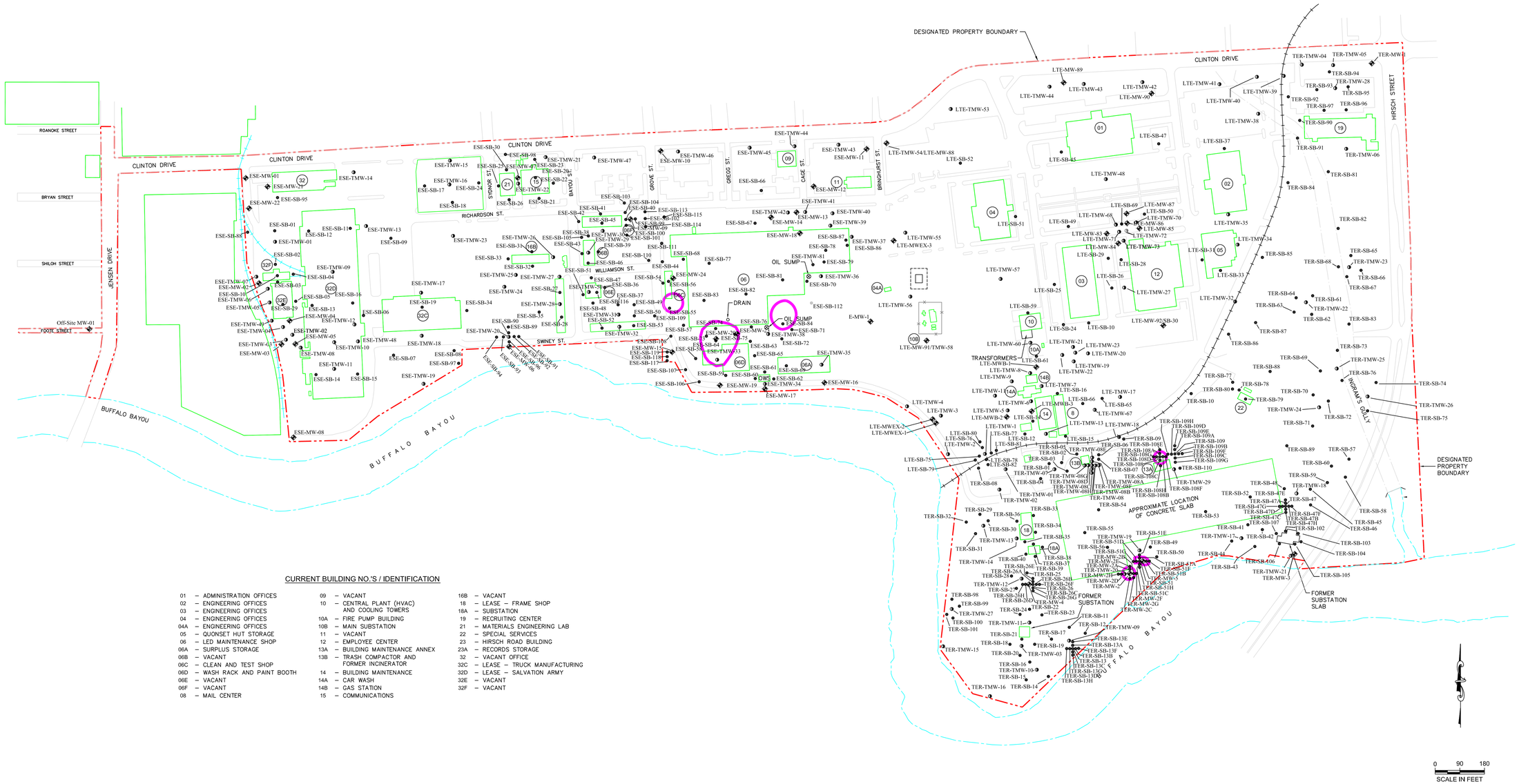

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Nickel in soil with concentrations exceeding the ingestion PCL of 160 mg/kg.

FIGURE 6–11
SOIL INGESTION PCLE ZONE MAP
NICKEL
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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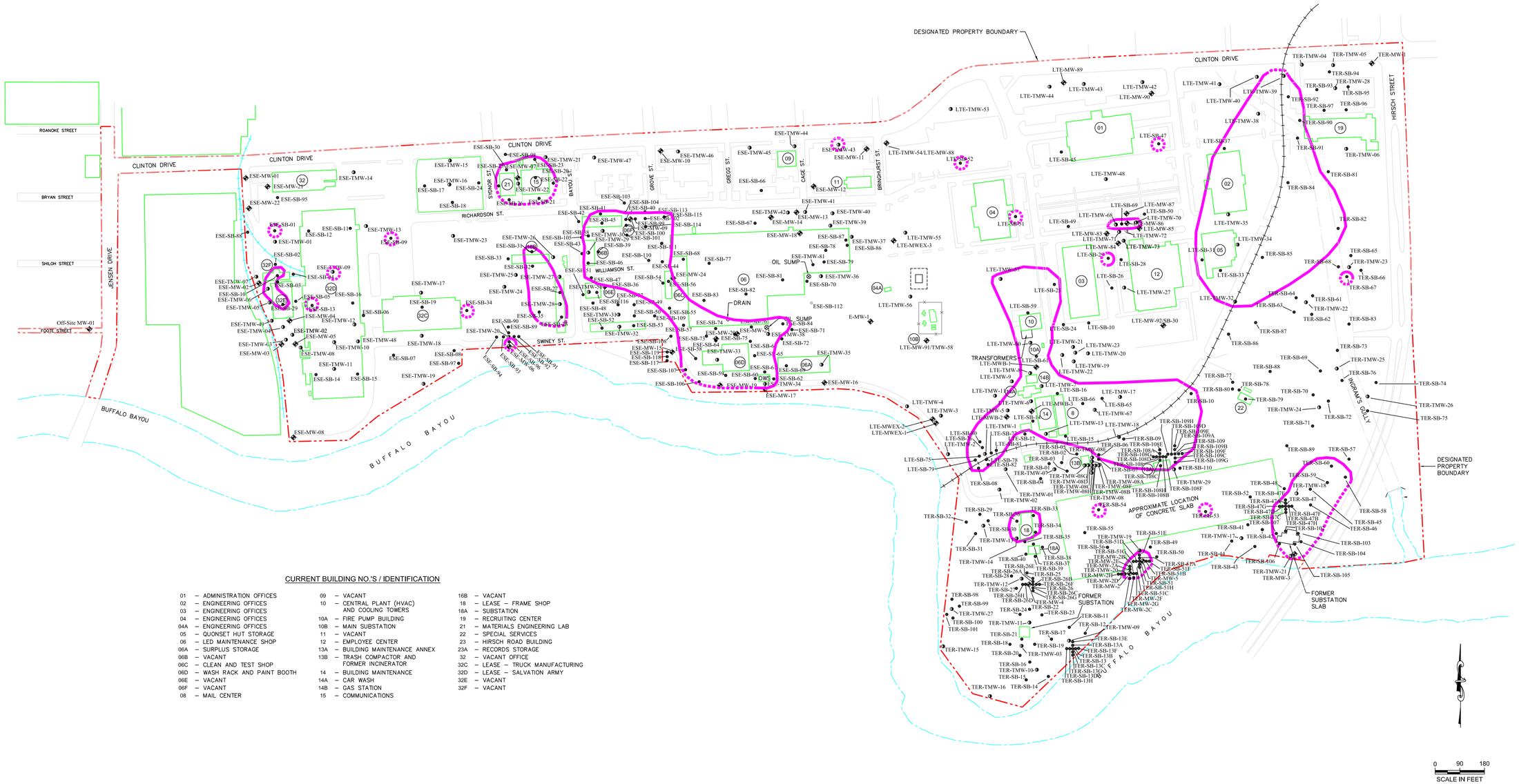

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Selenium in soil with concentrations exceeding the ingestion PCL of 1.1 mg/kg.

FIGURE 6–12
SOIL INGESTION PCLE ZONE MAP
SELENIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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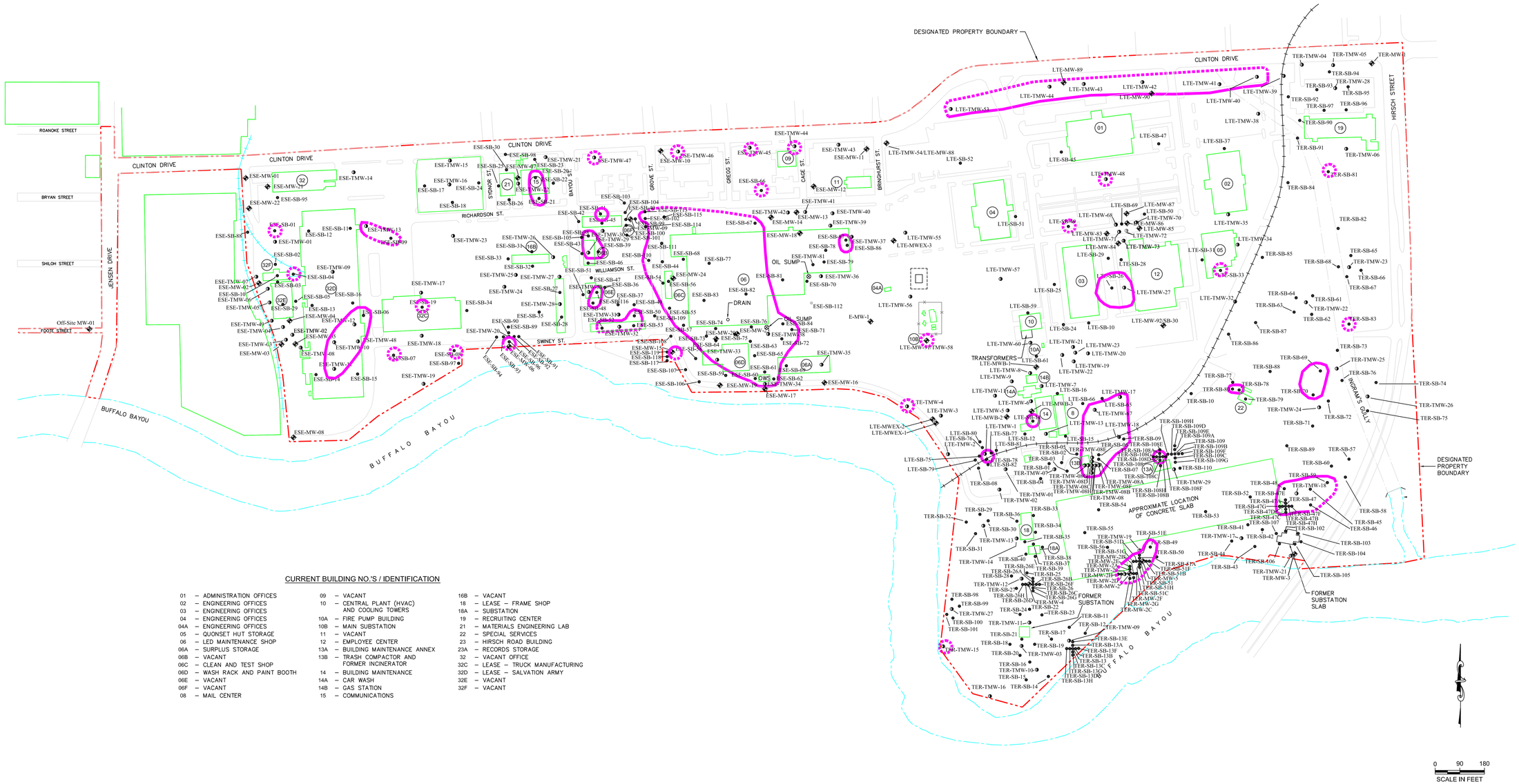

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Silver in soil with concentrations exceeding the ingestion PCL of 0.24 mg/kg.

FIGURE 6–13
SOIL INGESTION PCLE ZONE MAP
SILVER
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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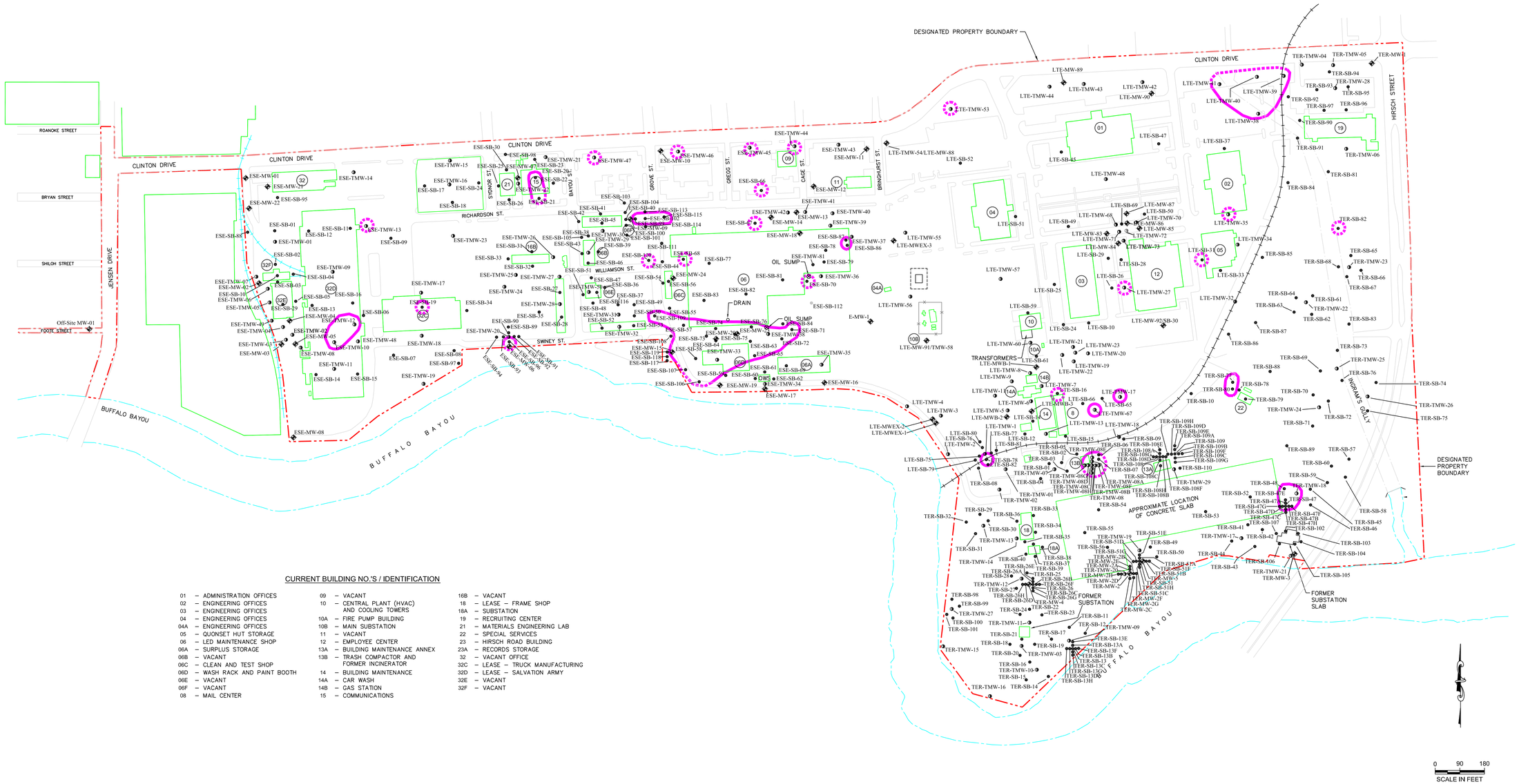

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Thallium in soil with concentrations exceeding the ingestion PCL of 0.9 mg/kg.

FIGURE 6–14
SOIL INGESTION PCLE ZONE MAP
THALLIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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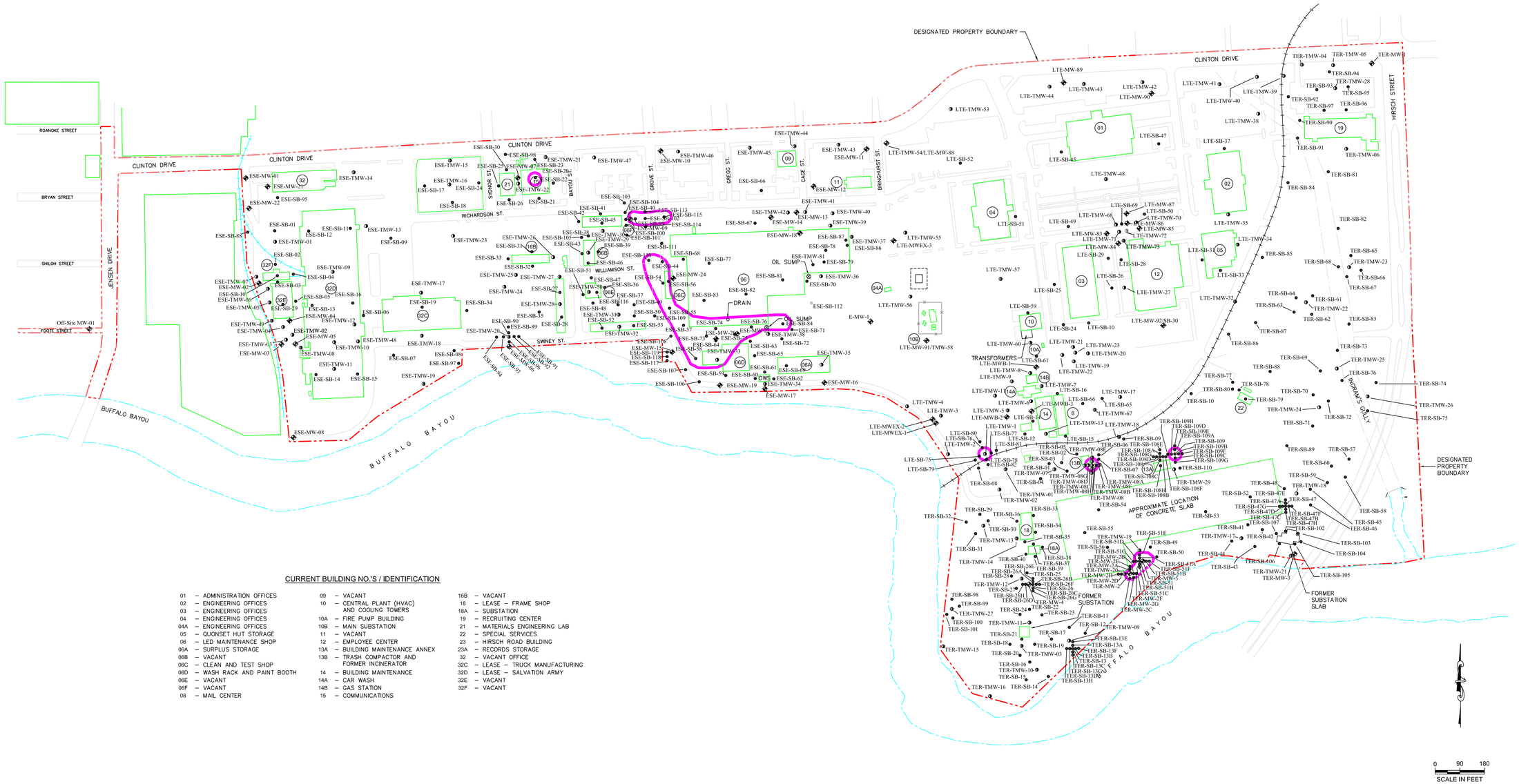

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Zinc in soil with concentrations exceeding the ingestion PCL of 1,200 mg/kg.

FIGURE 6–15
SOIL INGESTION PCLE ZONE MAP
ZINC
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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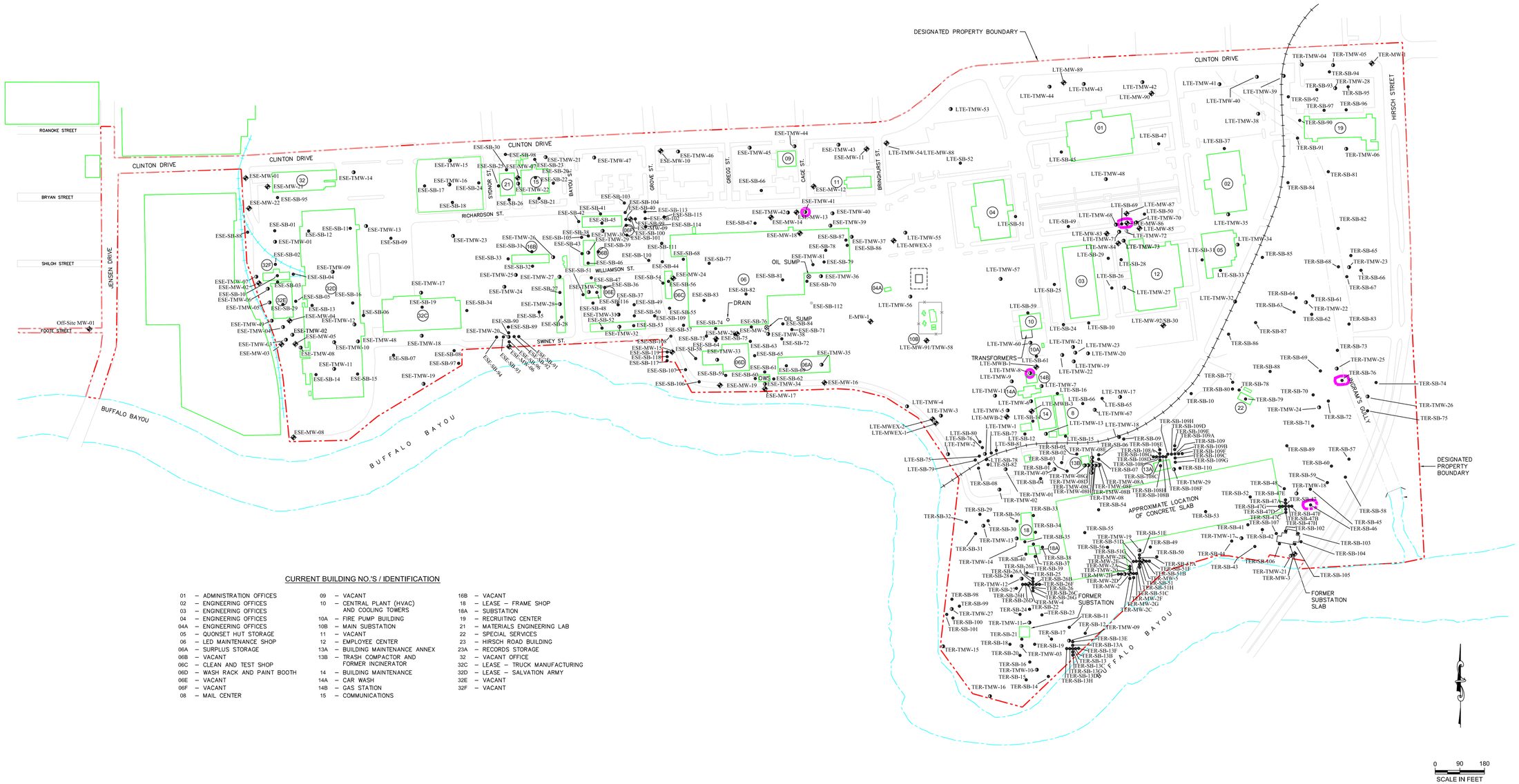

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Benzene in soil with concentrations exceeding the ingestion PCL of 0.026 mg/kg.

FIGURE 6–16
SOIL INGESTION PCLE ZONE MAP
BENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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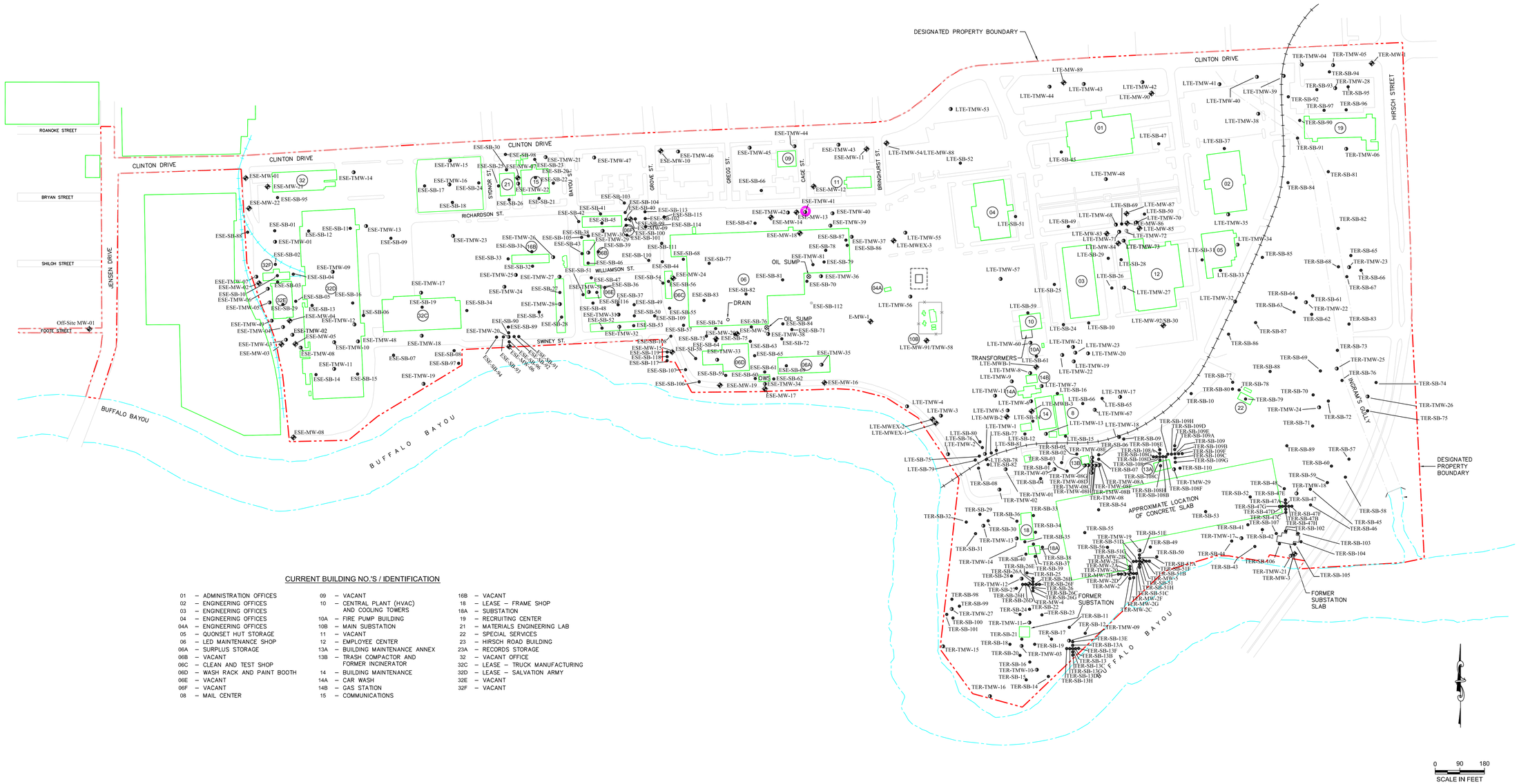

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Toluene in soil with concentrations exceeding the ingestion PCL of 8.2 mg/kg.

FIGURE 6–17
SOIL INGESTION PCLE ZONE MAP
TOLUENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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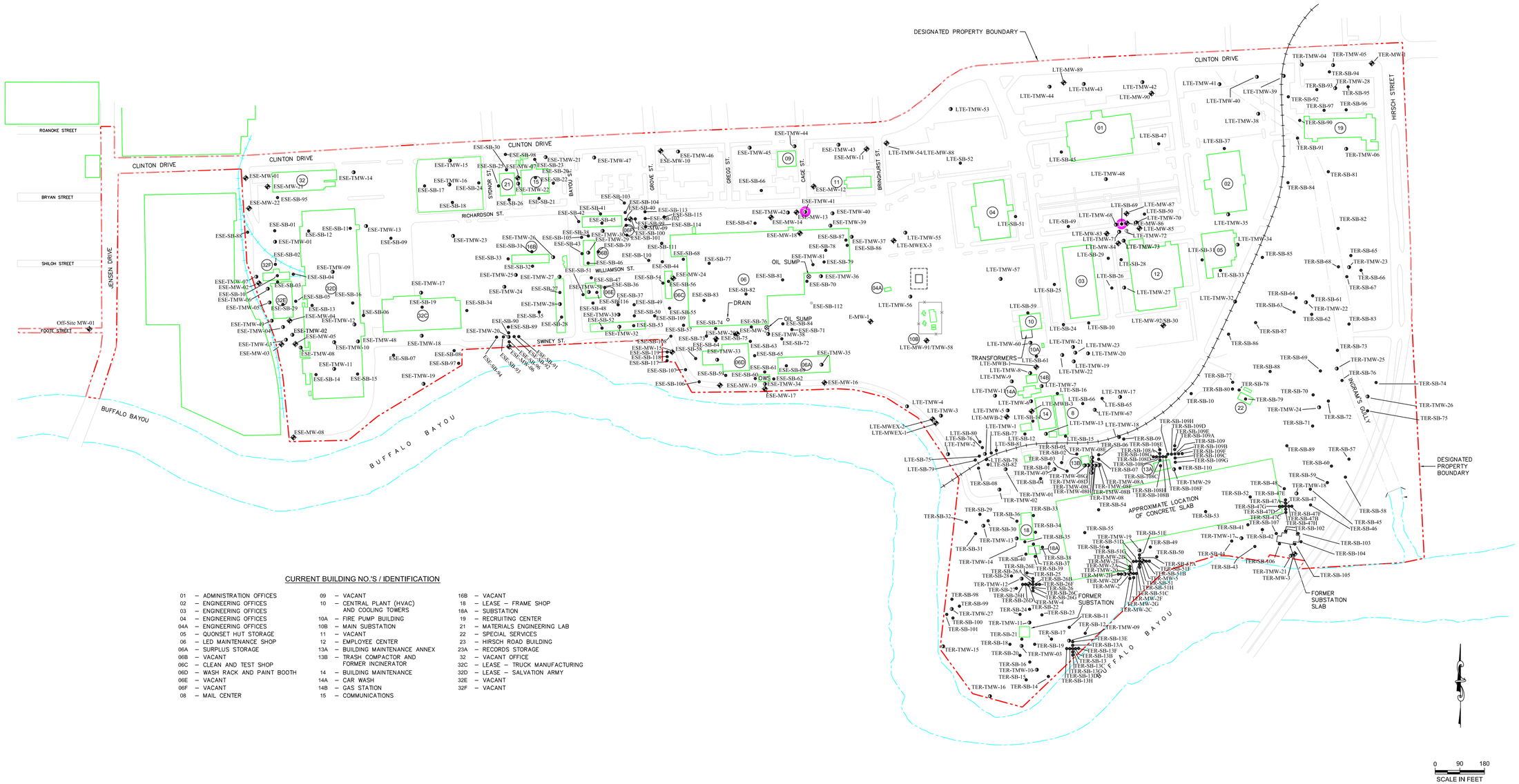

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Ethylbenzene in soil with concentrations exceeding the ingestion PCL of 7.6 mg/kg.

FIGURE 6–18
SOIL INGESTION PCLE ZONE MAP
ETHYLBENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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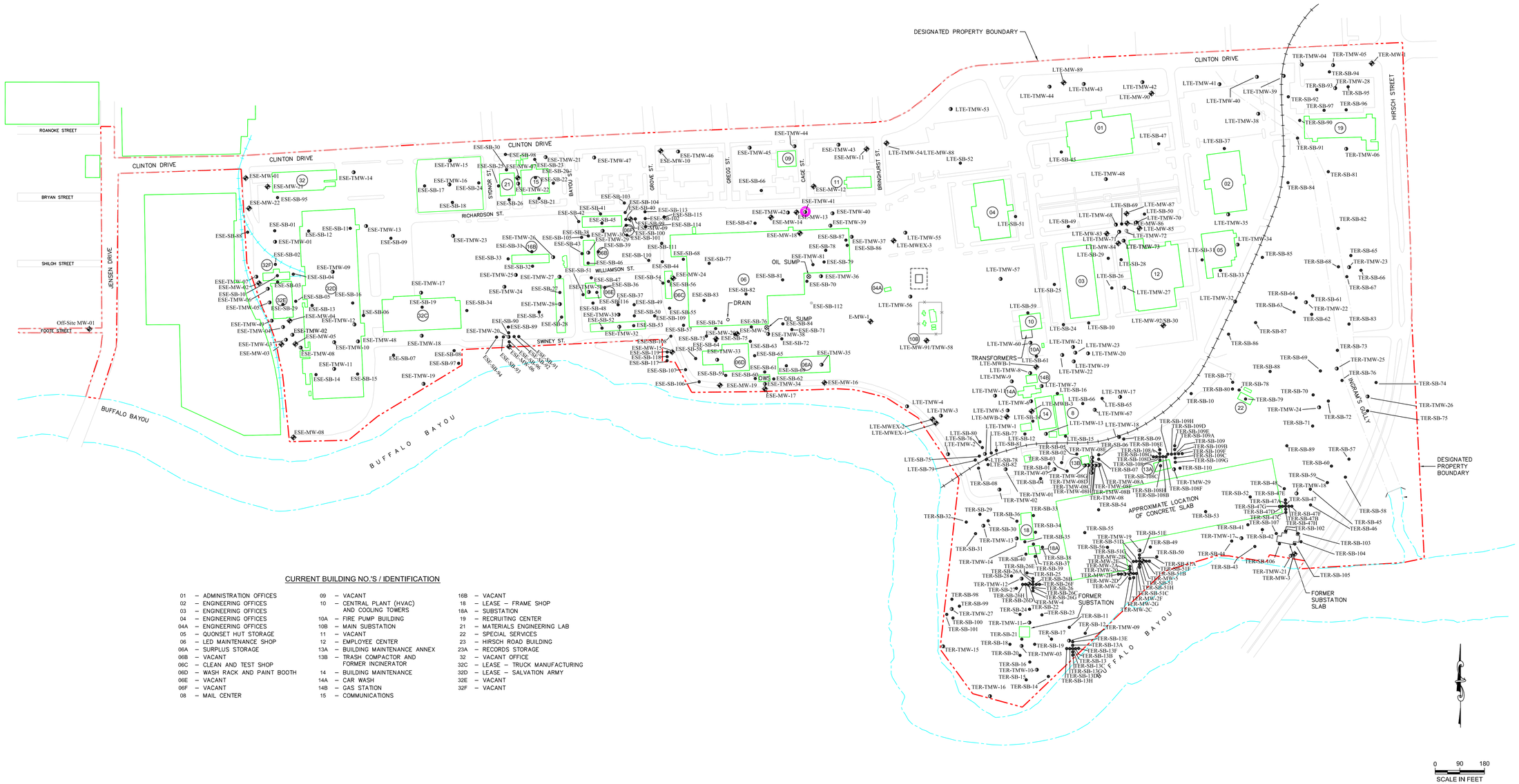

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Xylenes in soil with concentrations exceeding the ingestion PCL of 120 mg/kg.

FIGURE 6–19
SOIL INGESTION PCLE ZONE MAP
XYLENES
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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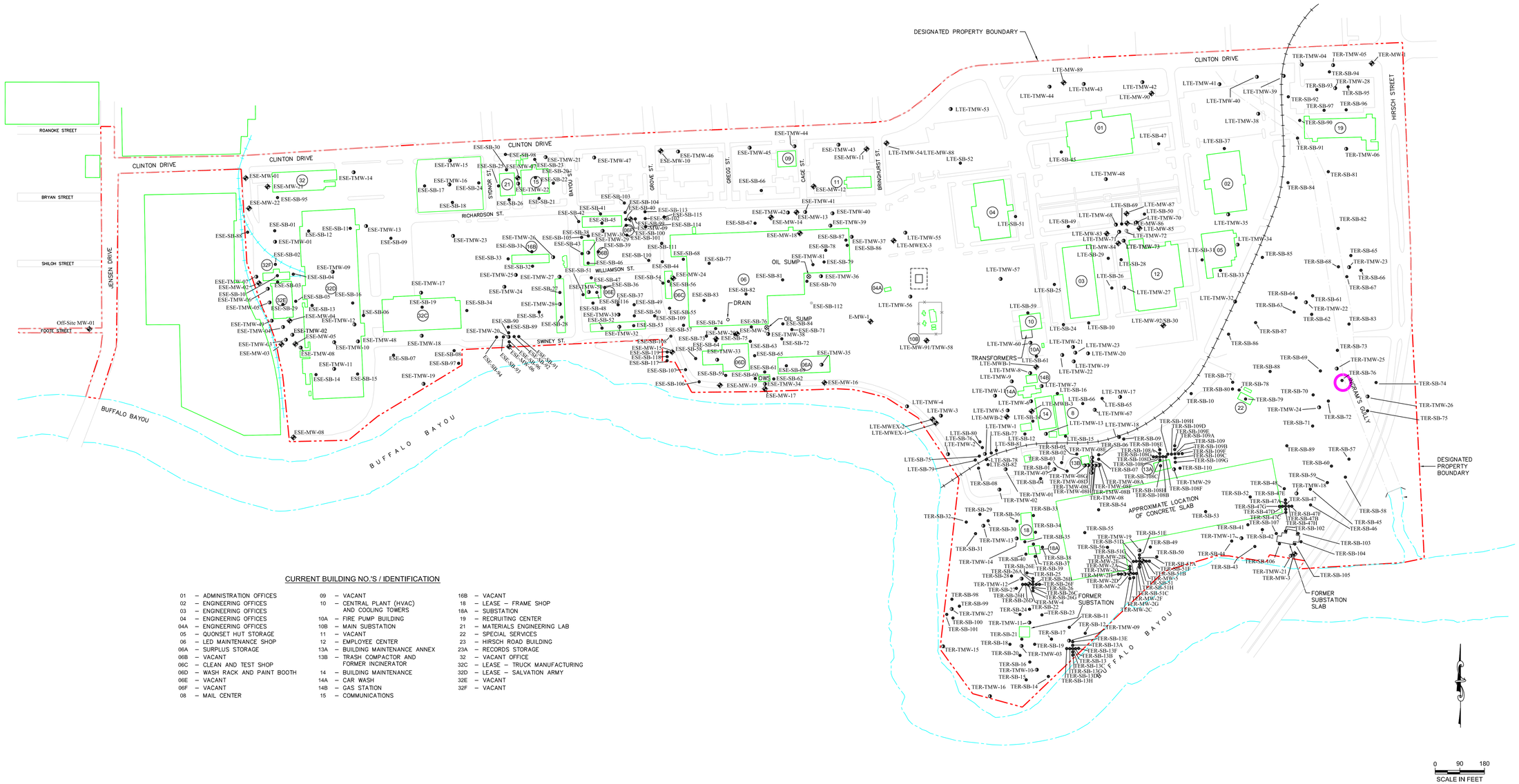

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Chlorobenzene in soil with concentrations exceeding the ingestion PCL of 1.1 mg/kg.

FIGURE 6–20
SOIL INGESTION PCLE ZONE MAP
CHLOROBENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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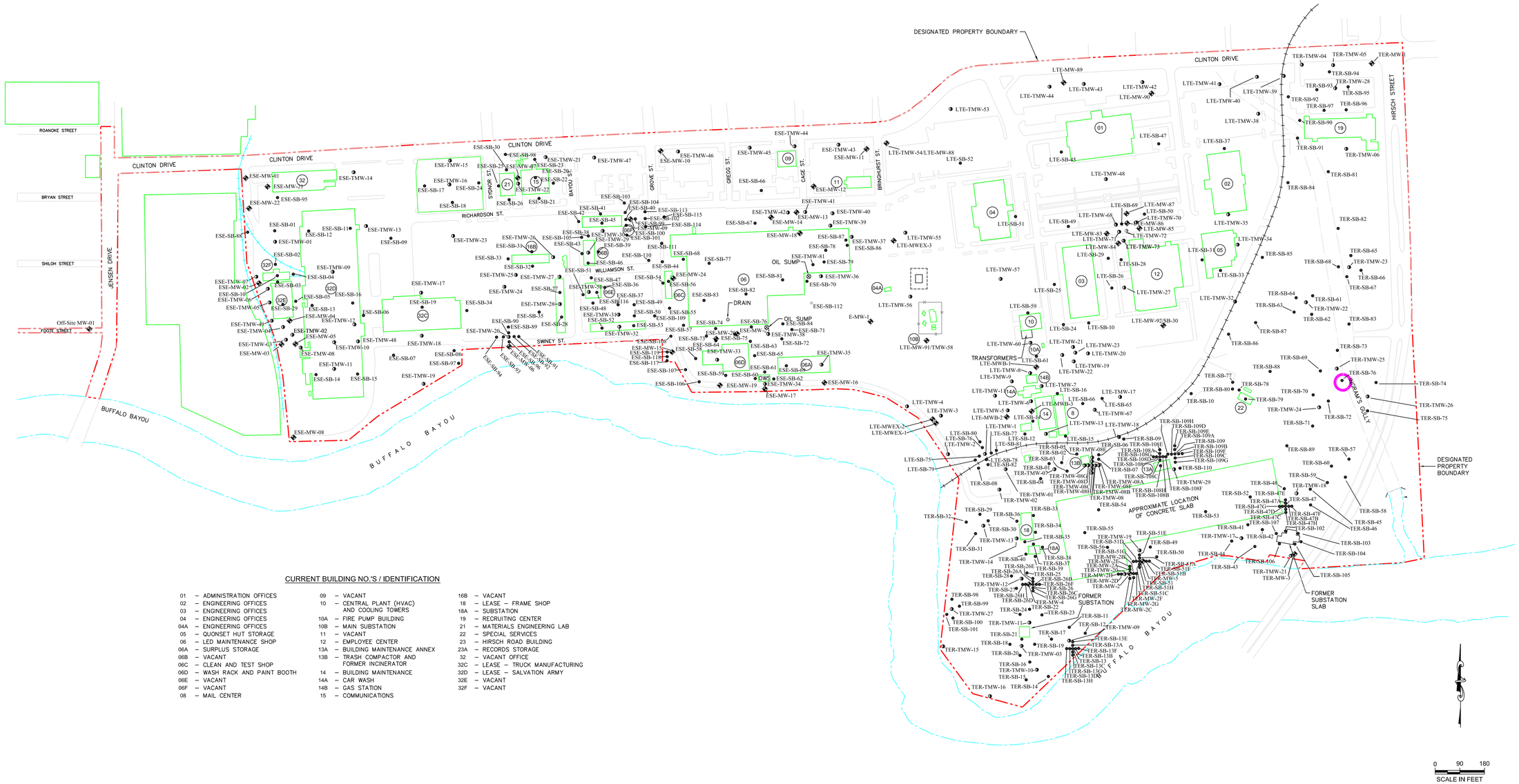

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Cis–1,2–DCE in soil with concentrations exceeding the ingestion PCL of 0.25 mg/kg.

FIGURE 6–21
SOIL INGESTION PCLE ZONE MAP
CIS–1,2–DCE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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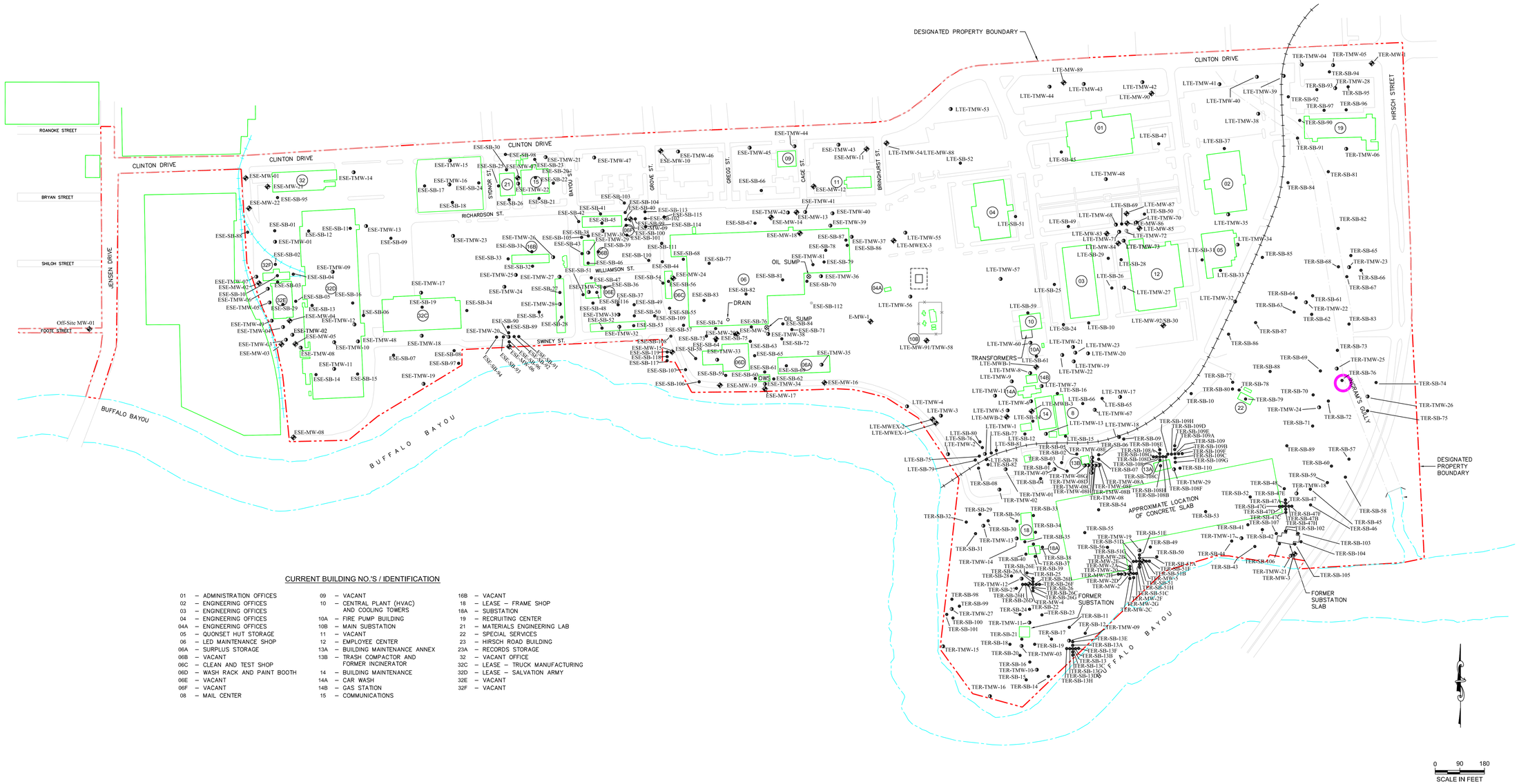

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Cis–1,3–Dichloropropene in soil with concentrations exceeding the ingestion PCL of 0.0066 mg/kg.

FIGURE 6–22
SOIL INGESTION PCLE ZONE MAP
CIS–1,3–DICHLOROPROPENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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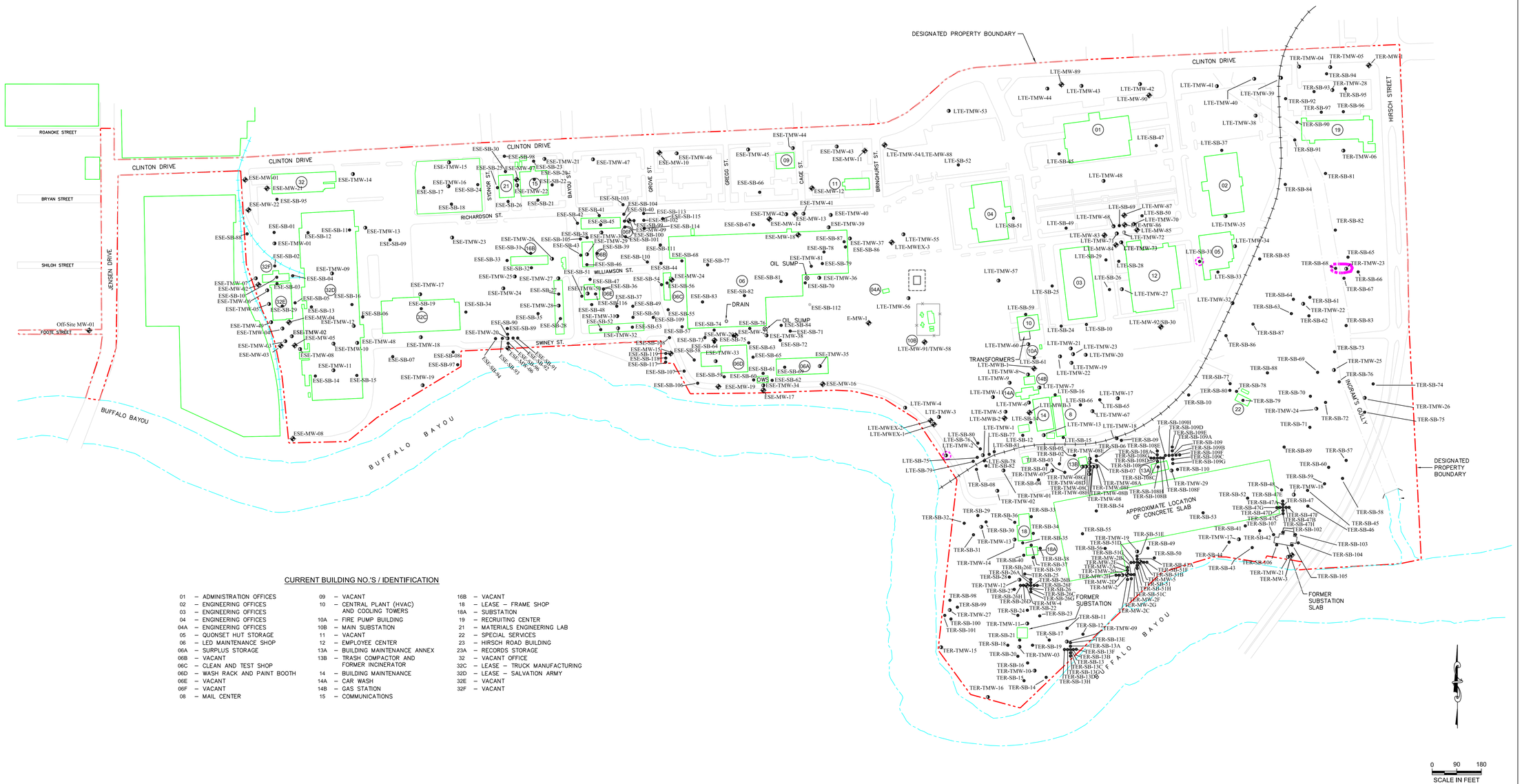

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Methylene Chloride in soil with concentrations exceeding the ingestion PCL of 0.013 mg/kg.

FIGURE 6–23
SOIL INGESTION PCLE ZONE MAP
METHYLENE CHLORIDE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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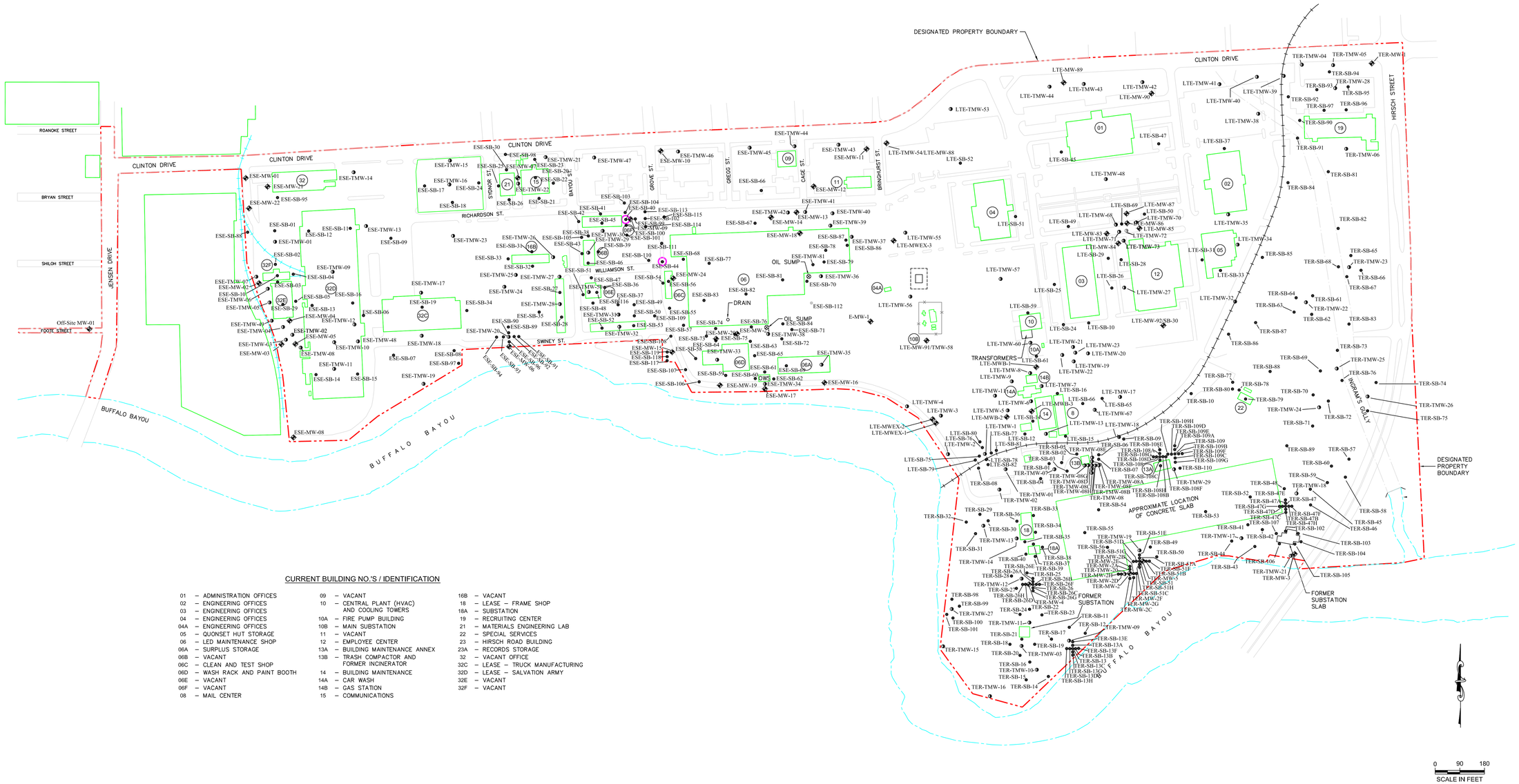

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Tetrachloroethene in soil with concentrations exceeding the ingestion PCL of 0.05 mg/kg.

FIGURE 6–24
SOIL INGESTION PCLE ZONE MAP
TETRACHLOROETHENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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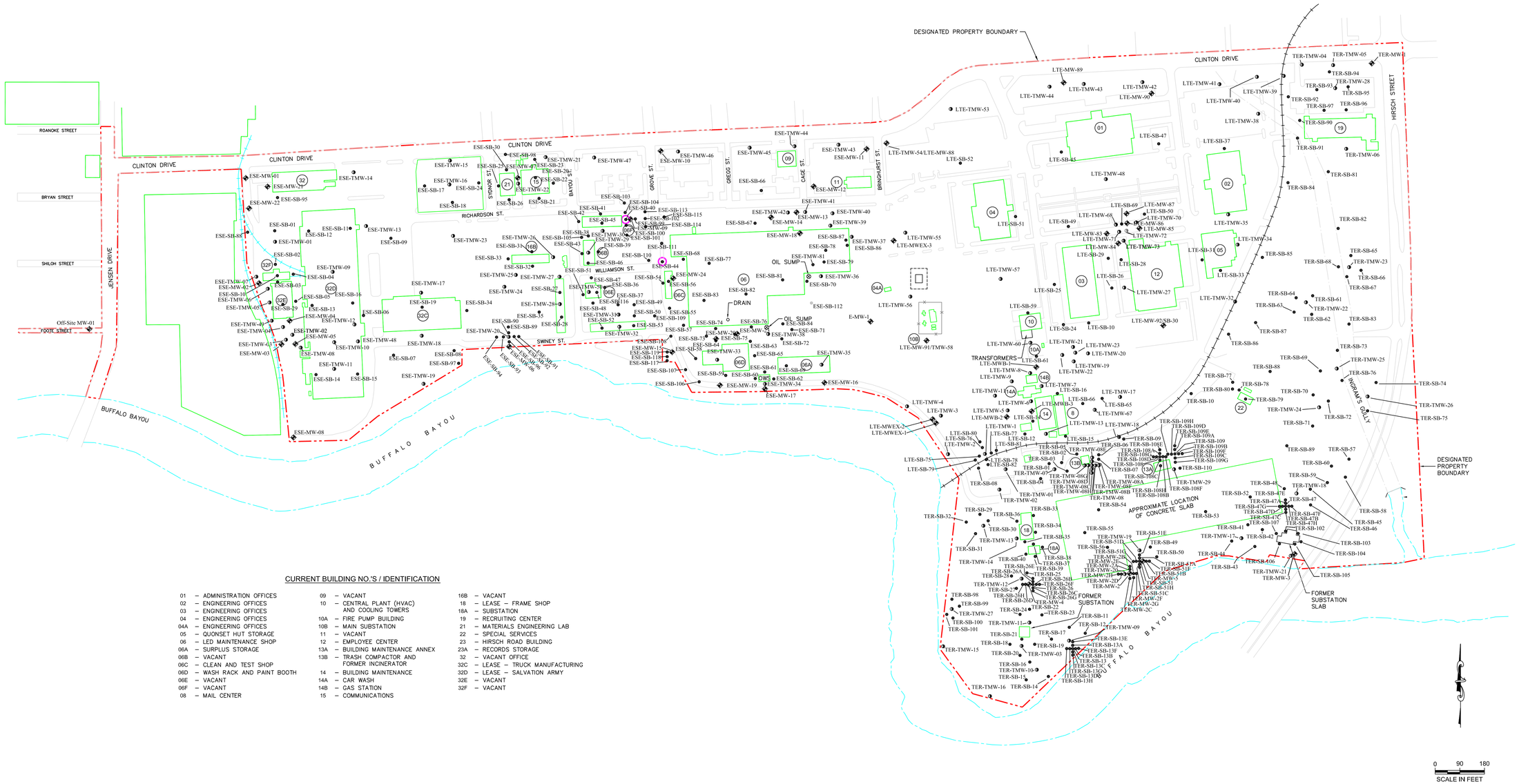

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Trichloroethene in soil with concentrations exceeding the ingestion PCL of 0.034 mg/kg.

FIGURE 6–25
SOIL INGESTION PCLE ZONE MAP
TRICHLOROETHENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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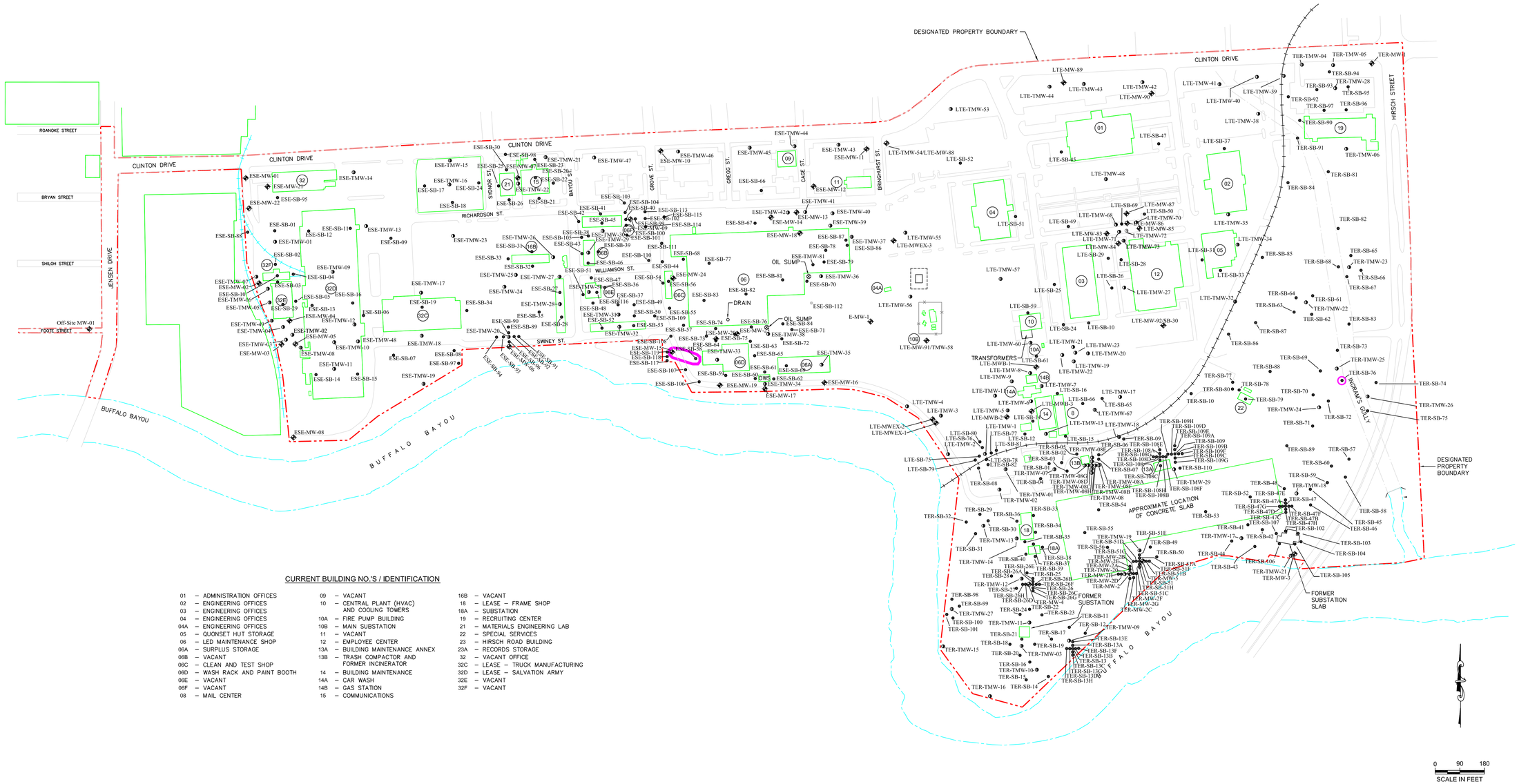

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 1,2,3–Trichloropropane in soil with concentrations exceeding the ingestion PCL of 0.0023 mg/kg.

FIGURE 6–26
SOIL INGESTION PCLE ZONE MAP
1,2,3–TRICHLOROPROPANE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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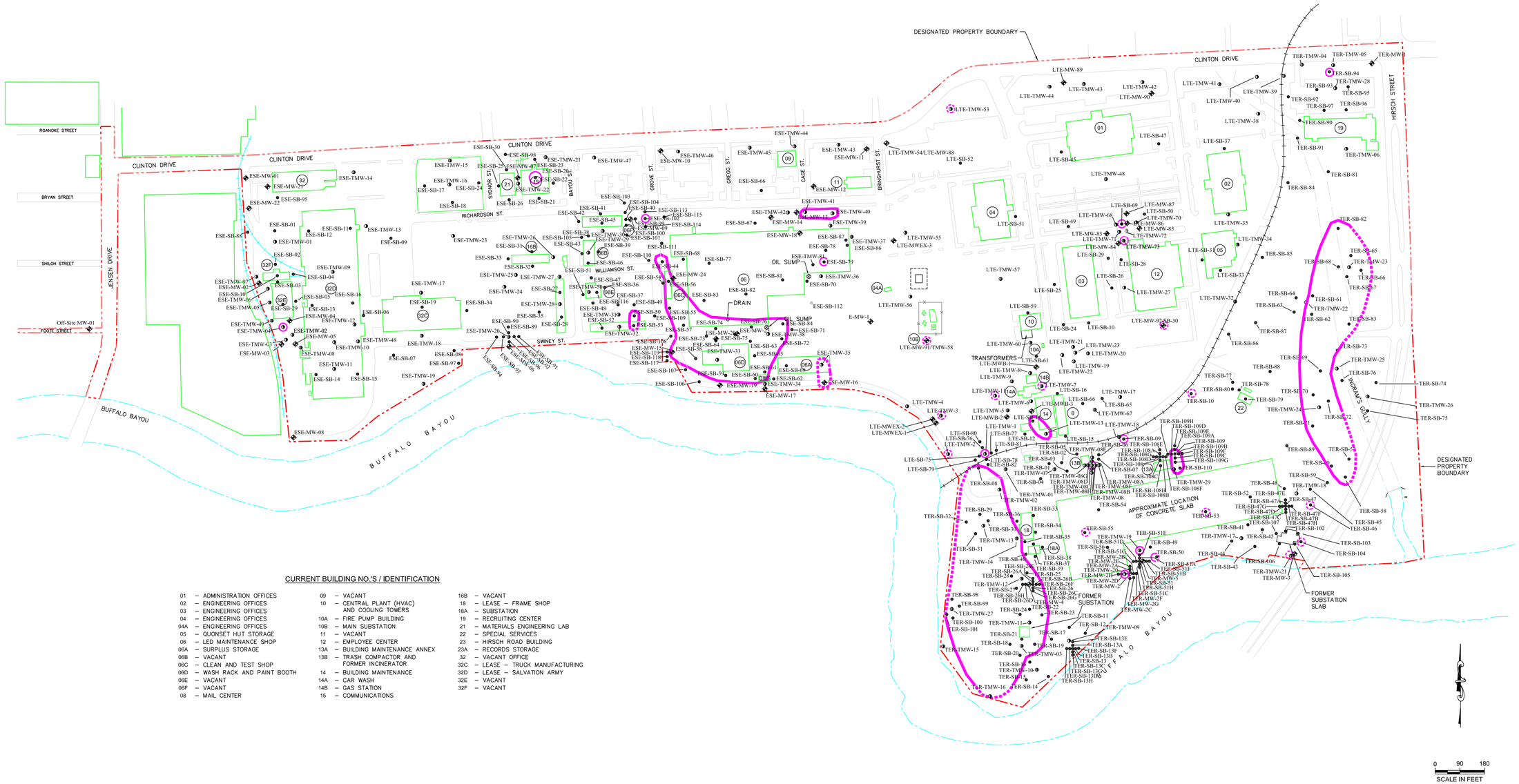

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- TPH in soil with concentrations exceeding the ingestion PCL of 33 mg/kg for C6–C12 and 99 mg/kg for C12–C35.

FIGURE 6–27
SOIL INGESTION PCLE ZONE MAP
TPH
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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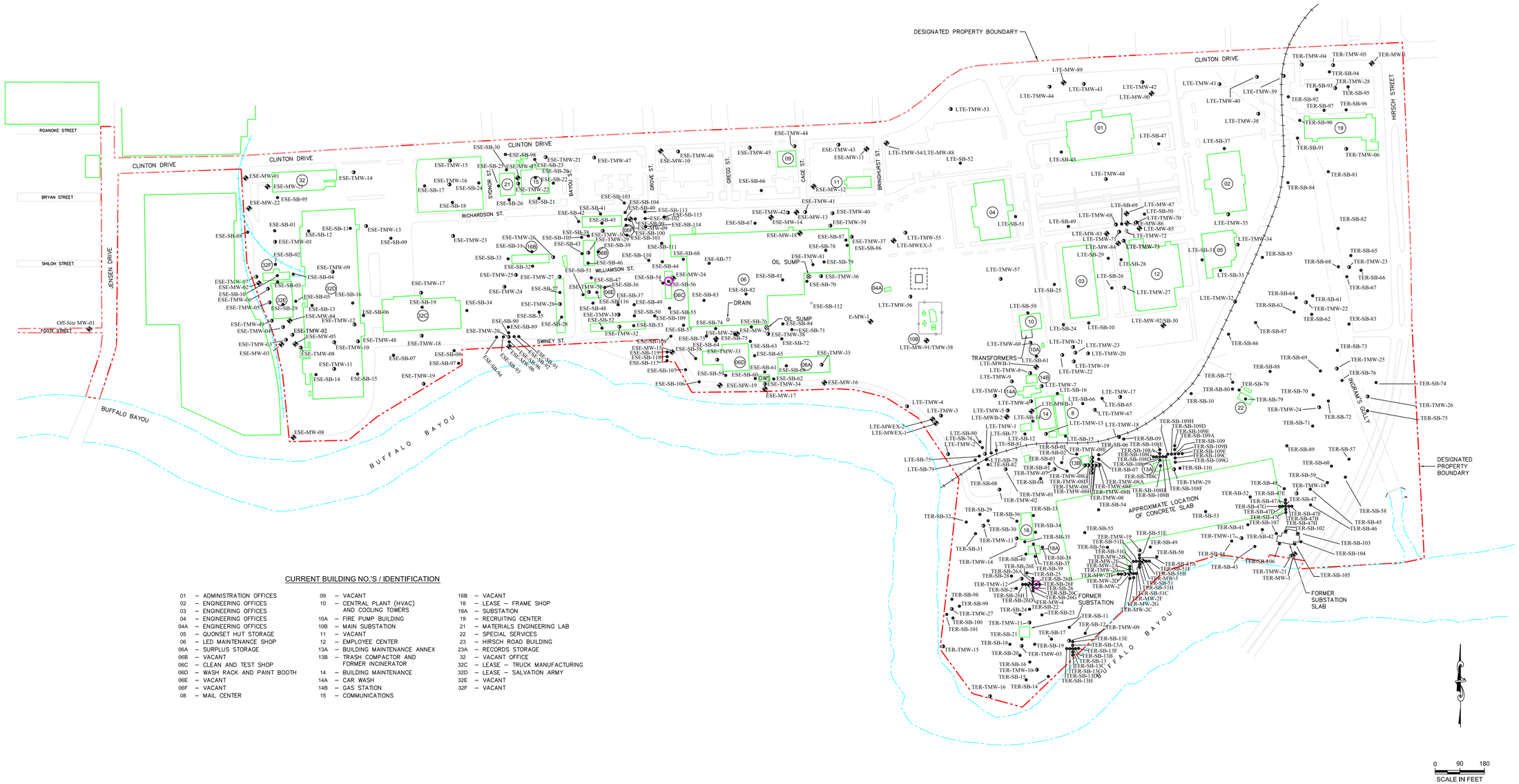

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Benzidine in soil with concentrations exceeding the ingestion PCL of 0.000011 mg/kg

FIGURE 6–28
SOIL INGESTION PCLE ZONE MAP
BENZIDINE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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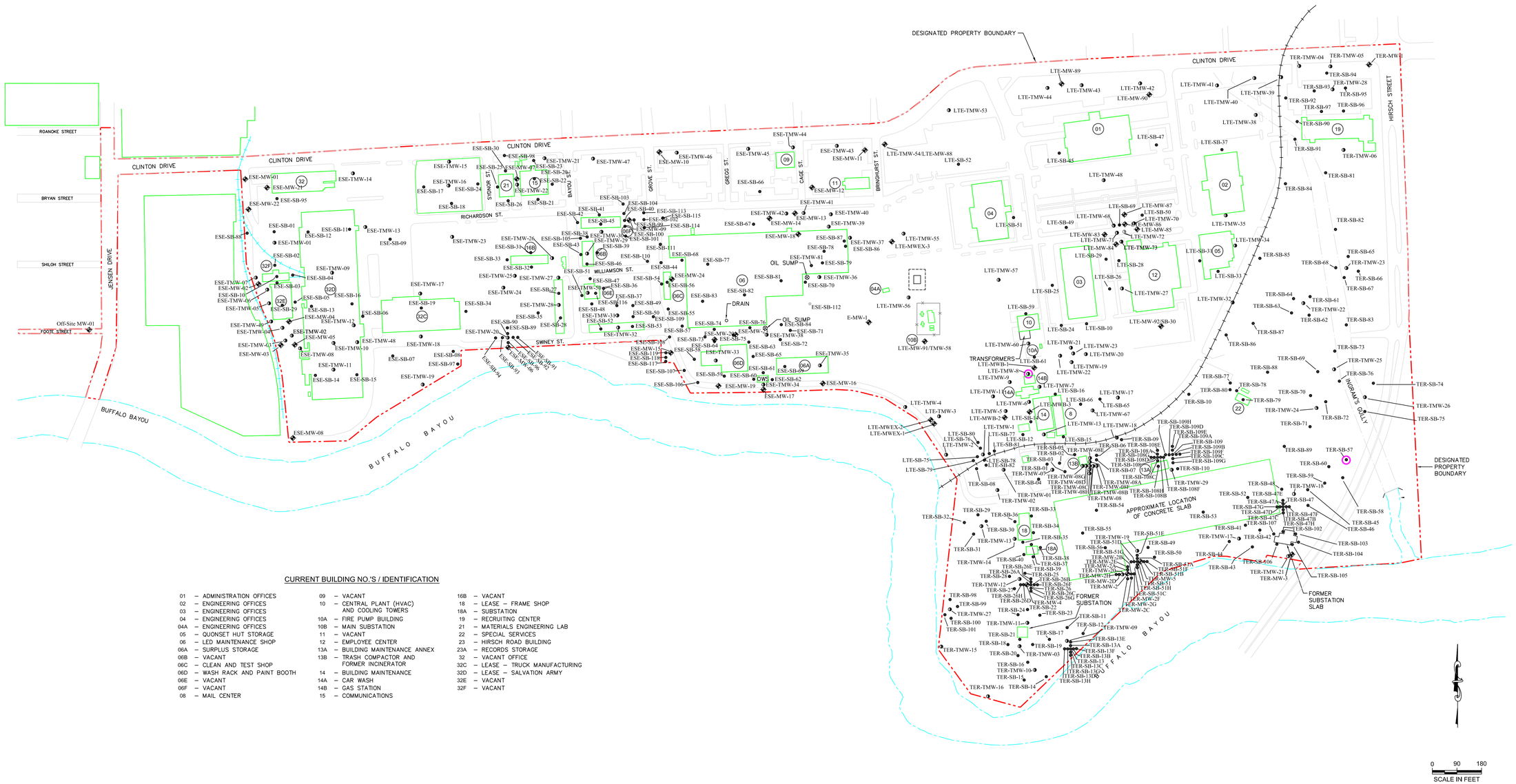

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Bis(2–chlorethoxy)methane in soil with concentrations exceeding the ingestion PCL of 0.012 mg/kg

FIGURE 6–29
SOIL INGESTION PCLE ZONE MAP
BIS(2–CHLORETHOXY)METHANE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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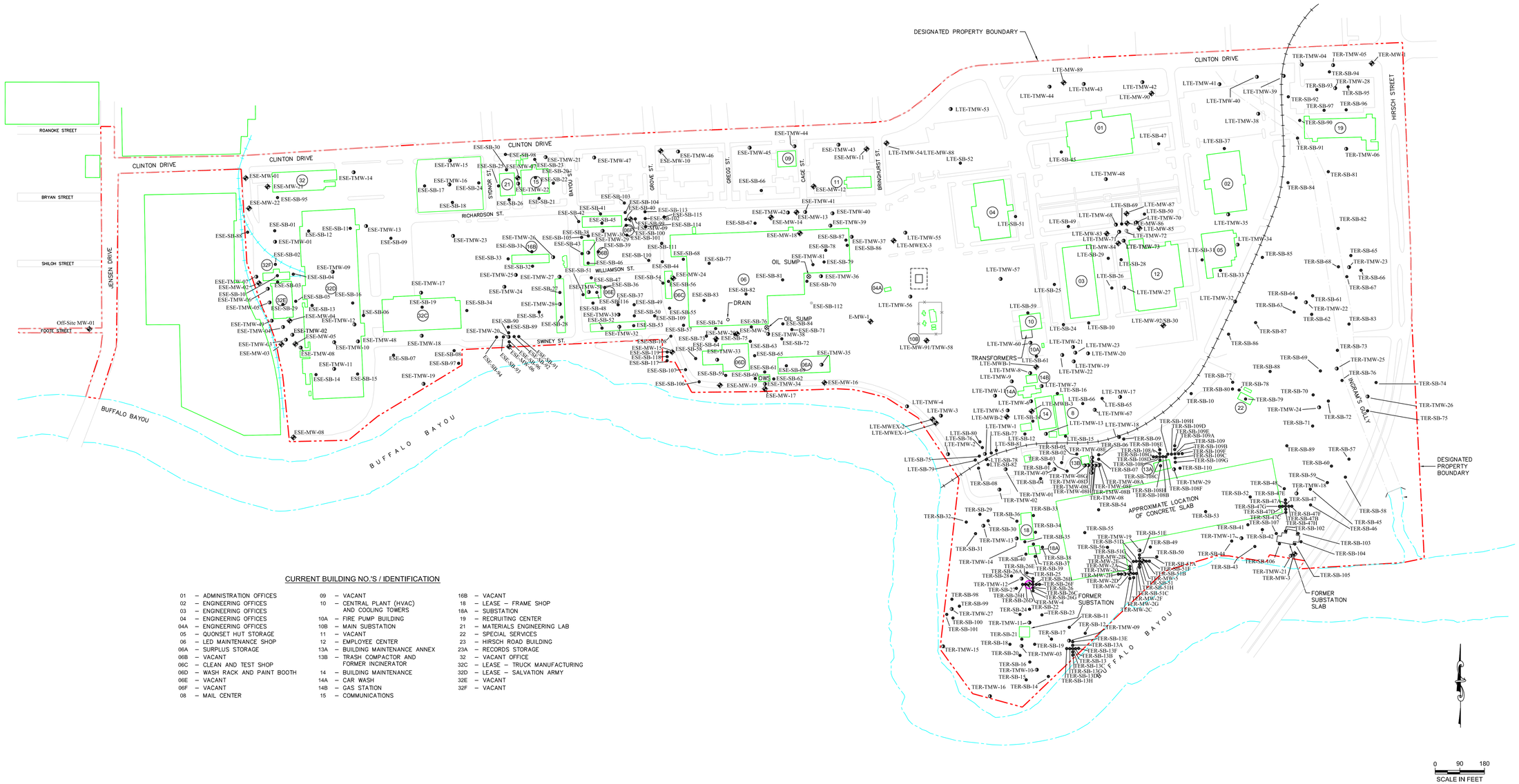

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 2,4–Dinitrotoluene in soil with concentrations exceeding the ingestion PCL of 0.0053 mg/kg

FIGURE 6–30
SOIL INGESTION PCLE ZONE MAP
2,4–DINITROTOLUENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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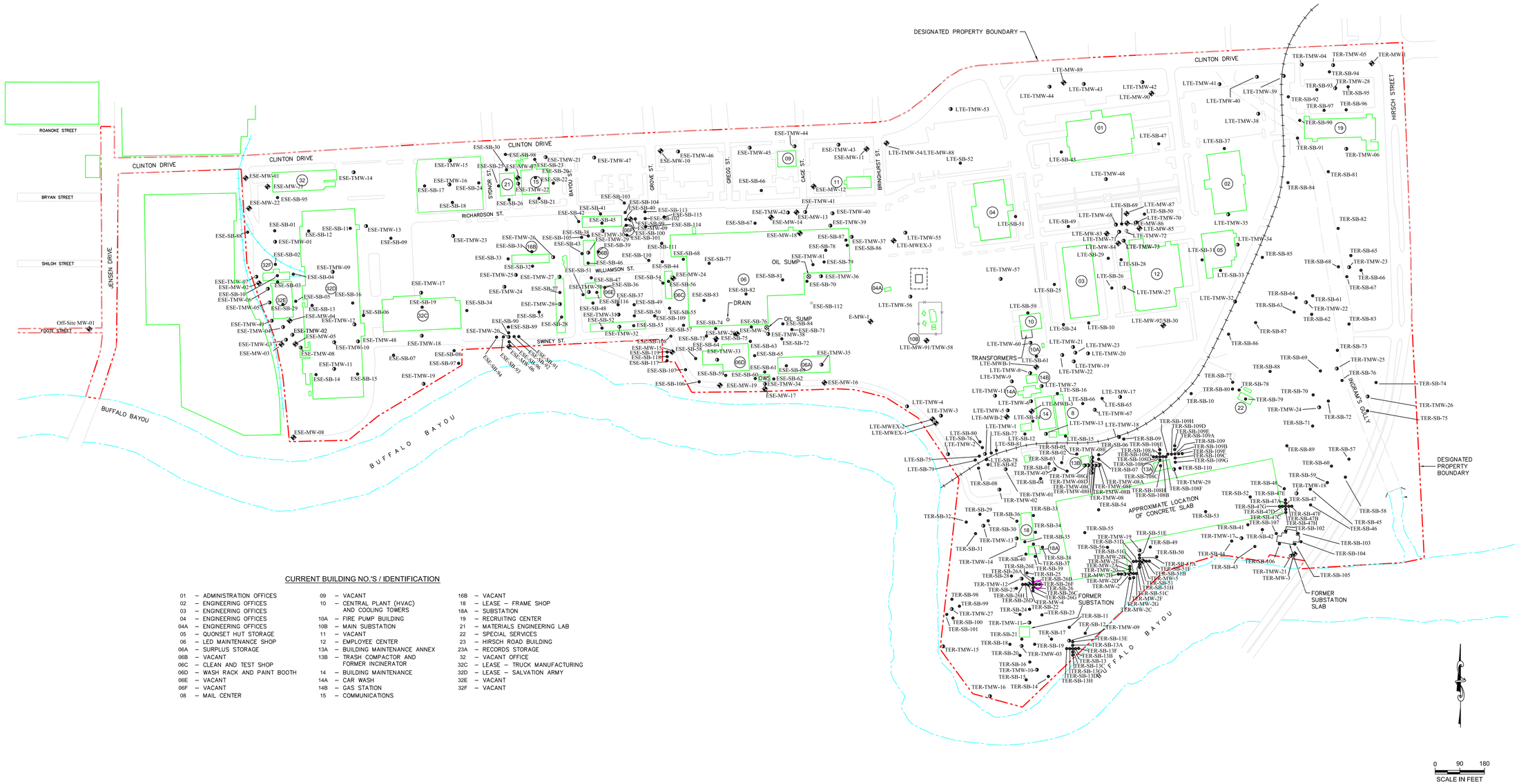

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 2,6–Dinitrotoluene in soil with concentrations exceeding the ingestion PCL of 0.0048 mg/kg

FIGURE 6–31
SOIL INGESTION PCLE ZONE MAP
2,6–DINITROTOLUENE
KBR – CLINTON DRIVE FACILITY
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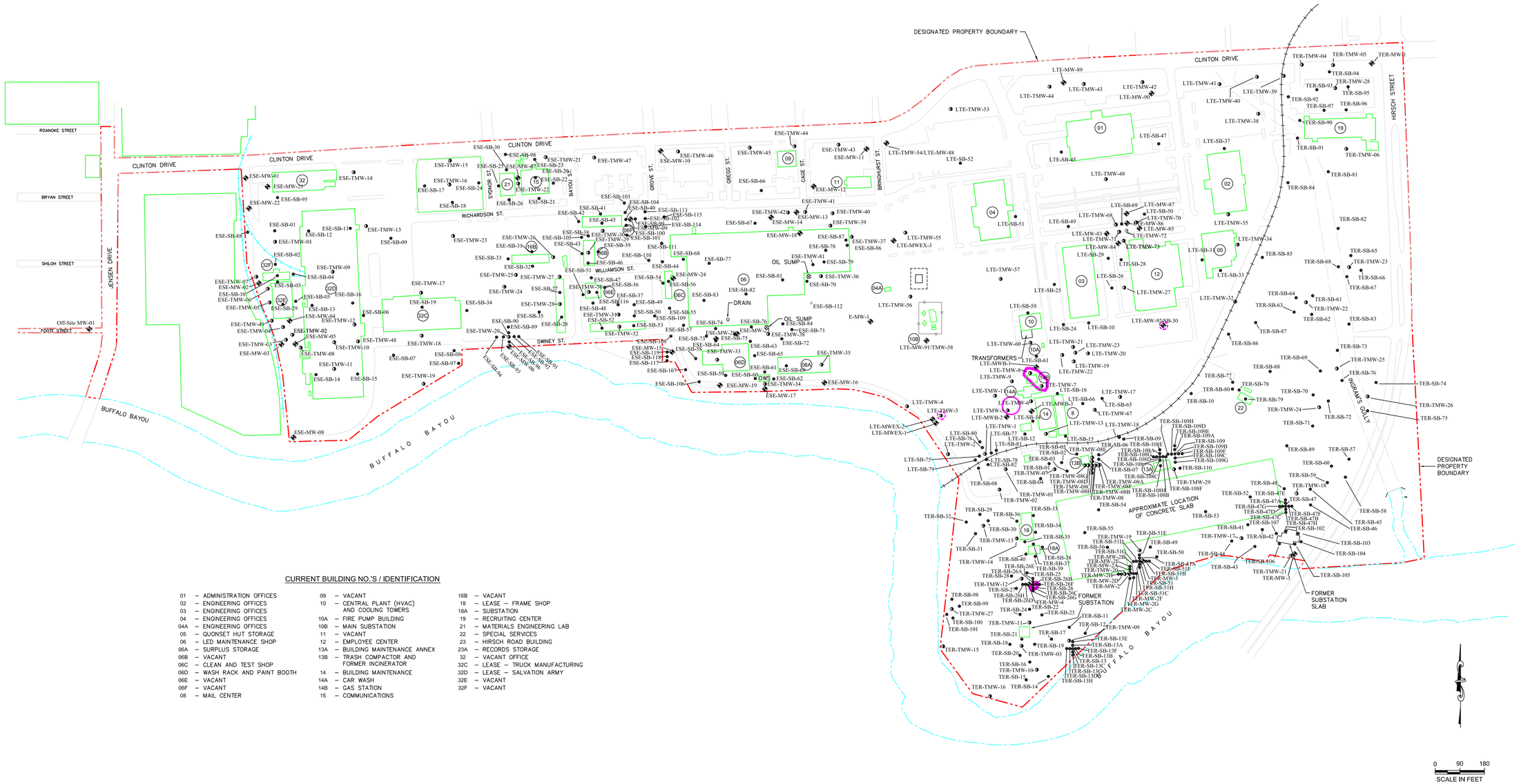

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 2,4–Dinotrophenol in soil with concentrations exceeding the ingestion PCL of 0.094 mg/kg

FIGURE 6–32
SOIL INGESTION PCLE ZONE MAP
2,4–DINITROPHENOL
KBR – CLINTON DRIVE FACILITY
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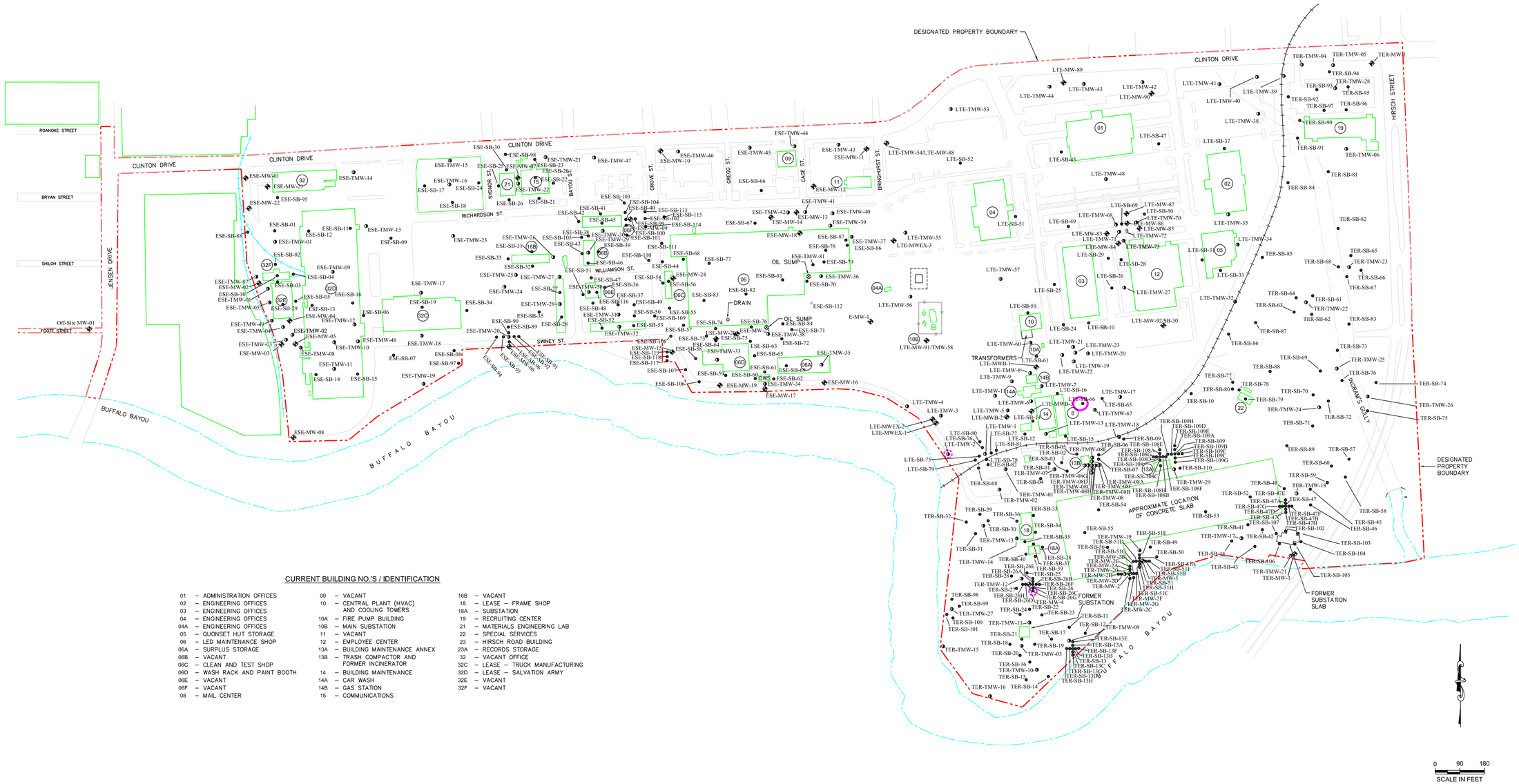

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Pentachlorophenol in soil with concentrations exceeding the ingestion PCL of 0.018 mg/kg

FIGURE 6–33
SOIL INGESTION PCLE ZONE MAP
PENTACHLOROPHENOL
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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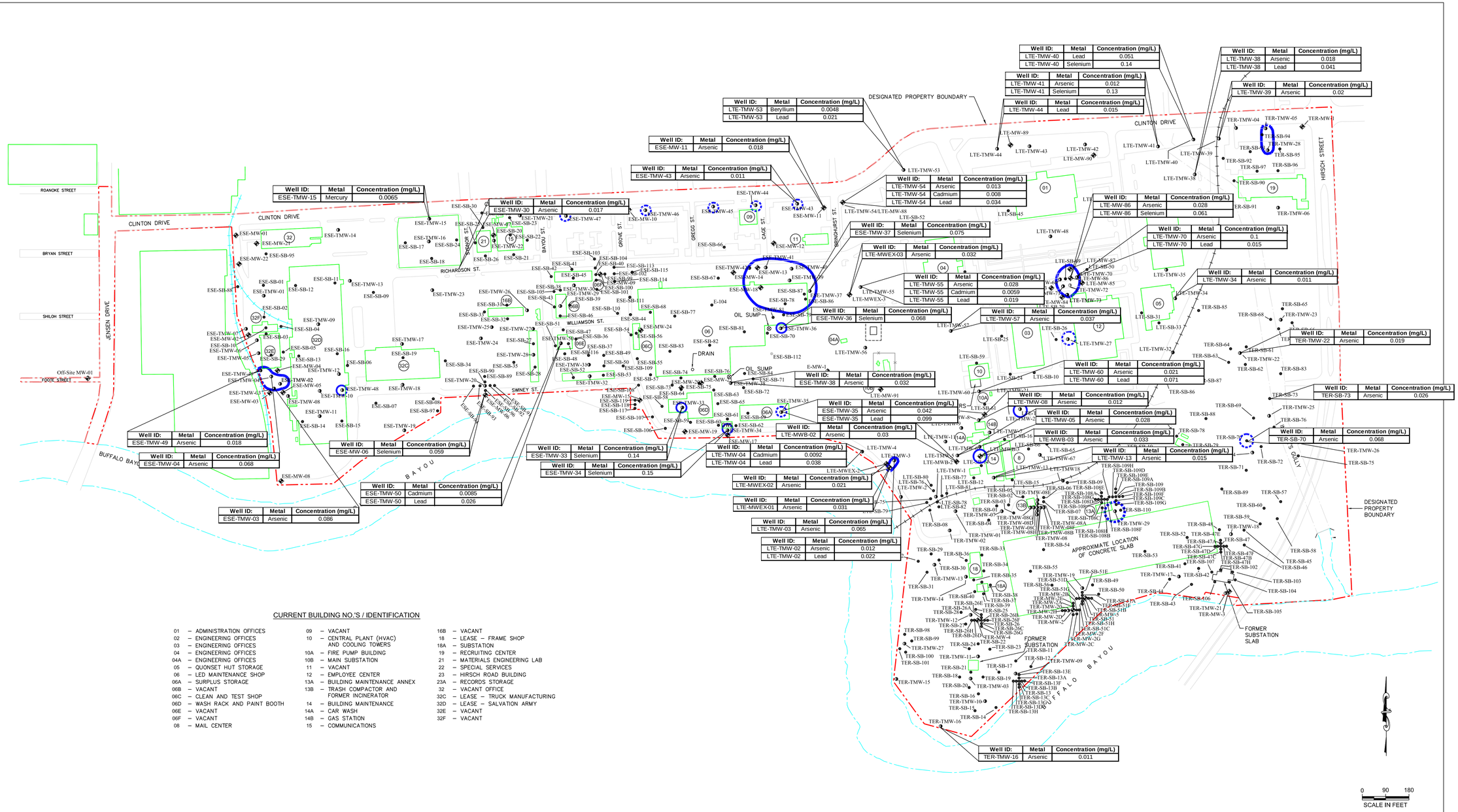

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- NON–METALS IMPACTED GROUNDWATER

Metal	Ingestion PCL (mg/L)
Arsenic	0.01
Beryllium	0.004
Cadmium	0.005
Lead	0.015
Mercury	0.002
Selenium	0.05

FIGURE 7–1
GROUNDWATER OVERALL PCLE ZONES
AND METALS EXCEEDING INGESTION PCLS

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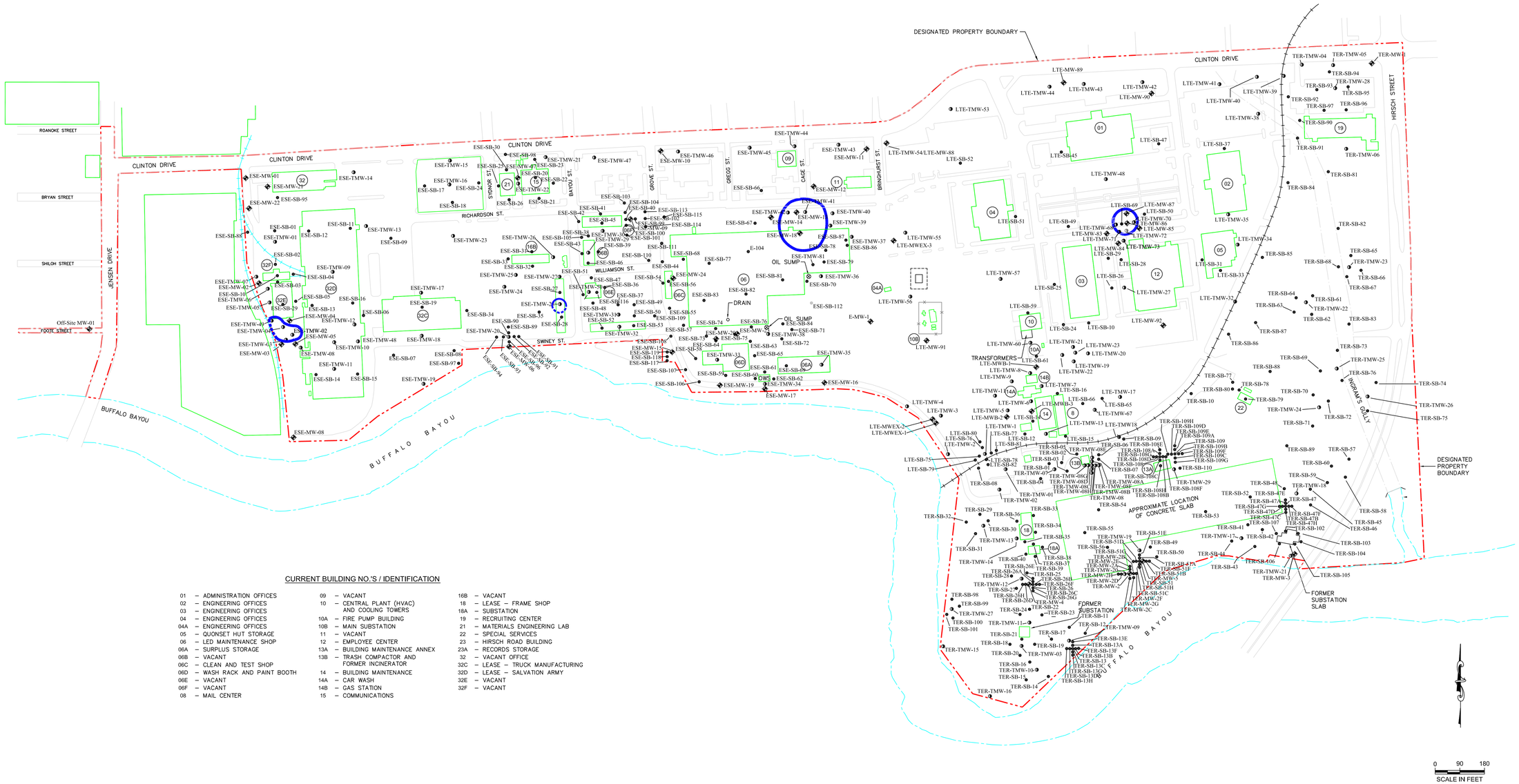

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Benzene plume with concentrations exceeding the ingestion PCL of 0.005 mg/L.

FIGURE 7–2
GROUNDWATER PCLE ZONE MAP
BENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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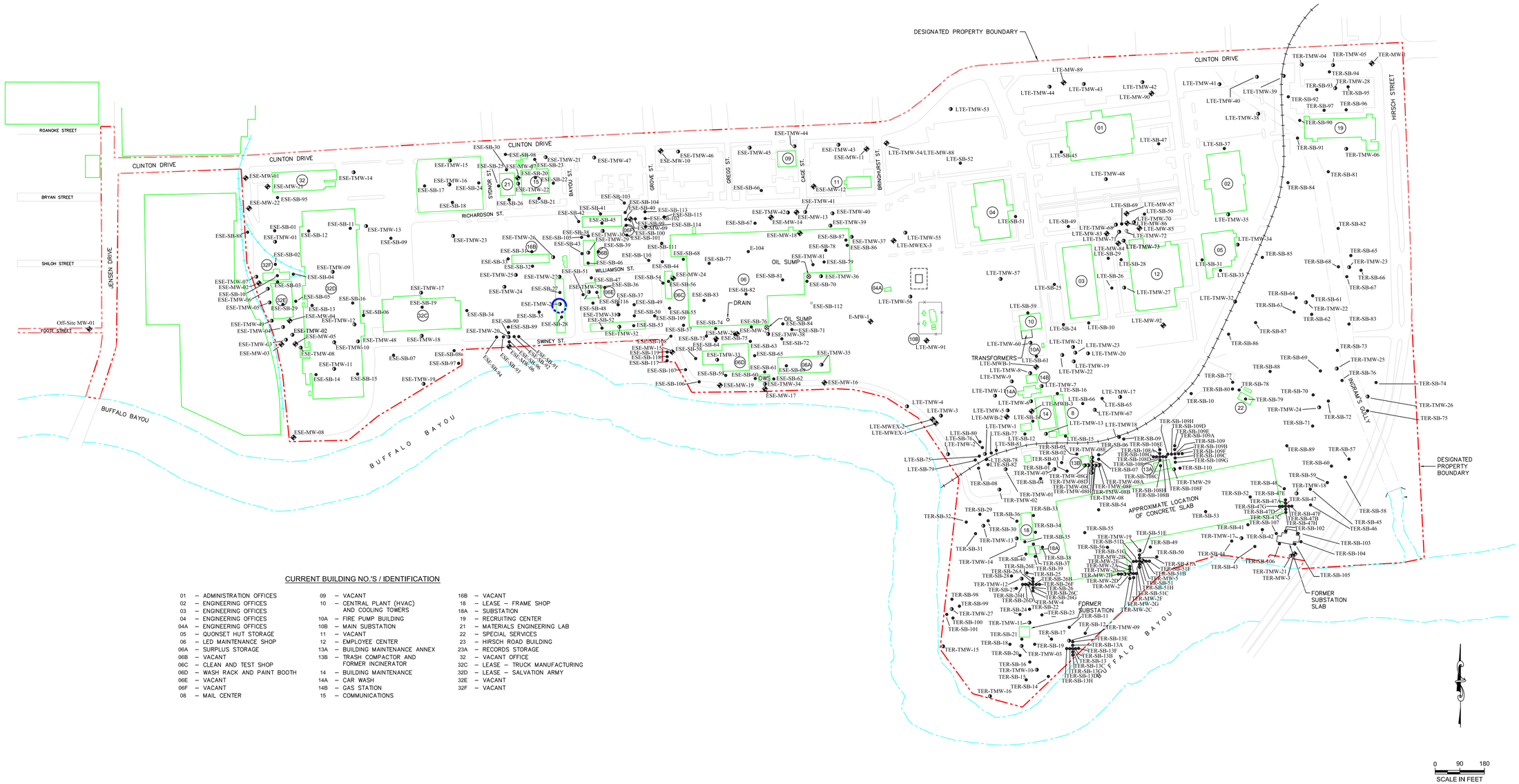

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Cis–1,2–Dichloroethene plume with concentrations exceeding the ingestion PCL of 0.070 mg/L.

FIGURE 7–3
GROUNDWATER PCLE ZONE MAP
CIS–1,2–DICHLOROETHENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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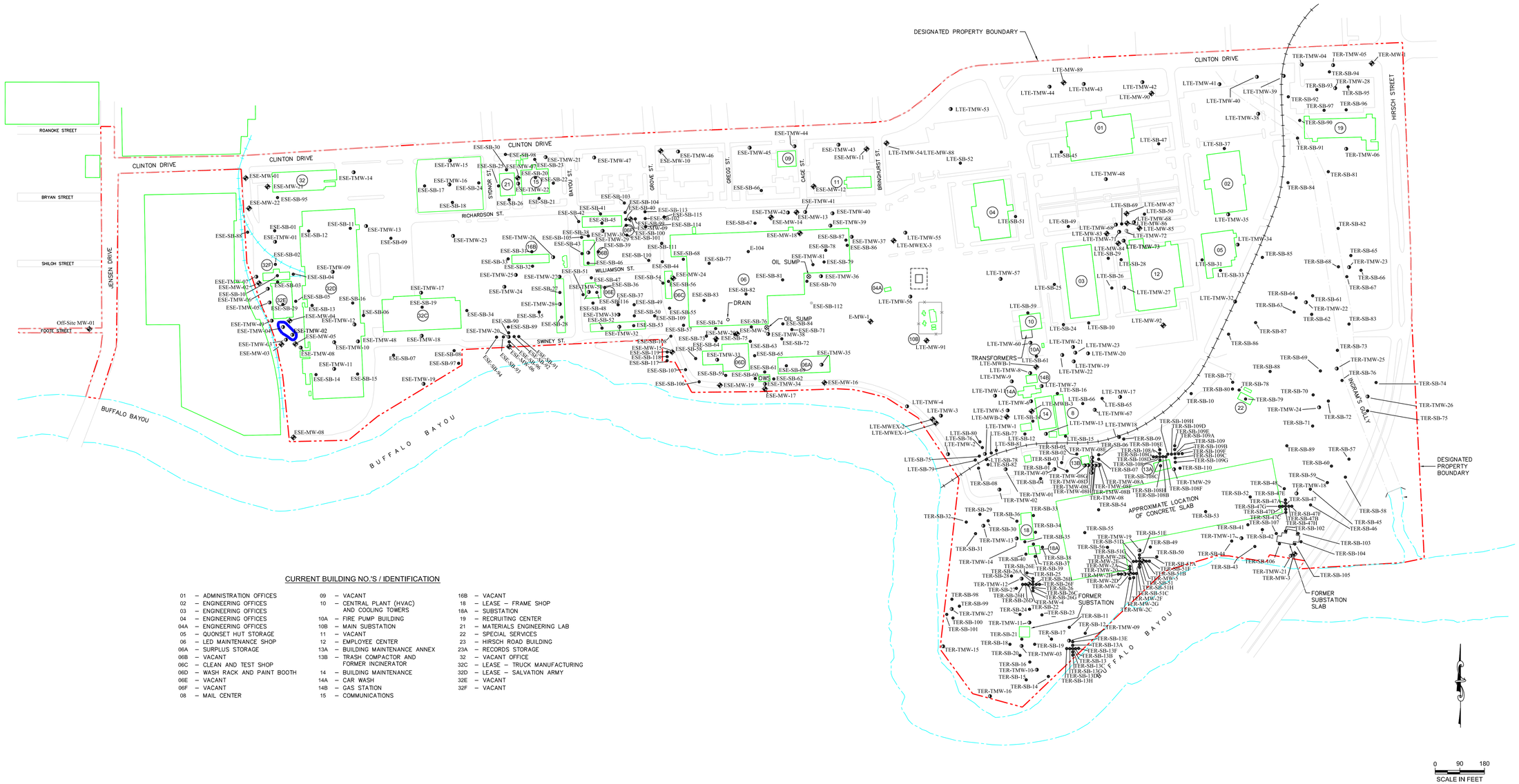

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 1,2,4–Trimethylbenzene plume with concentrations exceeding the ingestion PCL of 0.024 mg/L.

FIGURE 7–4
GROUNDWATER PCLE ZONE MAP
1,2,4–TRIMETHYLBENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
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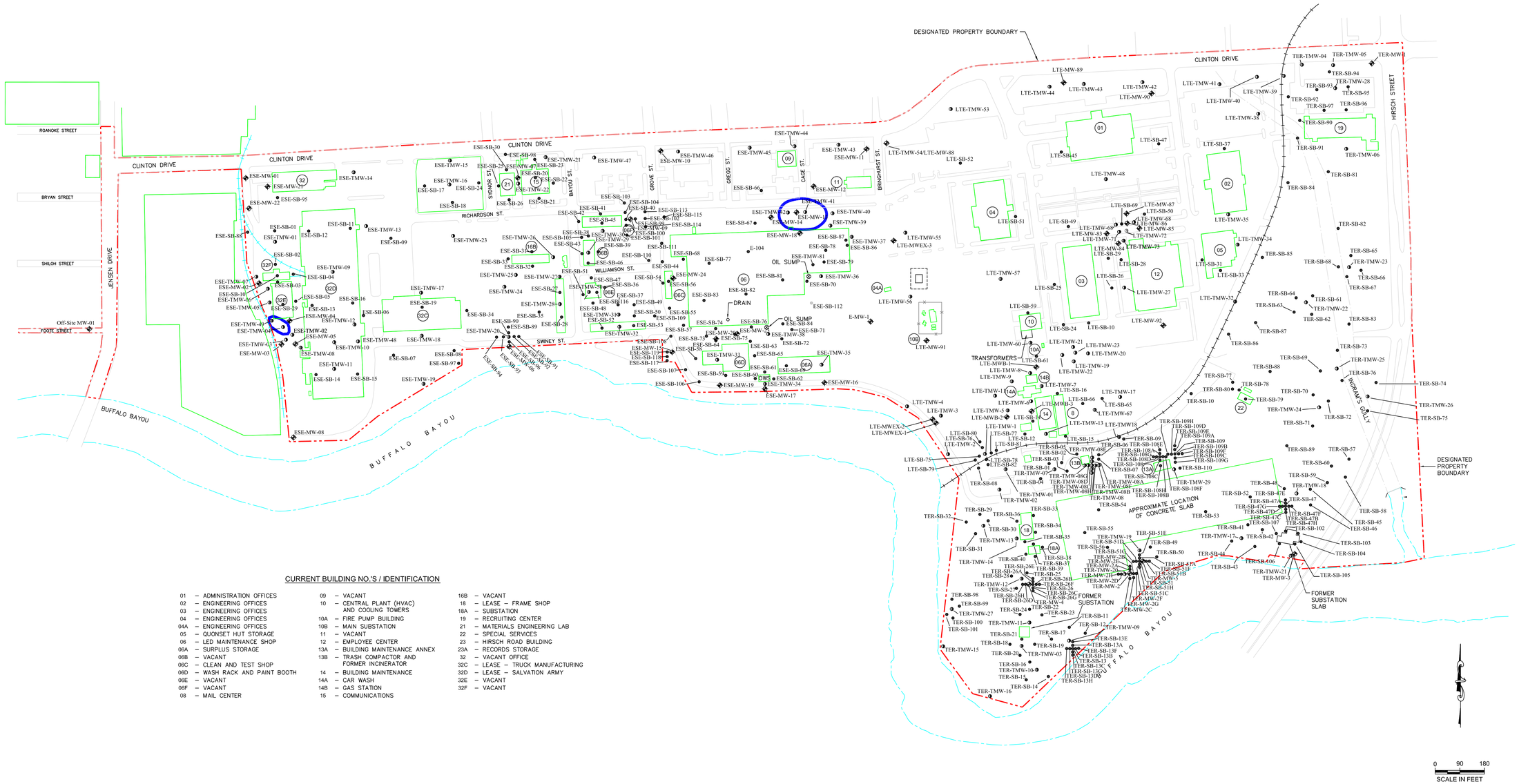

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Ethylbenzene plume with concentrations exceeding the ingestion PCL of 0.07 mg/L.

FIGURE 7–5
GROUNDWATER PCLE ZONE MAP
ETHYLBENZENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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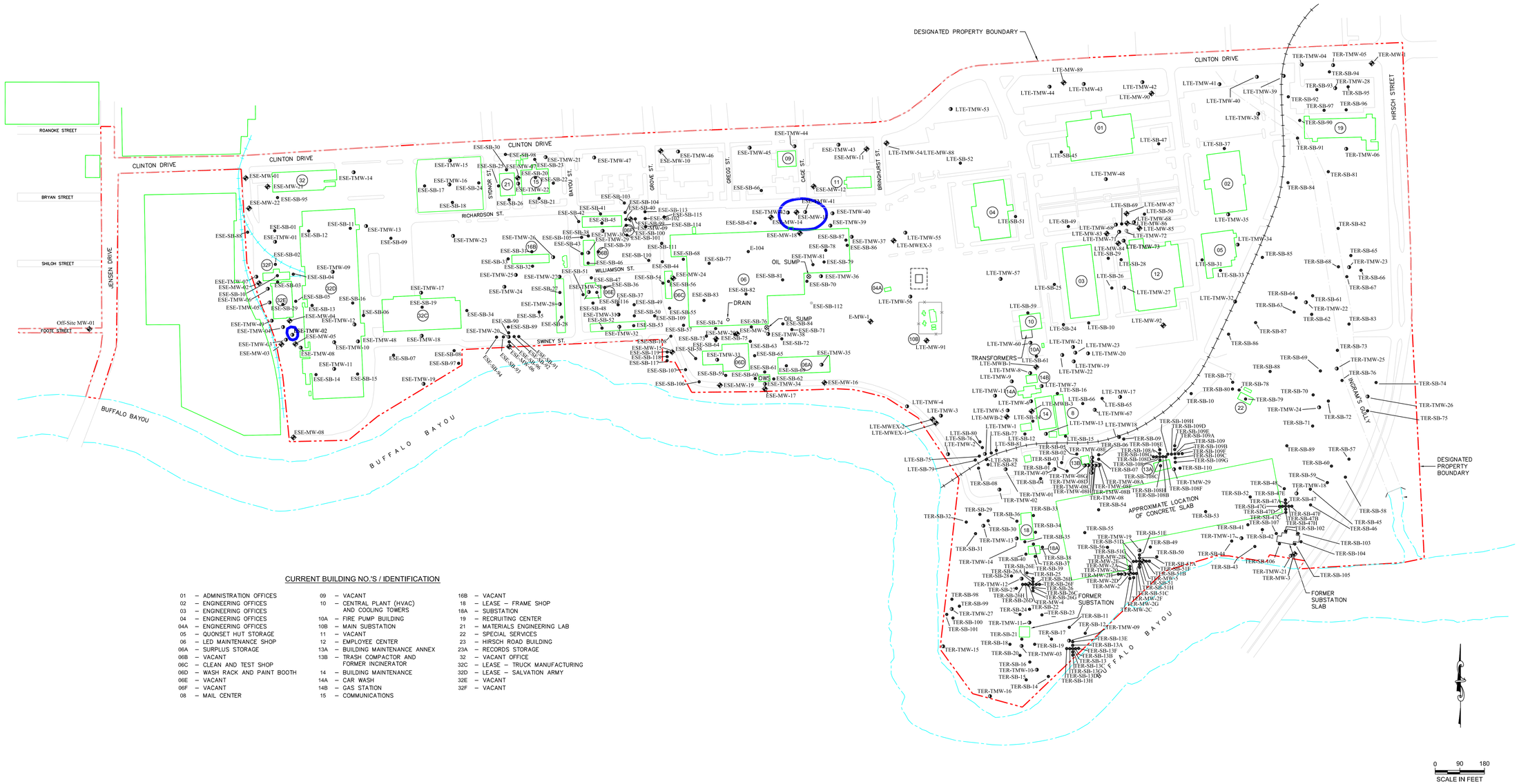

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Toluene plume with concentrations exceeding the ingestion PCL of 1.0 mg/L.

FIGURE 7–6
GROUNDWATER PCLE ZONE MAP
TOLUENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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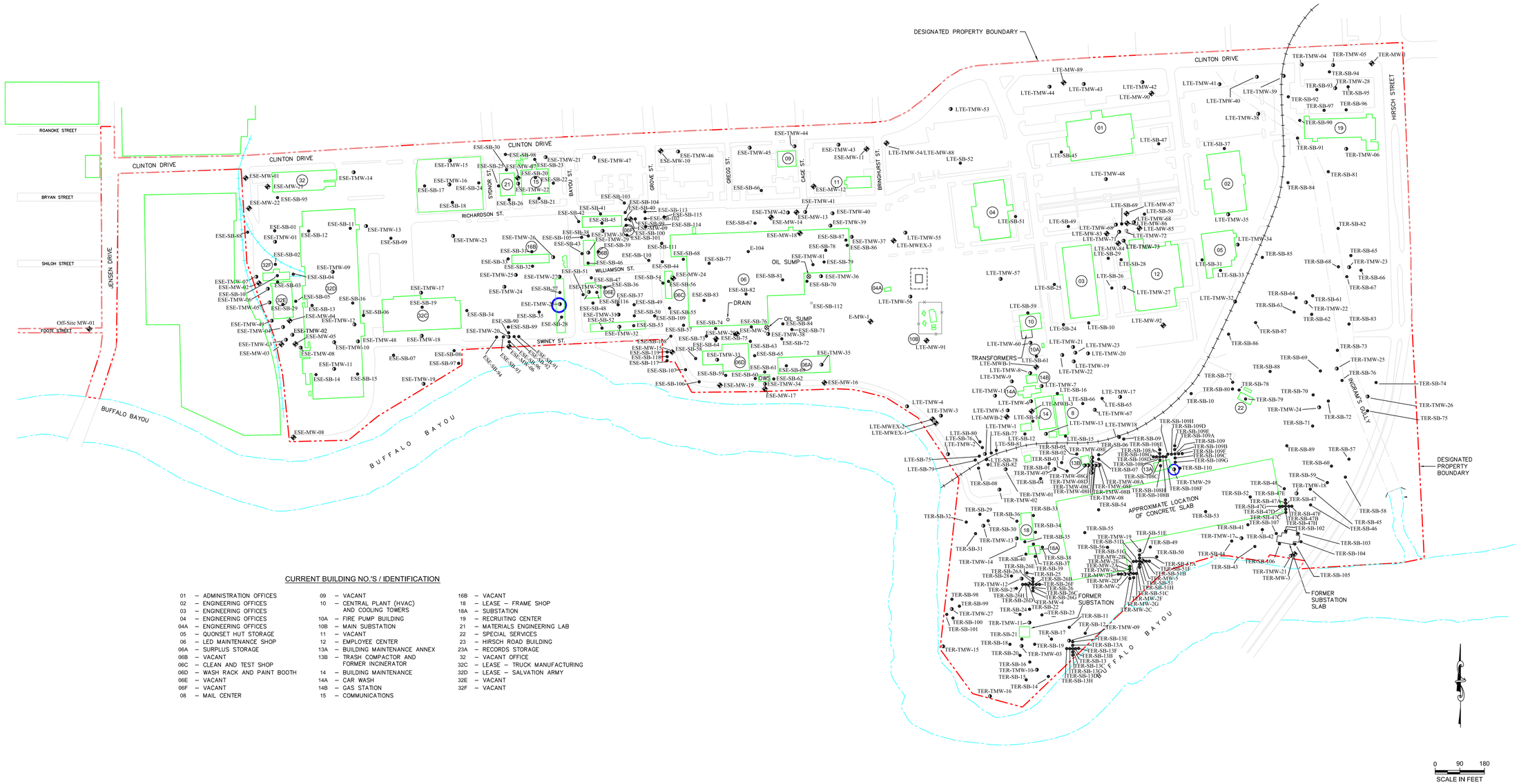

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
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06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Vinyl Chloride plume with concentrations exceeding the ingestion PCL of 0.002 mg/L.

FIGURE 7–7
GROUNDWATER PCLE ZONE MAP
VINYL CHLORIDE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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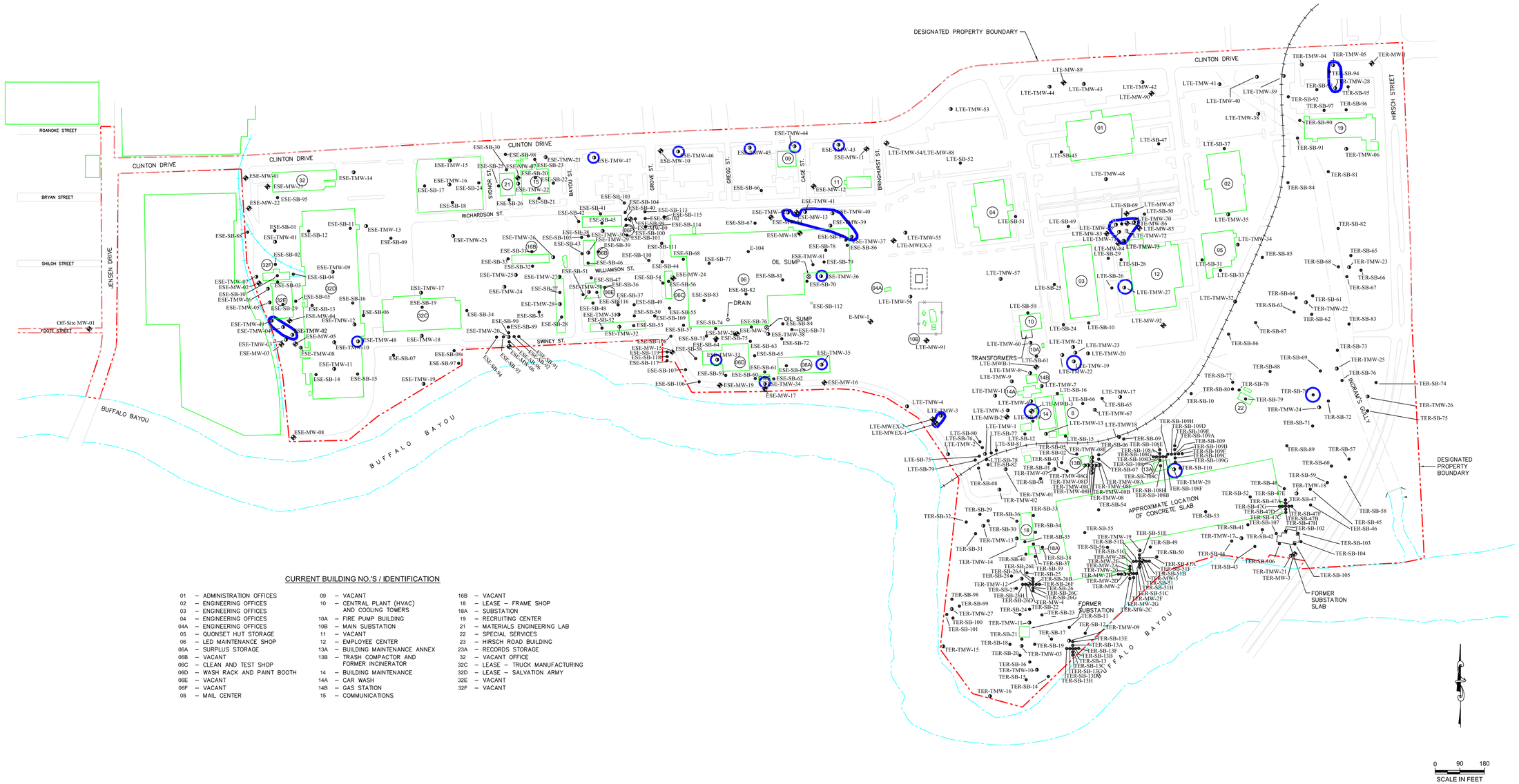

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
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06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- TPH plume with concentrations exceeding the ingestion PCL of 0.98 mg/L.

FIGURE 7–8
GROUNDWATER PCLE ZONE MAP
TPH
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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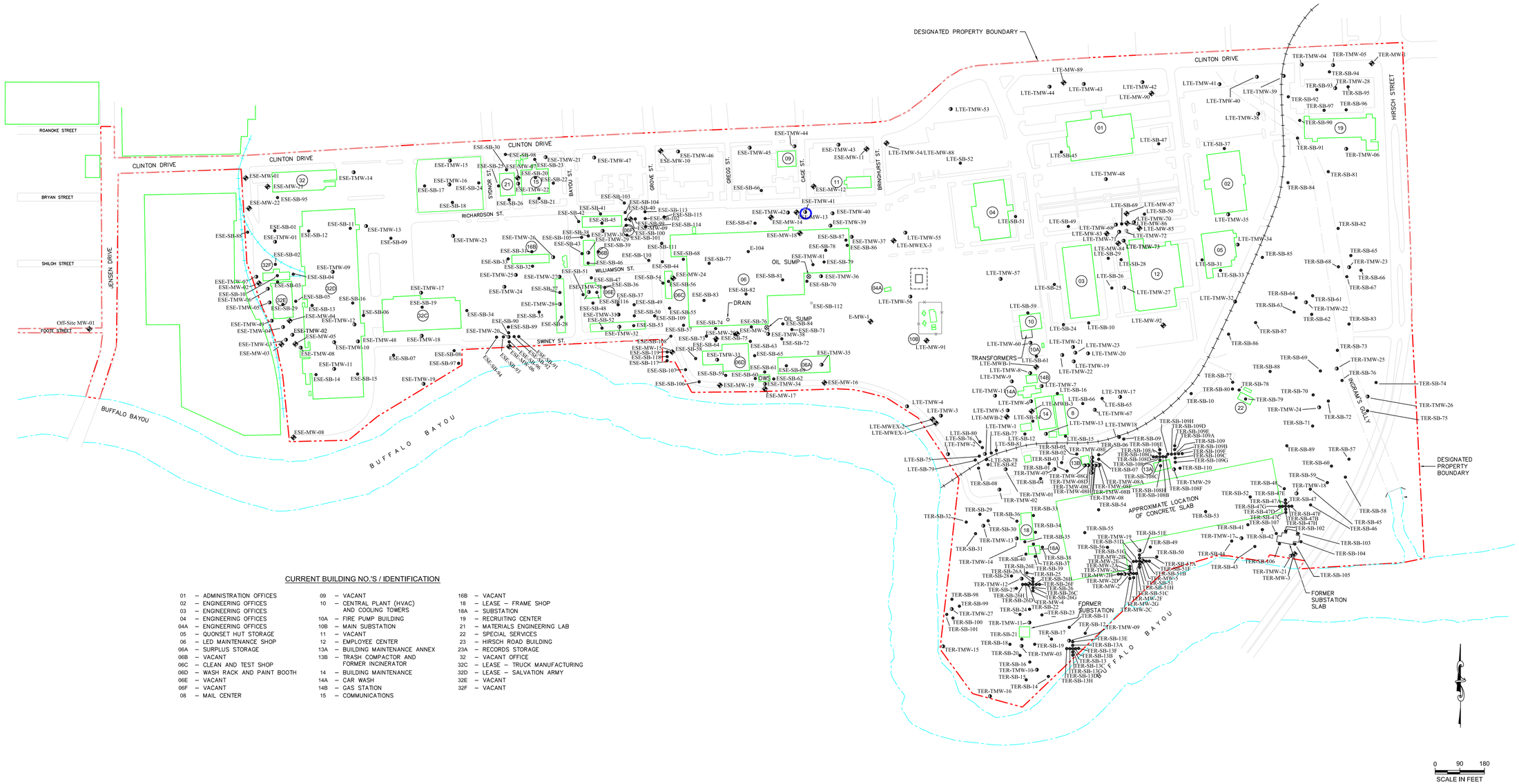

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
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04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
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06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 1–Methylnapthalene plume with concentrations exceeding the ingestion PCL of 0.031 mg/L.

FIGURE 7–9
GROUNDWATER PCLE ZONE MAP
1–METHYLNAPTHALENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
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Date: August 11, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003

Appendix C

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

PROPERTY USE INFORMATION

The Designated Property consists of one property located at 4100 Clinton Drive comprising approximately 153 acres. The Designated Property currently has 28 buildings used for general office purposes, medical offices, storage, City of Houston Sheriff's offices, and light construction/carpentry. The buildings were constructed in the 1970s and 1980s. The use of the Designated Property is anticipated to remain unchanged for the near future.

Currently, the land surrounding the Designated Property is primarily residential homes and condominiums, and industrial. Within a 500-foot radius to the north is Standco Industries, Inc. (2701 Clinton Drive), which manufactures oilfield, brake lining, and other industrial products; vacant commercial land; condominiums and houses; a supposed utility operations center (289 Hirsch Road); and the Maintenance Engineering Corporation (4154 Clinton Drive), a chemical and allied products wholesaler. To the west of the Designated Property are vacant land, a residential home, and light industrial (along Roanoke and Bryan Streets). Between the western property boundary and the City of Houston ROW along Jensen Drive is Bonded Logistics, presumably a warehousing and shipping company. To the east of the Designated Property is industrial property that appears to collect scrap metal and has warehouses for storage. To the south of the Designated Property is Buffalo Bayou. On the south side of Buffalo Bayou is industrial property and vacant land. The industrial property appears to be warehousing and also includes a rail yard. The Applicant is not aware of future changes to the use of the surrounding properties that would include the use of the shallow groundwater bearing unit.

Appendix D

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN WITHIN INGESTION PCL EXCEEDANCE ZONE

Ingestion PCLE zones exist for the following COCs in soil:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Silver
- Thallium
- Zinc
- Benzene
- Chlorobenzene
- Cis-1,2-DCE
- Cis-1,3-dichloropropane
- Ethylbenzene,
- PCE
- Trichloroethene (TCE)
- Methylene chloride
- 1,2,3-trichloropropane,
- Benzo(a)pyrene

Appendix D

- Benzidine,
- 2,4,-dinitrophenol
- Bis(2-chloroethoxy)methane
- 2,6-dinitrophenol
- Pentachlorophenol
- TPH

Ingestion PCLE zones exist for the following COCs in groundwater:

- Arsenic
- Benzene
- Beryllium
- Cadmium
- Chromium
- Lead
- Selenium
- Ethylbenzene
- Toluene
- 1,2,4-Trimethylbenzene (1,2,4-TMB)
- Cis-1,2-DCE
- Vinyl Chloride (VC)
- 1-Methylnapthalene
- TPH

Soil and groundwater analytical data tables are presented in **Tables 1A to 1E and Tables 2A to 2D**, respectively (presented in **Appendix F**). The analytical data tables present the concentrations of each COC detected above ingestion PCLs in soil and groundwater in comparison to the respective ingestion and non-ingestion PCLs.

Figures 6-1 to 6-33 (previously presented in **Appendix B**) depict the horizontal extent of the soil ingestion PCLE zone for the previously listed COCs in the soil. The ingestion PCLE zone is not fully delineated on-Site due to ubiquitous concentrations of metals just above ingestion PCLs in shallow surface soil across the Site; however, the Site is delineated to residential assessment levels, which are the non-ingestion PCL. Because of the ubiquitous concentrations of metals in shallow surface soil at the Site, the PCLE zone covers close to the entire property not including City of Houston ROW.

Appendix D

Figures 7-1 to 7-9 (previously presented in **Appendix B**) depict the horizontal extent of the groundwater ingestion PCLE zone for previously listed COCs in the groundwater. The groundwater ingestion PCLE zone is fully delineated and contained within the Designated Property. The PCLE zone covers close to the entire property not including City of Houston ROW due to the ubiquitous concentrations of metals just above their ingestion PCLs in groundwater. No COCs in groundwater have concentrations exceeding their respective non-ingestion PCLs. The depth of the impacted groundwater varies from elevations of 9.76 feet above Mean Sea Level to 24.19 feet above Mean Sea Level. Monitoring wells at the Designated Property were gauged in July 2009 and indicate groundwater flow direction is to the southwest.

Non-Ingestion PCLE zones exist for the following COCs:

- Antimony
- Arsenic
- Cadmium
- Copper
- Lead
- Mercury
- Thallium
- Zinc
- 1,2,3-Trichloropropane
- Benzo(a)pyrene
- Benzidine
- TPH

Figures 8-1 to 8-12 depict the horizontal extents of the above listed COCs in soil that exceed non-ingestion PCLs. The non-ingestion PCLE zone is fully delineated and contained within the Designated Property. Areas that contain soil with COC concentrations exceeding the non-ingestion PCL will require remedial actions through the TCEQ Voluntary Cleanup Program (VCP).

The chemical properties of the COCs listed above in this section are provided in the chemical abstract and fact sheet located in **Appendix D**. In general, all of the COCs are metals, which are not soluble in water, and VOCs and TPH, which are somewhat soluble in water to many parts per million. The chlorinated VOCs are denser than water and tend to sink in groundwater if present above the solubility limit. Gasoline and other aromatic VOCs are lighter than water and tend to float in groundwater if present above the solubility limit. 1-Methylnapthalene, a semi-volatile VOC (SVOC), was also detected in groundwater with a concentration exceeding the ingestion PCL. SVOCs are generally not very soluble with water and tend to float in groundwater if present above the solubility limit. Based on concentrations reported in the

groundwater, there is no indication that a dense or light non-aqueous phase liquid (NAPL) is present at the Designated Property.

Soil Ingestion and Non-Ingestion PCLE Zone Descriptions by COC

Antimony was detected in the soil with a maximum concentration of 120 mg/kg in ESE-SB-102 at a depth of 10-12 feet below ground surface (bgs). ESE-SB-102 is located east of Building 06F. The concentration of 120 mg/kg exceeds the ingestion and non-ingestion PCLs of 2.7 mg/kg and 15 mg/kg, respectively. Antimony was detected above ingestion and non-ingestion PCLs in numerous shallow surface soil samples (0-5 feet bgs) and with a maximum depth of 38-40 feet bgs in MW-23, the area of a historic landfill with fill material to a depth of approximately 40 feet. Antimony was not detected above ingestion PCLs in groundwater at the Site.

Arsenic was detected in the soil with a maximum concentration of 190 mg/kg in TER-SB-108 at a depth of 0-3 feet bgs. TER-SB-108 is located north of Building 13A. The concentration of 190 mg/kg exceeds the ingestion and non-ingestion PCLs of 5.9 mg/kg and 24 mg/kg, respectively. Arsenic was detected above ingestion and non-ingestion PCLs in several shallow surface soil samples (0-5 feet bgs) and with a maximum depth of 33-35 feet bgs in MW-23, the area of a historic landfill with fill material to a depth of approximately 40 feet bgs. Arsenic was detected above ingestion PCLs in groundwater at the Site; however, there appears to be no connection between arsenic detected in soil and arsenic detected in the groundwater. In monitoring well MW-23, arsenic was not detected in groundwater above the ingestion PCL despite the maximum depth of arsenic being located in the saturated zone.

Barium was detected in the soil with a maximum concentration of 900 mg/kg in TER-TMW-15 at a depth of 0-3 feet bgs. TER-TMW-15 is located in the former asphalt plant. The concentration of 900 mg/kg exceeds the ingestion PCL of 300 mg/kg, but is below the non-ingestion PCL of 7,800 mg/kg. Barium was detected above ingestion PCLs in only a few shallow surface soil samples (0-3 feet bgs) and with a maximum depth of 3 feet bgs in temporary monitoring well TER-TMW-15. Barium was not detected above non-ingestion PCLs and was not detected in groundwater above ingestion PCLs.

Beryllium was detected in the soil with a maximum concentration of 3 mg/kg in a duplicate sample collected from LTE-SB-31 at a depth of 10-12 feet bgs. LTE-SB-31 is located west of Building 05. The concentration of 3 mg/kg exceeds the ingestion PCL of 1.5 mg/kg but does not exceed the non-ingestion PCL of 38 mg/kg. Beryllium was detected above ingestion PCLs in several surface soil samples (0-6 feet bgs) and with a maximum depth of 26-28 feet bgs in ESE-MW-09, located east of Building 06F, the area of a historic landfill with fill material to a depth of approximately 35 feet bgs. Beryllium was not detected above non-ingestion PCLs in soil. Beryllium was detected above ingestion PCLs in groundwater; however, there appears to be no connection between beryllium in the soil and beryllium in the groundwater due to the location and concentrations of the soil and groundwater impacts.

Cadmium was detected in the soil with a maximum concentration of 54 mg/kg in soil borings ESE-SB-64 and TER-SB-51-A at depths of 2-4 feet bgs and 0-3 feet bgs, respectively. ESE-SB-64 is located south of Building 06 and TER-SB-51-A is located south of the Building 13 slab.

Appendix D

The concentration of 54 mg/kg exceeds the ingestion and non-ingestion PCLs of 0.75 mg/kg and 52 mg/kg, respectively. Cadmium was detected above ingestion PCLs in numerous shallow surface soil samples (0-6 feet bgs) and with a maximum depth of 38-40 feet bgs in MW-23, the area of a historic landfill with fill material to a depth of approximately 35 feet bgs. Cadmium was detected above non-ingestion PCLs only in the two samples listed above with a maximum depth of 4 feet bgs. Cadmium was detected above ingestion PCLs in groundwater at the Site (near Building 04 and Building 10); however, there appears to be no connection between cadmium detected in soil and cadmium detected in the groundwater. In monitoring well MW-23, cadmium in groundwater was not detected above the ingestion PCL despite the maximum depth of cadmium being located in the saturated zone.

Chromium was detected in a soil sample with a maximum concentration of 2,500 mg/kg from LTE-TMW-18 at a depth of 2-4 feet bgs. LTE-TMW-18 is located along the railroad tracks north of Buildings 13A and 13B. The concentration of 2,500 mg/kg exceeds the ingestion PCL of 1,200 for chromium. Chromium was not detected above the soil non-ingestion PCL. LTE-TMW-18 also represents the maximum depth that chromium was detected above the ingestion PCL. Chromium was detected in groundwater above the ingestion PCL but does not appear to be leaching from chromium detected in soil due to the location of groundwater and soil impact.

Hexavalent chromium was detected in soil with a maximum concentration of 20 mg/kg in TER-SB-109 at a depth of 0-3 feet. TER-SB-109 is located northeast of Building 13A and is the only location where hexavalent chromium was detected above ingestion PCLs. The concentration of 20 mg/kg exceeds the ingestion PCL of 14 mg/kg. No concentrations of hexavalent chromium were detected above non-ingestion PCLs. Hexavalent chromium was not detected in groundwater above ingestion PCLs.

Copper was detected in the soil with a maximum concentration of 14,000 mg/kg in ESE-TMW-33 at a depth of 13-15 feet bgs. ESE-TMW-33 is located inside Building 06D. The concentration of 14,000 mg/kg exceeds the ingestion and non-ingestion PCLs of 520 mg/kg and 550 mg/kg, respectively. Copper was detected above ingestion and non-ingestion PCLs in numerous surface samples (0-15 feet bgs) and with a maximum depth of 33-35 feet bgs in monitoring well MW-23, the area of a historic landfill with fill material to a depth of approximately 35 feet bgs. Copper was not detected above ingestion PCLs in groundwater at the Site despite concentrations exceeding the ingestion PCL in saturated soil.

Lead was detected in the soil with a maximum concentration of 6,600 mg/kg in ESE-SB-64 at a depth of 2-4 feet bgs. ESE-SB-64 is located south of Building 06. The concentration of 6,600 mg/kg exceeds the ingestion and non-ingestion PCLs of 15 mg/kg and 500 mg/kg, respectively. Lead was detected above ingestion PCLs across the entire Site mostly in the depth range of 0-15 feet bgs. Lead was detected above ingestion PCLs at a maximum depth of 38-40 feet and above the non-ingestion PCL at a depth of 33-35 feet, both in ESE-MW-23. Lead was detected above ingestion PCLs in groundwater at the Site but there does not appear to be a connection to lead impacts in the groundwater and lead impacts in soil. Lead was not detected in groundwater in monitoring well ESE-MW-23 despite concentrations of lead that exceed the non-ingestion PCL being detected in the saturated zone.

Appendix D

Mercury was detected in the soil with a maximum concentration of 35 mg/kg in ESE-SB-44 at a depth of 10-12 feet bgs. ESE-SB-44 is located west of Building 06. The concentration of 35 mg/kg exceeds the ingestion and non-ingestion PCLs of 0.04 and 2.10 mg/kg, respectively. Mercury was detected above ingestion PCLs across the Site mostly in shallow surface soil with a depth range of 0-5 feet bgs and was detected with a maximum depth of 33-35 feet bgs in ESE-MW-23, in the area of the former landfill with fill material down to approximately 35 feet bgs. Mercury was detected above non-ingestion PCLs at a maximum depth of 13-15 feet bgs in ESE-SB-44. Mercury was detected above ingestion PCLs in groundwater at one location (ESE-TMW-15) that is not associated with mercury detected in the soil.

Nickel was detected in the soil with a maximum concentration of 640 mg/kg in TER-SB-51-D at a depth of 0-3 feet bgs. TER-SB-51-D is located south of the Building 13 slab. The concentration of 640 mg/kg exceeds the ingestion PCL of 160 mg/kg but does not exceed the non-ingestion PCL of 830 mg/kg. Nickel was detected above ingestion PCLs across the Site but is mostly confined to a depth range of 0-5 feet bgs. The maximum depth where nickel was detected above the ingestion PCL was 13-15 feet bgs in ESE-SB-64, south of Building 06 in the area of the former landfill where fill material was detected down to approximately 35 feet bgs. Nickel was not detected above ingestion PCLs in groundwater at the Site.

Selenium was detected in soil with a maximum concentration of 160 mg/kg in ESE-SB-102 at a depth of 10-12 feet bgs. ESE-SB-102 is located east of Building 06F. The concentration of 160 mg/kg exceeds the ingestion PCL of 1.1 mg/kg but does not exceed the non-ingestion PCL of 310 mg/kg. Selenium was detected above the ingestion PCL across the Site but is mostly confined to a depth range of 0-5 feet bgs. The maximum depth where selenium was detected above the ingestion PCL was 30-35 feet bgs in ESE-MW-23. Selenium was not detected above non-ingestion PCLs for soil but was detected just above the ingestion PCL for groundwater in a few locations.

Silver was detected in soil with a maximum concentration of 18 mg/kg at a depth of 3-5 feet bgs in ESE-SB-68, which is located immediately west of Building 06. The concentration of 18 mg/kg exceeds the ingestion PCL of 0.24 mg/kg but does not exceed the non-ingestion PCL of 95 mg/kg. Silver was detected above the ingestion PCL across the Site but is mostly confined to a depth range of 0-5 feet bgs. The maximum depth where silver was detected above the ingestion PCL was 38-40 feet bgs in LTE-TMW-41, located north of Building 02. Silver was not detected above non-ingestion PCLs for soil and was not detected above ingestion PCLs in groundwater at the Site.

Appendix D

Thallium was detected in soil with a maximum concentration of 65 mg/kg at a depth of 2-4 feet bgs in ESE-SB-64, which is located south of Building 06. The concentration of 65 mg/kg exceeds the ingestion and non-ingestion PCLs of 0.9 mg/kg and 6.3 mg/kg, respectively. Thallium was detected above the ingestion PCL across the Site at varying depths. The maximum depth where thallium was detected above the ingestion PCL was 38-40 feet bgs in LTE-TMW-41, located north of Building 02. The maximum depth where thallium was detected above the non-ingestion PCL was 15-16 feet bgs in ESE-SB-102. Thallium was not detected above ingestion PCLs for groundwater at the Site.

Zinc was detected in soil with a maximum concentration of 25,000 mg/kg at a depth of 3-5 feet bgs in ESE-SB-57, which is located southwest of Building 06. The concentration of 25,000 mg/kg exceeds the ingestion and non-ingestion PCLs of 1,200 mg/kg and 9,900 mg/kg, respectively. Zinc was detected above the ingestion and non-ingestion PCLs at depths ranging mostly from 0-15 feet. The maximum depth that zinc was detected above the ingestion PCL is 33-35 feet bgs in ESE-MW-23. The maximum depth that zinc was detected above the non-ingestion PCL is ESE-SB-64. Both locations are south of Building 06 in the area of the former landfill with fill material detected down to approximately 35 feet bgs. Zinc was not detected above ingestion PCLs for groundwater.

Benzene was detected in soil with a maximum concentration of 6.5 mg/kg at a depth of 16-18 feet bgs in LTE-TMW-41, which is located north of Building 02. The concentration of 6.5 mg/kg exceeds the ingestion PCL of 0.026 mg/kg but does not exceed the non-ingestion PCL of 66 mg/kg. No plume of benzene impact was detected in the soil, only isolated locations where it exceeded the ingestion PCL. Benzene was not detected in soil above the non-ingestion PCL, but was detected above the ingestion PCL in groundwater.

Chlorobenzene was detected with a concentration of 22 mg/kg at a depth of 9-12 feet bgs in TER-SB-76, which is located near the Ingram's Gully fill material area. The concentration of 22 mg/kg exceeds the ingestion PCL of 1.1 mg/kg but does not exceed the non-ingestion PCL of 520 mg/kg. This is the only location at the Site where chlorobenzene was detected above the ingestion PCL. Chlorobenzene was not detected above ingestion PCLs in groundwater at the Site.

Cis-1,2-DCE was detected with a concentration of 0.28 mg/kg at a depth of 9-12 feet bgs in TER-SB-76, which is located near the Ingram's Gully fill material area. The concentration of 0.28 mg/kg exceeds the ingestion PCL of 0.25 mg/kg but does not exceed the non-ingestion PCL of 770 mg/kg. This is the only location at the Site where cis-1,2-DCE was detected above the ingestion PCL.

Cis-1,3-dichloropropene was detected with a concentration of 0.28 mg/kg at a depth of 9-12 feet bgs in TER-SB-76, which is located near the Ingram's Gully fill material area. The concentration of 0.28 mg/kg exceeds the ingestion PCL of 0.0066 mg/kg but does not exceed the non-ingestion PCL of 7.6 mg/kg. This is the only location at the Site where cis-1,3-dichlorpropene was detected above the ingestion PCL. Cis-1,3-dichloropropene was not detected above groundwater ingestion PCLs at the Site.

Appendix D

Ethylbenzene was detected with a maximum concentration of 79 mg/kg at a depth of 16-18 feet bgs in LTE-TMW-41, which is located north of Building 02 along the Ingram's Gully fill material area. The concentration of 79 mg/kg exceeds the ingestion PCL of 7.6 mg/kg but does not exceed the non-ingestion PCL of 5,300 mg/kg. The maximum depth where ethylbenzene was detected above the ingestion PCL is 22-24 feet bgs in LTE-SB-69, located in the area of a former tank hold north of Buildings 03 and 12. Ethylbenzene was not detected above the non-ingestion at the Site but was detected above the groundwater ingestion PCL.

Methylene chloride was detected with a maximum concentration of 0.71 mg/kg at a depth of 2-4 feet bgs in LTE-TMW-02, which is located west of Building 14. The concentration of 0.71 mg/kg exceeds the ingestion PCL of 0.013 mg/kg but does not exceed the non-ingestion PCL of 390 mg/kg. The maximum depth where methylene chloride was detected above the ingestion PCL is 10-12 feet bgs in LTE-SB-31, immediately west of Building 12. Methylene chloride was not detected above the non-ingestion PCL nor was it detected above groundwater ingestion PCLs at the Site.

PCE was detected with a maximum concentration of 14 mg/kg and at a maximum depth of 13-15 feet bgs in ESE-SB-40, which is located east of Building 06F. The concentration of 14 mg/kg exceeds the ingestion PCL of 0.050 mg/kg but does not exceed the non-ingestion PCL of 100 mg/kg. PCE was not detected above groundwater ingestion PCLs at the Site.

Toluene was detected with a maximum concentration of 270 mg/kg at a maximum depth of 16-18 feet bgs in ESE-TMW-41, which is located northeast of Building 06 in the area of a former tankhold. The concentration of 270 mg/kg exceeds the ingestion PCL of 8.2 mg/kg but does not exceed the non-ingestion PCL of 5,900 mg/kg. This is the only location where toluene was detected above the ingestion PCL and it was not detected above groundwater ingestion PCLs at the Site.

TCE was detected with a maximum concentration of 0.42 mg/kg and at a maximum depth of 13-15 feet bgs in ESE-SB-40, which is located east of Building 06F. The concentration of 0.42 mg/kg exceeds the ingestion PCL of 0.050 mg/kg but does not exceed the non-ingestion PCL of 120 mg/kg. TCE was not detected above groundwater ingestion PCLs at the Site.

1,2,3-Trichloroprpane was detected with a maximum concentration of 1.9 mg/kg at a depth of 3-5 feet bgs in ESE-MW-15, located southwest of Building 06. The concentration of 1.9 mg/kg exceeds the ingestion and non-ingestion PCLs of 0.0023 mg/kg and 0.87 mg/kg, respectively. The maximum depth where 1,2,3-trichlorpropane was detected above ingestion PCLs is 9-12 feet bgs in TER-SB-76, located along the Ingram's Gully fill material area. The maximum depth where 1,2,3-trichloropropane was detected above non-ingestion PCLs is 3-5 feet bgs in ESE-MW-15. 1,2,3-Trichloropropane was not detected above groundwater ingestion PCLs at the Site.

Appendix D

Xylenes were detected with a maximum concentration of 360 mg/kg and a maximum depth of 16-18 feet bgs in ESE-TMW-41, which is located northeast of Building 06 in the area of a former tankhold. The concentration of 360 mg/kg exceeds the ingestion PCL of 120 mg/kg but does not exceed the non-ingestion PCL of 6,000 mg/kg. This is the only location where toluene was detected above the ingestion PCL and it was not detected above groundwater ingestion PCLs at the Site.

Benzo(a)pyrene was detected with a maximum concentration of 2.5 mg/kg and a maximum depth of 18-20 feet bgs in LTE-TMW-38, which is located along the Ingram's Gully fill material area north of Building 02. The concentration of 2.5 mg/kg does NOT exceed the ingestion PCL of 7.6 mg/kg but DOES exceed the non-ingestion PCL of 0.56 mg/kg. Benzo(a)pyrene was not detected above the ingestion PCL nor was it detected above the groundwater ingestion PCL.

Benzidine was detected with a maximum concentration of 0.054 mg/kg and maximum depth of 10-12 feet bgs in ESE-SB-56, located inside Building 06C. The concentration of 0.054 mg/kg exceeds the ingestion and non-ingestion PCLs of 0.000011 mg/kg and 0.015 mg/kg, respectively. ESE-SB-56 is the only location where benzidine was detected above the ingestion and non-ingestion PCLs. Benzidine was not detected above the groundwater ingestion PCL at the Site.

Bis (2-chlorethyoxy)methane was detected with a maximum concentration of 0.066 mg/kg and maximum depth of 8-10 feet bgs in TER-SB-57, located near the Ingram's Gully fill material area and east of the Building 13 slab. The concentration of 0.066 mg/kg exceeds the ingestion PCL of 0.012 mg/kg but does not exceed the non-ingestion PCL of 3.1 mg/kg. Bis (2-chlorethyoxy)methane was only detected in two locations, TER-SB-57 and LTE-TMW-08, and was not detected above the non-ingestion PCL or the groundwater ingestion PCL.

2,4-Dinitrotoluene was detected with a maximum concentration of 0.14 mg/kg and a maximum depth of 0-3 feet bgs in TER-MW-04, which is located in the former asphalt plant south of Building 18. The concentration of 0.14 mg/kg exceeds the ingestion PCL of 0.0053 mg/kg but does not exceed the non-ingestion PCL of 6.9 mg/kg. TER-MW-04 is the only location where 2,4-dinitrotoluene was detected above the ingestion PCL and it was not detected above groundwater ingestion PCLs at the Site.

2,6-Dinitrotoluene was detected with a maximum concentration of 0.17 mg/kg and a maximum depth of 6-9 feet bgs in TER-SB-26-B, which is located in the former asphalt plant south of Building 18. The concentration of 0.17 mg/kg exceeds the ingestion PCL of 0.0048 mg/kg but does not exceed the non-ingestion PCL of 6.9 mg/kg. TER-SB-26-B is the only location where 2,6-dinitrotoluene was detected above the ingestion PCL and it was not detected above groundwater ingestion PCLs at the Site.

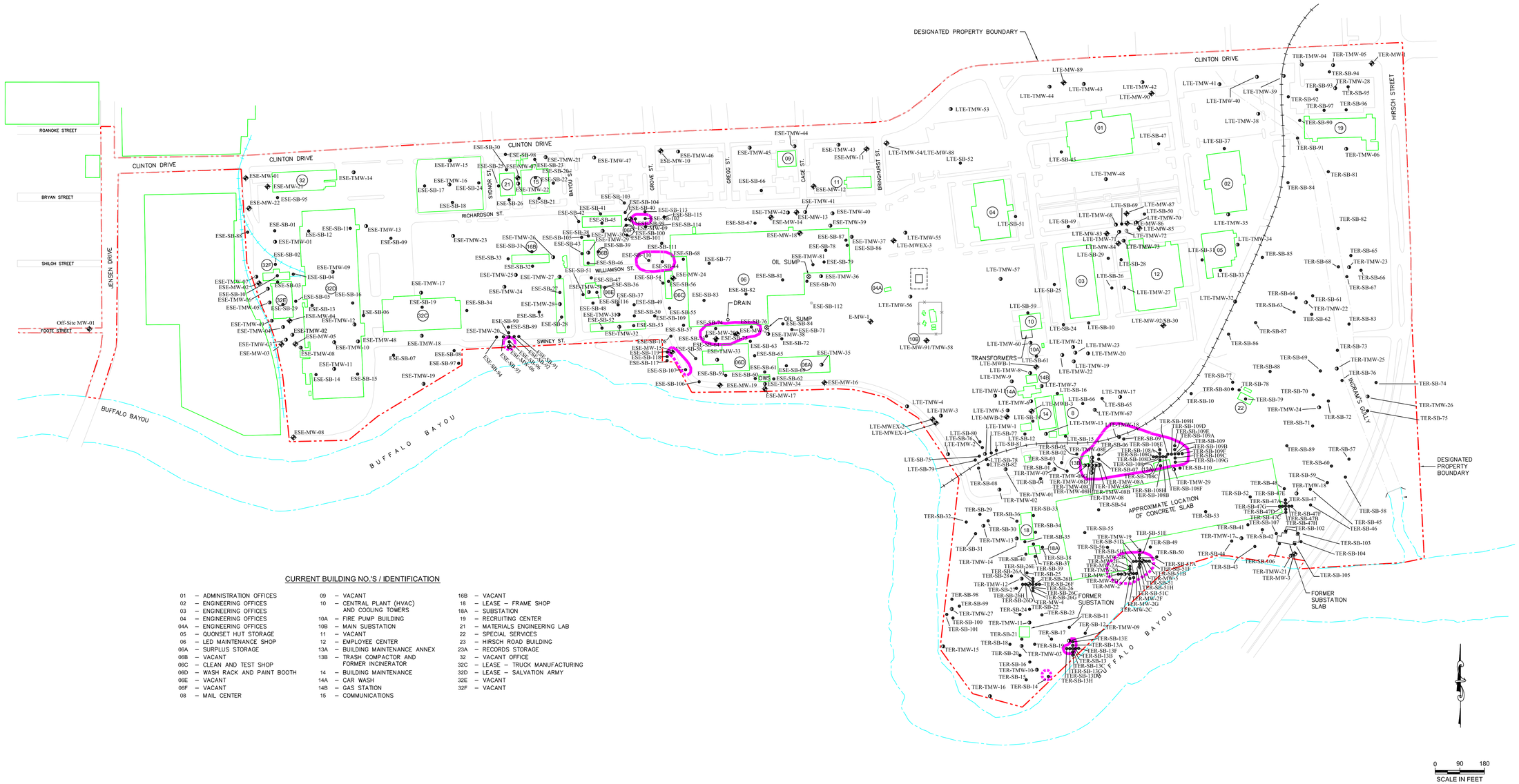
Appendix D

2,4-Dinitrophenol was detected with a maximum concentration of 2.6 mg/kg at a depth of 3-6 feet bgs in TER-SB-26-C, which is located in the former asphalt plant south of Building 18. The concentration of 2.6 mg/kg exceeds the ingestion PCL of 0.094 mg/kg but does not exceed the non-ingestion PCL of 130 mg/kg. The maximum depth where 2,4-dinitrophenol was detected above ingestion PCLs is 20-22 feet bgs in LTE-TMW-04, which is located west of Building 14. 2,4-Dinitrophenol was not detected above the groundwater ingestion PCL at the Site.

Pentachlorophenol was detected with a maximum concentration of 0.16 mg/kg at a depth of 0-3 feet bgs in TER-SB-26-G, which is located in the former asphalt plant south of Building 18. The concentration of 0.16 mg/kg exceeds the ingestion PCL of 0.018 mg/kg but does not exceed the non-ingestion PCL of 2.4 mg/kg. The maximum depth where pentachlorophenol was detected above the ingestion PCL is 2-4 feet bgs in LTE-SB-66, located east of Building 8. Soil borings TER-SB-26-G and LTE-SB-66 are the only locations where pentachlorophenol was detected above ingestion PCLs. Pentachlorophenol was not detected above the groundwater ingestion PCL at the Site.

TPH was detected with a maximum total concentration of 34,000 mg/kg for the entire C_6-C_{35} range at a depth of 6-9 feet bgs in TER-SB-26, which is located in the former asphalt plant south of Building 18. The concentration of 34,000 mg/kg exceeds the ingestion and non-ingestion PCLs of 33 mg/kg and 99 mg/kg, respectively, for samples analyzed using Texas Method 1005. The sample collected from soil boring TER-SB-26 was also analyzed using Texas Method 1006 to characterize the TPH as aromatic and aliphatic fractionated ranges of hydrocarbons. None of the fractionated ranges of TPH exceeded the ingestion or non-ingestion PCLs. TPH was detected above the ingestion PCL with a maximum depth of 30-31 feet in ESE-TMW-04, the location of a former tank hold west of Building 32. TPH was detected above the non-ingestion PCL with a maximum depth of 22-24 feet bgs in LTE-TMW-03, which is located west of Building 14. Both of these samples were also analyzed using Texas Method 1006 and did not result in concentrations of aliphatic or aromatic fractionated ranges above ingestion or non-ingestion PCLs.

Descriptions of COCs detected above groundwater ingestion PCLs are presented in **Appendix E**.



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Antimony in soil with concentrations exceeding the non-ingestion PCL of 15 mg/kg.

FIGURE 8-1
SOIL NON-INGESTION PCLE ZONE MAP
ANTIMONY
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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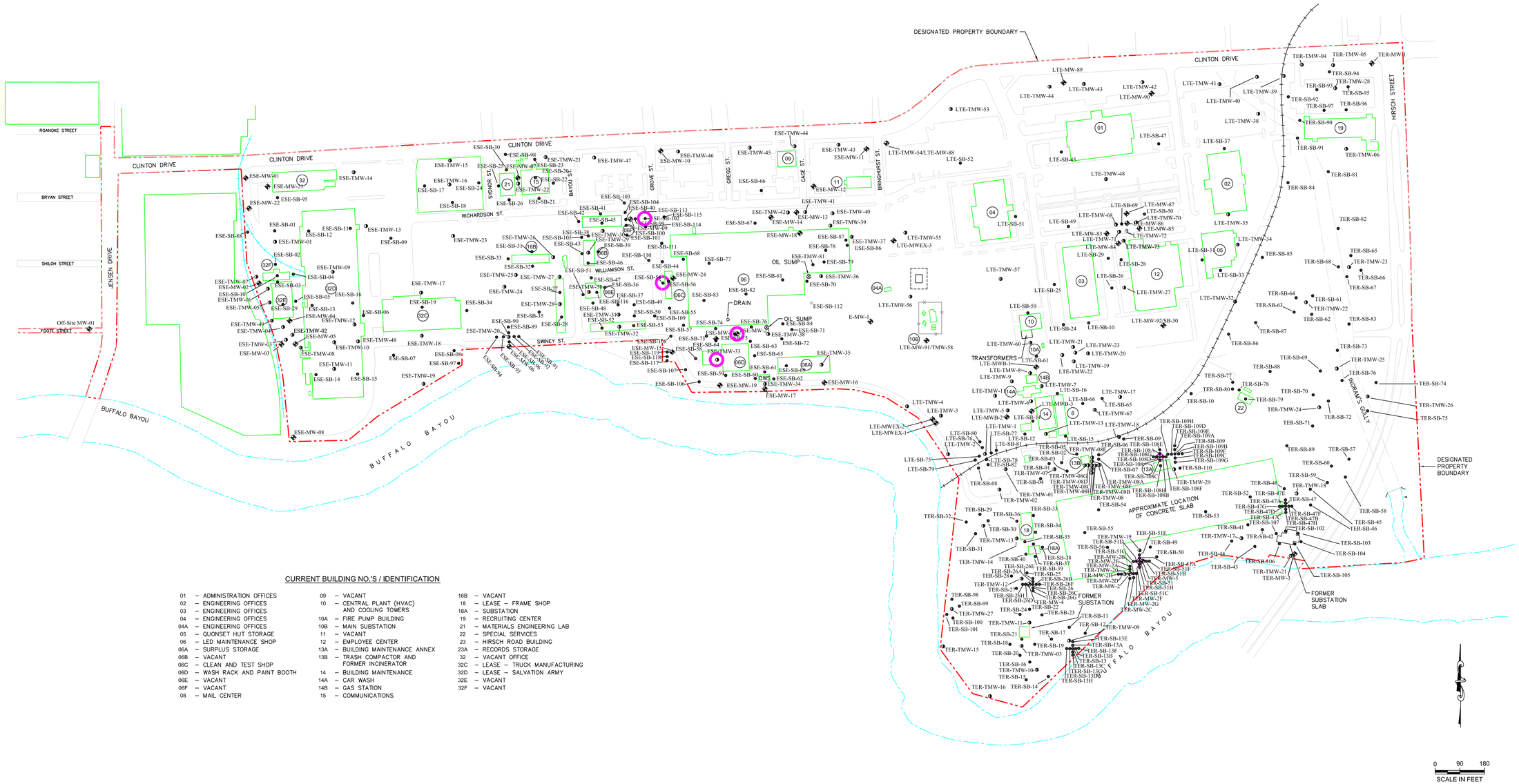
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Arsenic in soil with concentrations exceeding the non-ingestion PCL of 24 mg/kg.

FIGURE 8-2
SOIL NON-INGESTION PCLE ZONE MAP
ARSENIC
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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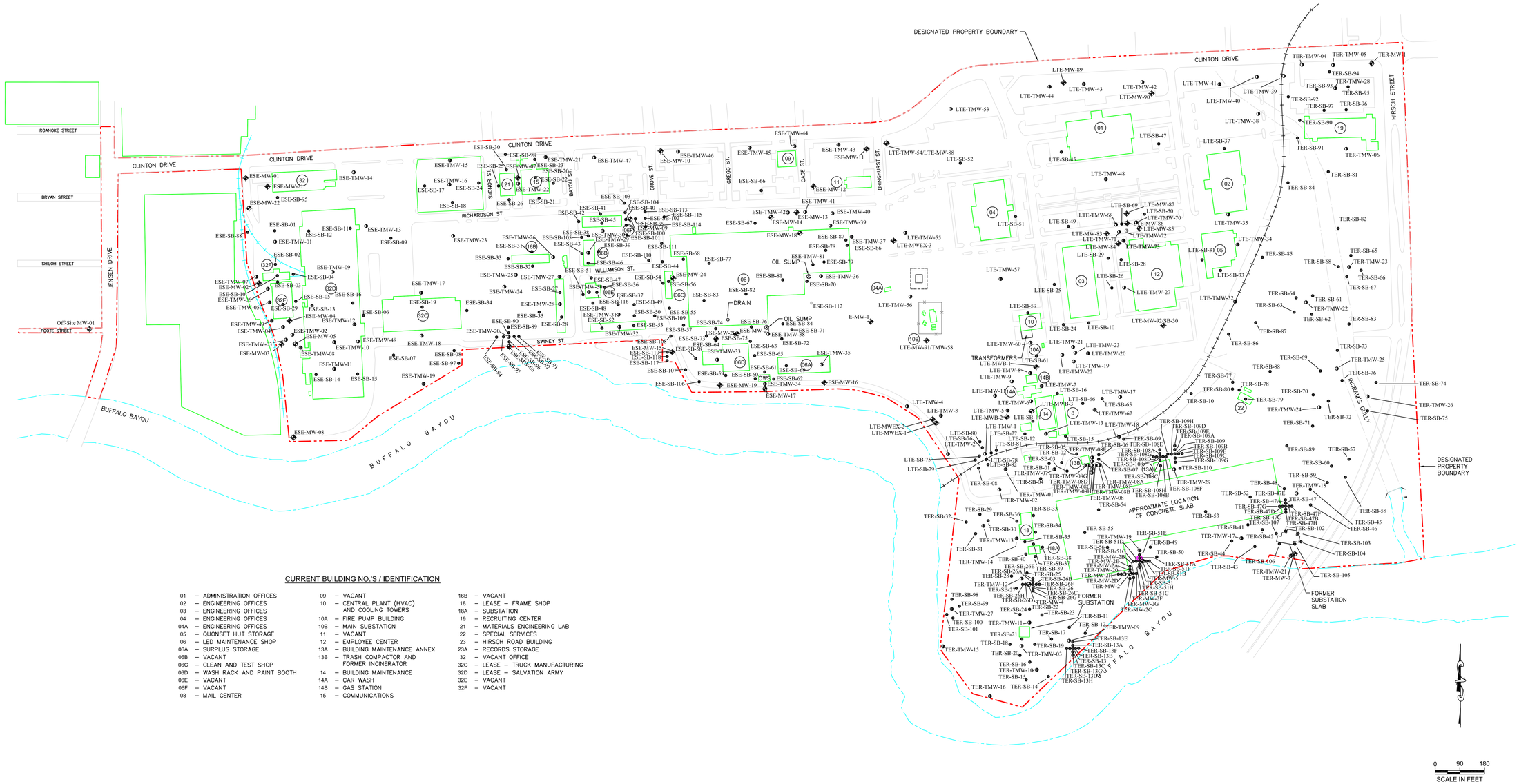

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Cadmium in soil with concentrations exceeding the non-ingestion PCL of 52 mg/kg.

FIGURE 8-3
SOIL NON-INGESTION PCLE ZONE MAP
CADMIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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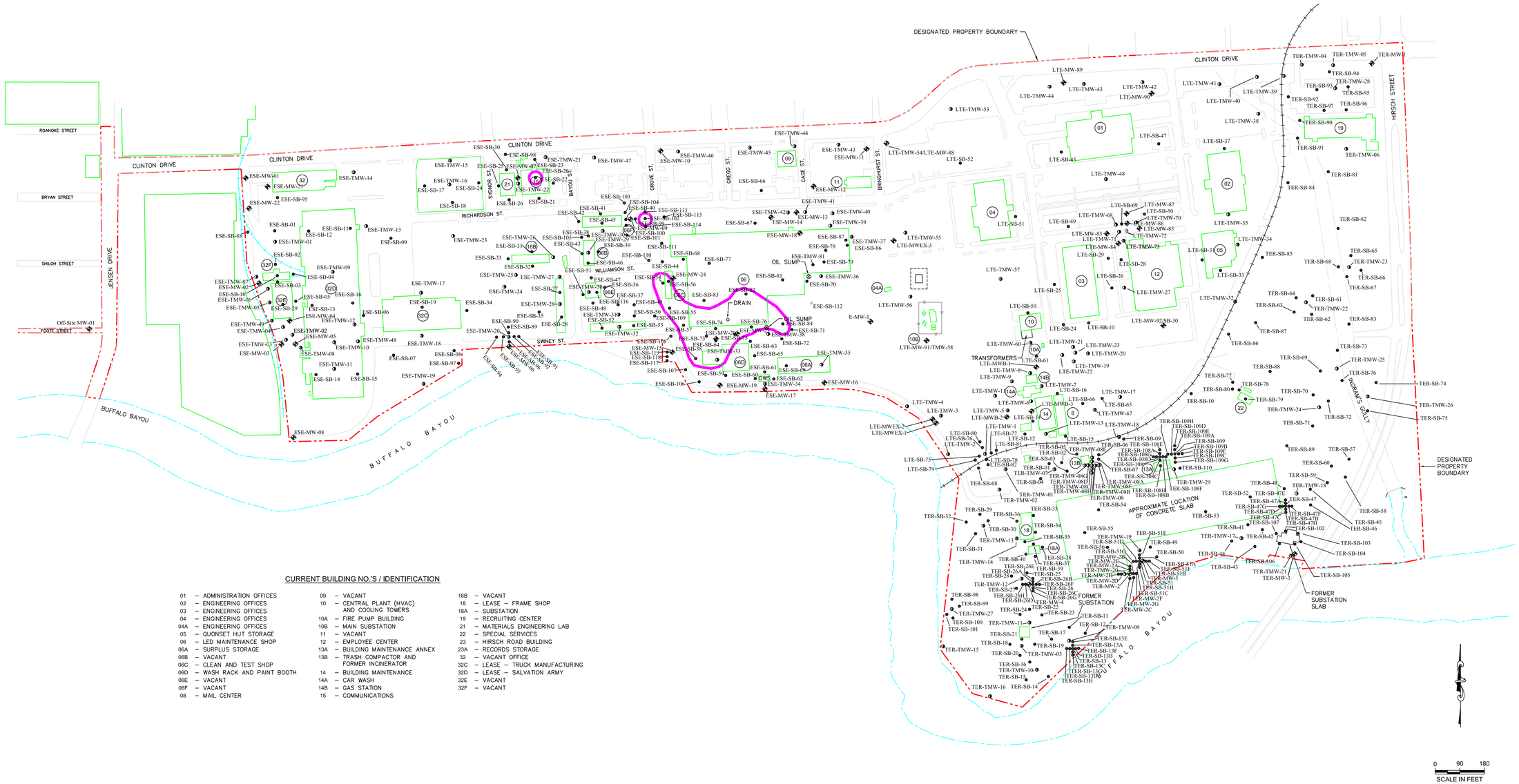

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Copper in soil with concentrations exceeding the non-ingestion PCL of 550 mg/kg.

FIGURE 8-4
SOIL NON-INGESTION PCLE ZONE MAP
COPPER
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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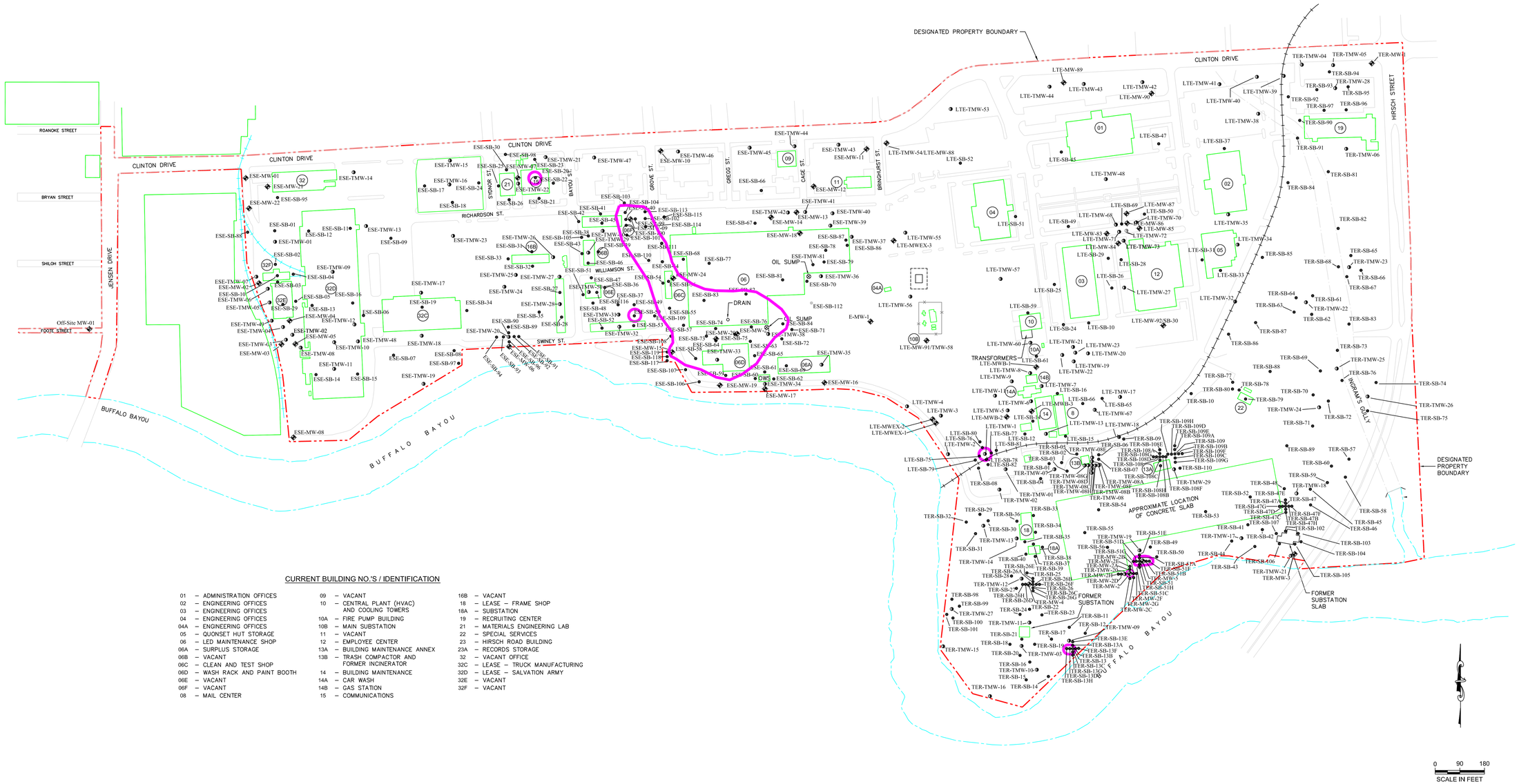
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Lead in soil with concentrations exceeding the non-ingestion PCL of 500 mg/kg.

FIGURE 8-5
SOIL NON-INGESTION PCLE ZONE MAP
LEAD
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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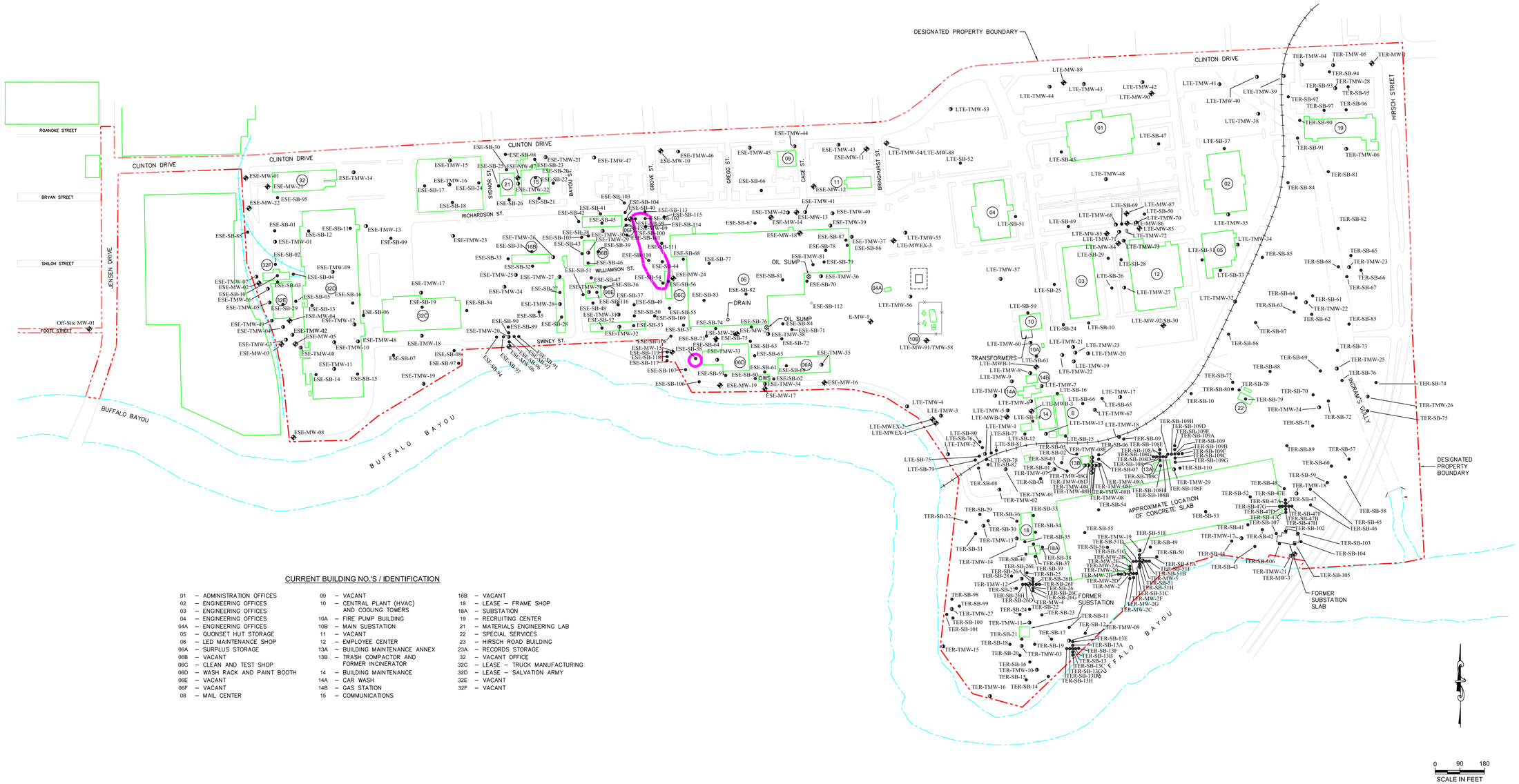

CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Mercury in soil with concentrations exceeding the non-ingestion PCL of 2.10 mg/kg.

FIGURE 8-6
SOIL NON-INGESTION PCLE ZONE MAP
MERCURY
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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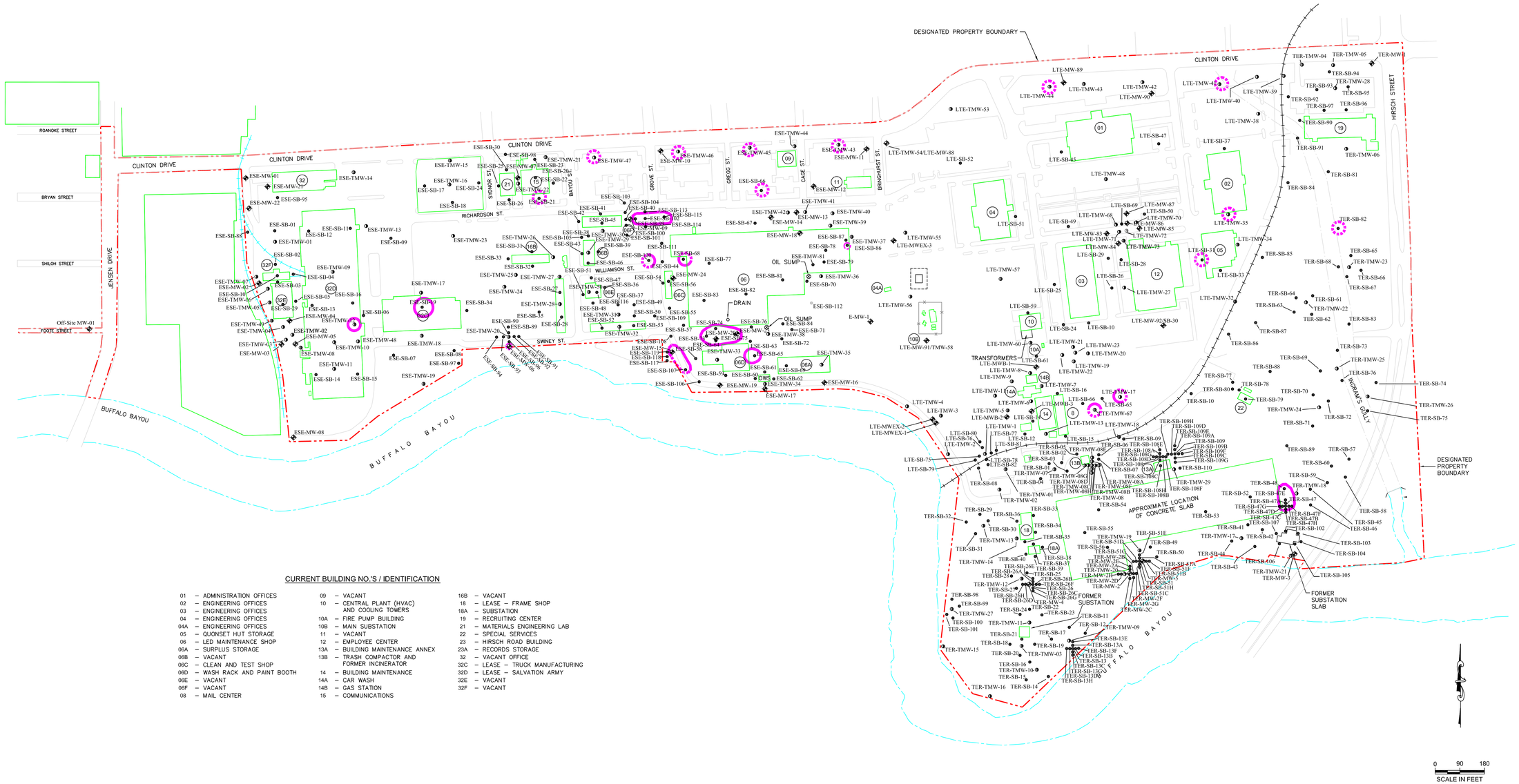
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Thallium in soil with concentrations exceeding the non-ingestion PCL of 6.3 mg/kg.

FIGURE 8-7
SOIL NON-INGESTION PCLE ZONE MAP
THALLIUM
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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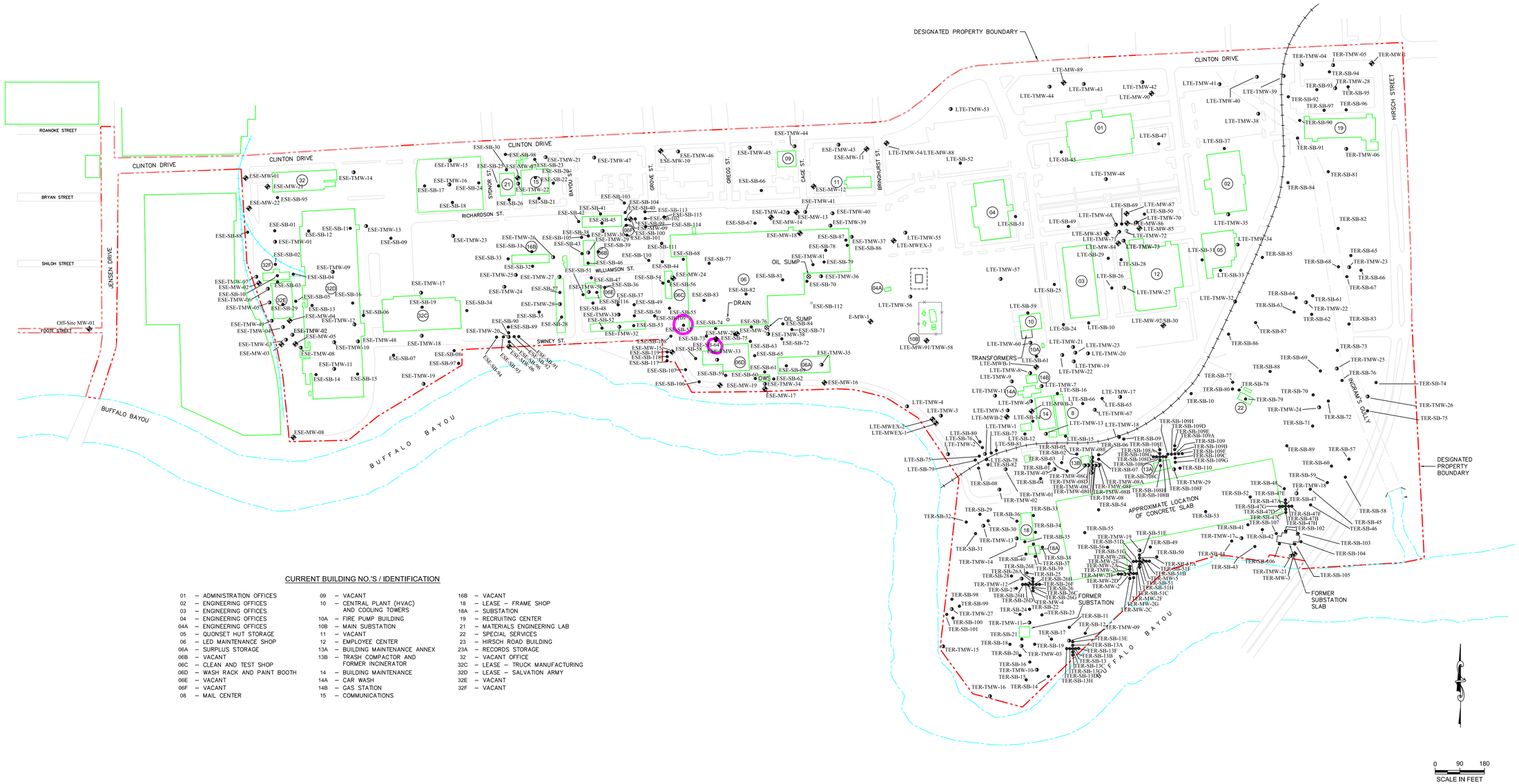
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



CURRENT BUILDING NO.'S / IDENTIFICATION

01	– ADMINISTRATION OFFICES	09	– VACANT	16B	– VACANT
02	– ENGINEERING OFFICES	10	– CENTRAL PLANT (HVAC) AND COOLING TOWERS	18	– LEASE – FRAME SHOP
03	– ENGINEERING OFFICES			18A	– SUBSTATION
04	– ENGINEERING OFFICES	10A	– FIRE PUMP BUILDING	19	– RECRUITING CENTER
04A	– ENGINEERING OFFICES	10B	– MAIN SUBSTATION	21	– MATERIALS ENGINEERING LAB
05	– QUONSET HUT STORAGE	11	– VACANT	22	– SPECIAL SERVICES
06	– LED MAINTENANCE SHOP	12	– EMPLOYEE CENTER	23	– HIRSCH ROAD BUILDING
06A	– SURPLUS STORAGE	13A	– BUILDING MAINTENANCE ANNEX	23A	– RECORDS STORAGE
06B	– VACANT	13B	– TRASH COMPACTOR AND FORMER INCINERATOR	32	– VACANT OFFICE
06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Zinc in soil with concentrations exceeding the non-ingestion PCL of 9,900 mg/kg.

FIGURE 8-8
SOIL NON-INGESTION PCLE ZONE MAP
ZINC
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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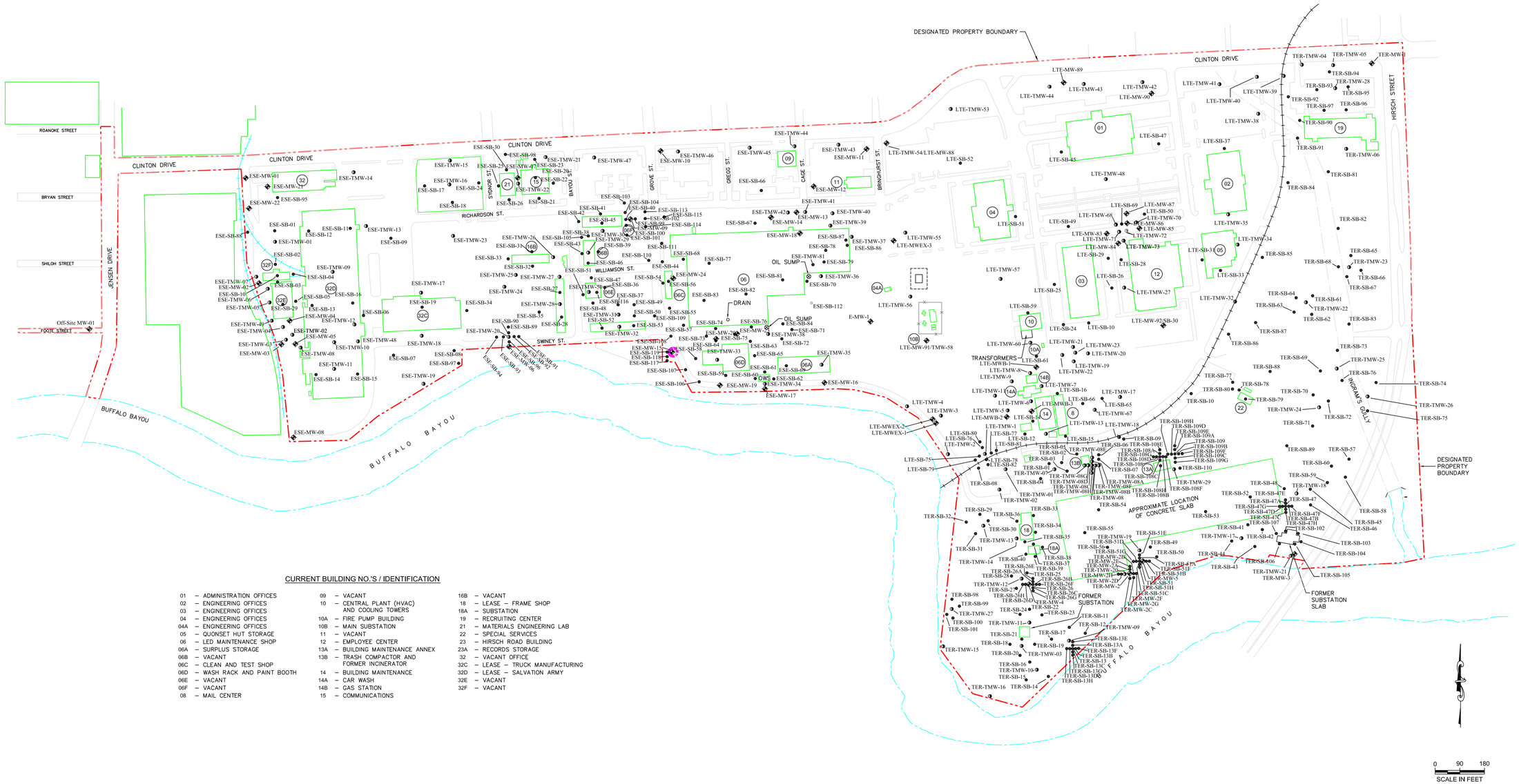

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06C	– CLEAN AND TEST SHOP			32C	– LEASE – TRUCK MANUFACTURING
06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- 1,2,3–Trichloropropane in soil with concentrations exceeding the non–ingestion PCL of 0.87 mg/kg.

FIGURE 8–9
SOIL NON–INGESTION PCLE ZONE MAP
1,2,3–TRICHLOROPROPANE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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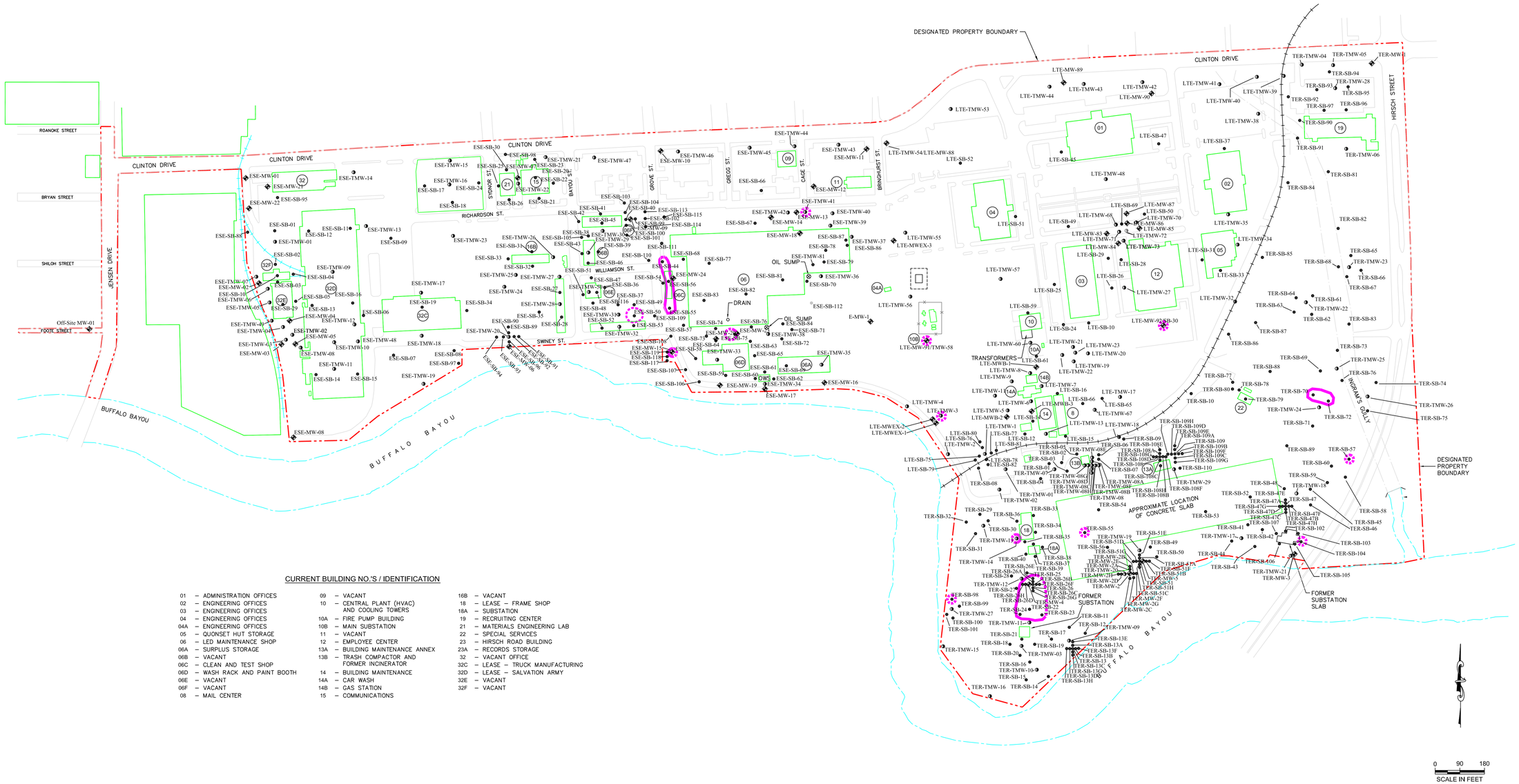

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06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- TPH in soil with concentrations exceeding the non-ingestion PCL of 1,100mg/kg for C6–C12 and 2,000 mg/kg for C12–C35.

FIGURE 8–10
SOIL NON–INGESTION PCLE ZONE MAP
TPH
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
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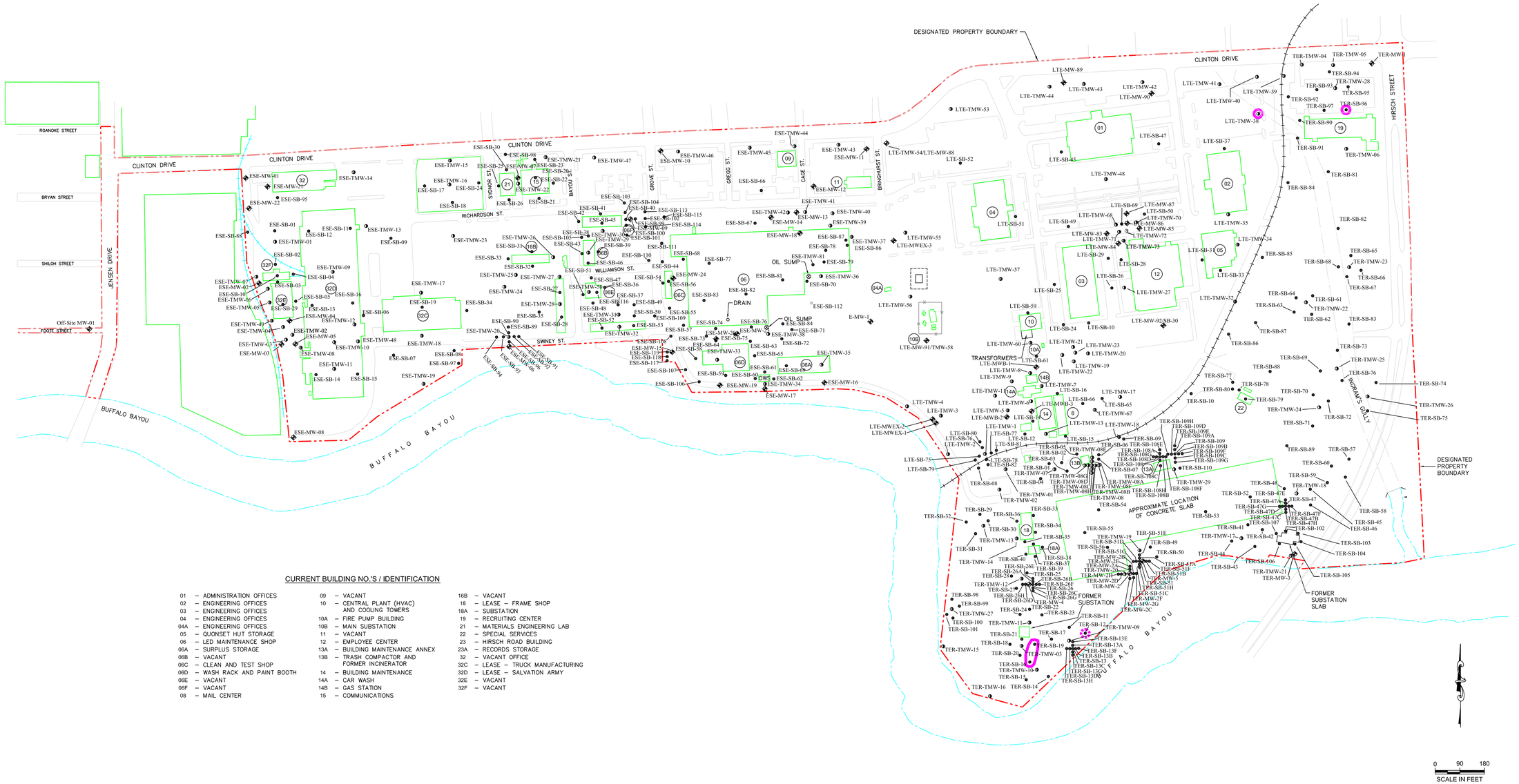
Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003



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06D	– WASH RACK AND PAINT BOOTH	14	– BUILDING MAINTENANCE	32D	– LEASE – SALVATION ARMY
06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Benzo(a)pyrene in soil with concentrations exceeding the non-ingestion PCL of 7.6 mg/kg.

FIGURE 8-11
SOIL NON-INGESTION PCLE ZONE MAP
BENZO(A)PYRENE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

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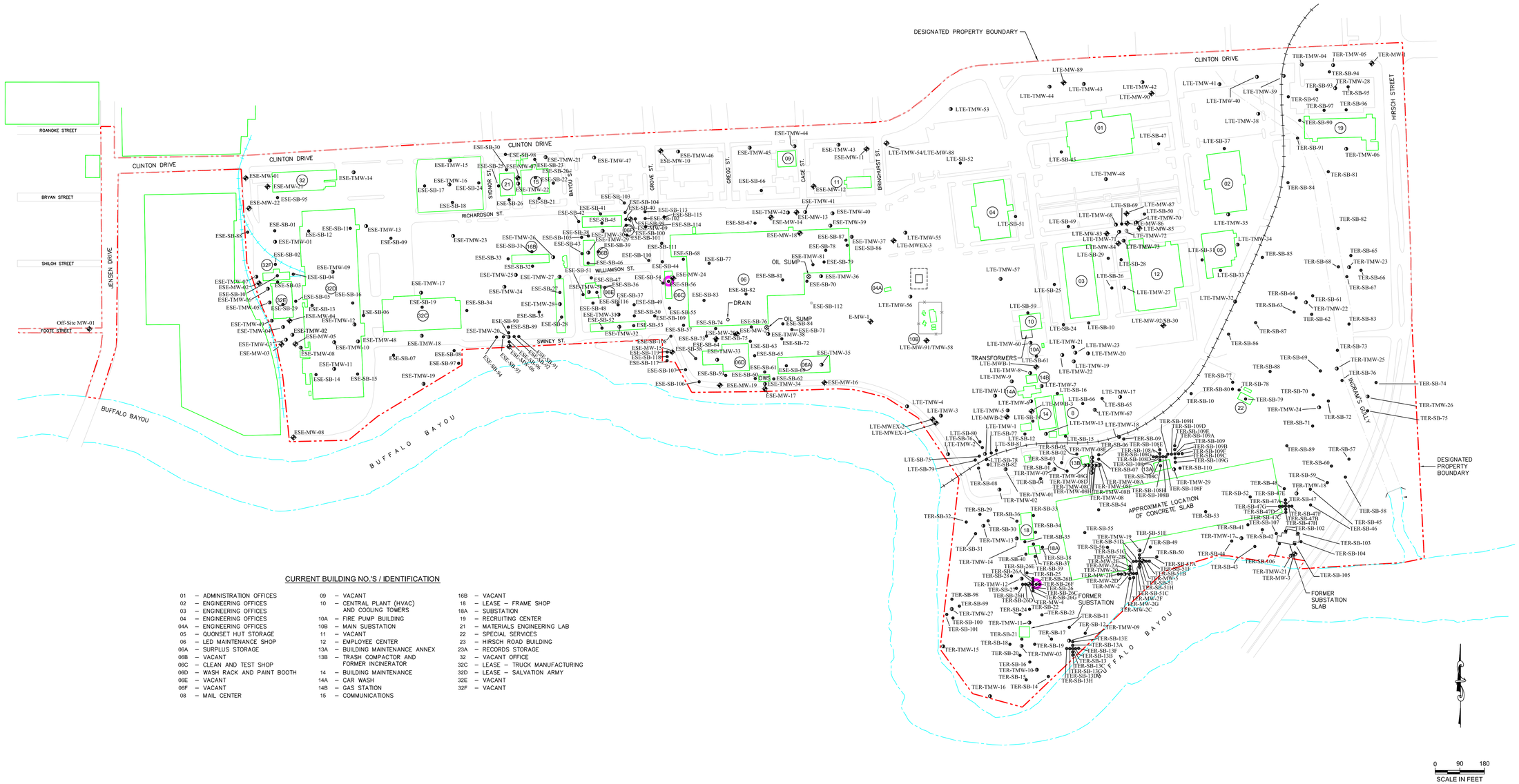

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06E	– VACANT	14A	– CAR WASH	32E	– VACANT
06F	– VACANT	14B	– GAS STATION	32F	– VACANT
08	– MAIL CENTER	15	– COMMUNICATIONS		

LEGEND:

- DESIGNATED PROPERTY BOUNDARY
- SOIL BORING
- PERMANENT MONITORING WELL
- TEMPORARY MONITORING WELL
- Benzidine in soil with concentrations exceeding the non-ingestion PCL of 0.015 mg/kg.

FIGURE 8-12
SOIL NON-INGESTION PCLE ZONE MAP
BENZIDINE
KBR – CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

W&M ENVIRONMENTAL GROUP, INC.
www.wh-m.com

Date: September 18, 2009	Edited by: PTF	MSD	W&M Project Number: 760.003

Right to Know

Hazardous Substance Fact Sheet

Common Name: **1,2,3-TRICHLOROPROPANE**

Synonyms: Allyl Trichloride; Trichlorohydrin

Chemical Name: Propane, 1,2,3-Trichloro-

Date: May 1999 Revision: June 2008

CAS Number: 96-18-4

RTK Substance Number: 1902

DOT Number: UN 2810

Description and Use

1,2,3-Trichloropropane is a colorless to straw-colored, heavy liquid with a *Chloroform*-like odor. It is used as a paint and varnish remover, as a solvent for oils, fats, waxes, rubber, and resins, as a degreasing agent, and in the manufacture of other chemicals.

Reasons for Citation

- **1,2,3-Trichloropropane** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, NIOSH, NTP, DEP, IARC, IRIS, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	2
FLAMMABILITY	-	2
REACTIVITY	-	1
CARCINOGEN AND MUTAGEN COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **1,2,3-Trichloropropane** can affect you when inhaled and by passing through the skin.
- **1,2,3-Trichloropropane** should be handled as a CARCINOGEN and MUTAGEN--WITH EXTREME CAUTION.
- Contact can irritate and burn the skin and eyes.
- Inhaling **1,2,3-Trichloropropane** can irritate the nose, throat and lungs.
- Exposure can cause headache, dizziness, lightheadedness, and affect memory.
- **1,2,3-Trichloropropane** may damage the liver and kidneys.
- Exposure may affect the brain and the heart.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **50 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **10 ppm** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **10 ppm** averaged over an 8-hour workshift.

- **1,2,3-Trichloropropane** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **1,2,3-Trichloropropane**:

- Contact can irritate and burn the skin and eyes.
- Inhaling **1,2,3-Trichloropropane** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- Exposure can cause headache, dizziness, lightheadedness, and affect concentration, memory and muscle coordination.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **1,2,3-Trichloropropane** and can last for months or years:

Cancer Hazard
- **1,2,3-Trichloropropane** is a PROBABLE CARCINOGEN in humans since it has been shown to cause liver, mouth, and stomach cancer in animals.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard
- There is limited evidence that **1,2,3-Trichloropropane** may affect female fertility in animals.

Other Effects
- Prolonged or repeated exposure can cause redness, drying and cracking of the skin.
- **1,2,3-Trichloropropane** may damage the liver and kidneys.
- Exposure may affect the heart.
- This chemical has not been adequately evaluated to determine whether repeated exposure can cause brain or other nerve damage. However, many solvents and other petroleum-based chemicals have been shown to cause such damage. Effects may include reduced memory and concentration, personality changes (withdrawal, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").

Medical

Medical Testing
For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- Liver and kidney function tests
- EKG
- Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as for headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- More than light alcohol consumption can cause liver damage, drinking alcohol may increase the liver damage caused by **1,2,3-Trichloropropane**.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **1,2,3-Trichloropropane**. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend Butyl, Polyvinyl Alcohol, and Viton for gloves and DuPont Tychem® BR, LV, Responder®, and TK; Kappler® Zytron® 300; and Saint-Gobain ONESuit® TEC, or the equivalent, as protective materials for *Aliphatic Halogens*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- Do not wear contact lenses when working with this substance.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **10 ppm**, use a NIOSH approved full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **1,2,3-Trichloropropane**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential exists for high exposure (but less than **100 ppm**), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **100 ppm** is immediately dangerous to life and health. If the possibility of exposure above **100 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **1,2,3-Trichloropropane** is a COMBUSTIBLE LIQUID.
- Use dry chemical, CO_2, or alcohol-resistant foam as extinguishing agents.
- Fine water spray may be used to blanket the fire.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **1,2,3-Trichloropropane** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
- Ventilate and wash area after clean-up is complete.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **1,2,3-Trichloropropane** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **1,2,3-Trichloropropane** you should be trained on its proper handling and storage.

- **1,2,3-Trichloropropane** reacts violently with POWDERED METALS.
- **1,2,3-Trichloropropane** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ZINC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); RESINS; and WAXES.
- Store in tightly closed containers in a cool, well-ventilated area away from LIGHT and HEAT.
- Sources of ignition, such as smoking and open flames, are prohibited where **1,2,3-Trichloropropane** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **1,2,3-TRICHLOROPROPANE**

Synonyms: Allyl Trichloride; Trichlorohydrin
CAS No: 96-18-4
Molecular Formula: $C_3H_5Cl_3$
RTK Substance No: 1902
Description: Colorless to straw-colored liquid with a Chloroform-like odor

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **2 - Fire** **1 - Reactivity** **DOT#:** UN 2810 **ERG Guide #:** 153 **Hazard Class:** 6.1 (Poison)	**1,2,3-Trichloropropane** is a COMBUSTIBLE LIQUID. Use dry chemical, CO_2, or alcohol-resistant foam as extinguishing agents. Fine water spray may be used to blanket the fire. POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*. CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool.	**1,2,3-Trichloropropane** reacts violently with POWDERED METALS. **1,2,3-Trichloropropane** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ZINC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); RESINS; and WAXES.

SPILL/LEAKS

Isolation Distance:

Small Spill: 60 meters (200 feet)

Large Spill: 330 meters (1,200 feet)

Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.

DO NOT wash into sewer.

1,2,3-Trichloropropane is a marine pollutant and may be hazardous to the environment.

PHYSICAL PROPERTIES

Odor Threshold:	*Chloroform* odor
Flash Point:	160°F (71°C)
LEL:	3.2%
UEL:	12.6%
Auto Ignition Temp:	579°F (304°C)
Vapor Density:	5.1 (air = 1)
Vapor Pressure:	3 mm Hg at 68°F (20°C)
Specific Gravity:	1.4 (water = 1)
Water Solubility:	Very slightly soluble
Boiling Point:	313°F (156°C)
Molecular Weight:	147.4

EXPOSURE LIMITS

OSHA:	50 ppm, 8-hr TWA
NIOSH:	10 ppm, 10-hr TWA
ACGIH:	10 ppm, 8-hr TWA
IDLH:	100 ppm

PROTECTIVE EQUIPMENT

Gloves:	Butyl, Polyvinyl Alcohol and Viton
Coveralls:	DuPont Tychem® BR, LV, Responder®, and TK; Kappler® Zytron® 300; and Saint-Gobain ONESuit® TEC, (>8-hr breakthrough for *Aliphatic Halogens*)
Respirator:	>10 ppm - Supplied air

HEALTH EFFECTS

Eyes:	Irritation and burns
Skin:	Irritation and burns with redness, drying and cracking.
Inhalation:	Nose, throat and lung irritation with coughing, wheezing and shortness of breath Headache, dizziness and lightheadedness
Chronic:	Cancer (liver, mouth and stomach) in animals

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer promptly to a medical facility.

OPPT Chemical Fact Sheet EPA 749-F-94-022

HEMICALS IN THE ENVIRONMENT: 1,2,4-TRIMETHYLBENZENE (CAS NO. 95-63-6)

prepared by
OFFICE OF POLLUTION PREVENTION AND TOXICS
U.S. ENVIRONMENTAL PROTECTION AGENCY
August 1994

Chemicals can be released to the environment as a result of their manufacture, processing, and use. EPA has developed information summaries on selected chemicals to describe how you might be exposed to these chemicals, how exposure to them might affect you and the environment, what happens to them in the environment, who regulates them, and whom to contact
for additional information. EPA is committed to reducing environmental releases of chemicals through source reduction and other practices that reduce creation of pollutants.

WHAT IS 1,2,4-TRIMETHYLBENZENE, HOW IS IT USED, AND HOW MIGHT I BE EXPOSED?

1,2,4-Trimethylbenzene (also called TMB or pseudocumene) is a colorless, flammable liquid. It occurs naturally in coal tar and petroleum crude oil. It is a major component (typically 40%) of a petroleum refinery distillation fraction known as the C9 aromatic fraction (or simply
the C9 fraction). Oil refineries produce large amounts (an estimated 80 billion pounds) of the C9 fraction each year. Most of the C9 fraction is not isolated. Refineries pump this "unrecovered" C9 fraction to some other
location where it is usually added directly to gasoline. Refineries isolate less than one-half percent of the C9 fraction. Companies add this "recovered" C9 fraction to protective surface coatings and cleaners.

Oil refineries generally do not isolate 1,2,4-trimethylbenzene from crude oil or from the C9 fraction. Currently only one refinery in the United States "recovers" TMB. The Environmental Protection Agency estimates that the amount of "recovered" 1,2,4-trimethylbenzene is in excess of 10 million pounds per year. US demand for this isolated 1,2,4-trimethylbenzene is likely to remain stable. The largest users of isolated
1,2,4-trimethylbenzene are chemical companies that make trimellitic anhydride. Companies also use it to make dyes and drugs.

Exposure to 1,2,4 trimethylbenzene can occur in the workplace or in the environment following releases to air, water, land, or groundwater. Exposure can also occur when people use gasoline or certain paints and cleaners. 1,2,4-Trimethylbenzene enters the body when breathed in with contaminated air or when consumed with contaminated food or water. It can also be absorbed through skin contact. It may remain in the body, stored in fat, before its removal in expired air or in urine.

WHAT HAPPENS TO 1,2,4-TRIMETHYLBENZENE IN THE ENVIRONMENT?

1,2,4-Trimethylbenzene evaporates when exposed to air. It dissolves only slightly when mixed with water. Most direct releases of 1,2,4-trimethylbenzene to the environment are to air. It also evaporates from water
and soil exposed to air. Once in air, it breaks down to other chemicals. Microorganisms that live in water and in soil can also break down TMB. Because it is a liquid that does not bind well to soil, 1,2,4-trimethylbenzene that makes its way into the ground can move through the ground and enter groundwater. Plants and animals living in environments contaminated with TMB can store small amounts of the chemical.

HOW DOES 1,2,4-TRIMETHYLBENZENE AFFECT HUMAN HEALTH AND THE ENVIRONMENT?

Effects of 1,2,4-trimethylbenzene on human health and the environment depend on how much TMB is present and the length and frequency of exposure.
Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Breathing large amounts of 1,2,4-trimethylbenzene for short periods of time adversely affects the human nervous system. Effects range from headaches to fatigue and drowsiness. TMB vapor irritates the nose and the throat. Prolonged contact with liquid TMB irritates the skin. These effects are not likely to occur at levels of 1,2,4-trimethylbenzene that are normally found in the environment.

Human health effects associated with breathing or otherwise consuming smaller amounts of 1,2,4-trimethylbenzene are not known. The petroleum industry has conducted several studies on the C9 fraction in response to an
EPA request for testing. These studies show that repeat exposure to this mixture of chemicals in air adversely affects the reproductive system and the developing fetus of animals. EPA believes that adverse effects associated with exposure to the C9 fraction are similar to those expected to occur as a result of exposure to individual chemicals, like 1,2,4-tri-

methylbenzene, that make up this mixture.

1,2,4-Trimethylbenzene by itself is not likely to cause environmental rm at levels normally found in the environment. TMB can contribute to une formation of photochemical smog when it reacts with other volatile organic carbon substance in air.

WHAT EPA PROGRAM OFFICES REGULATE 1,2,4-TRIMETHYLBENZENE, AND UNDER WHAT LAWS IS IT REGULATED?

EPA OFFICE	LAW	PHONE NUMBER
Pollution Prevention & Toxics	Toxic Substances Control Act	(202) 554-1404
	Emergency Planning and Community Right-to-Know Act (EPCRA) Regulations (Sec. 313)	(800) 424-9346
	Toxics Release Inventory data	(202) 260-1531
Air	Clean Air Act	(919) 541-0888
Solid Waste & Emergency Response	EPCRA (Sec. 311/312)	(800) 424-9346

A technical support document can be requested from the TSCA Assistance ~ formation Service, (202) 554-1404.

WHAT OTHER FEDERAL AGENCIES OR GROUPS CAN I CONTACT FOR INFORMATION ON 1,2,4-TRIMETHYLBENZENE?

AGENCY/GROUP	PHONE NUMBER
Consumer Product Safety Commission	(301) 504-0994
National Institute for Occupational Safety and Health (NIOSH)	(800) 356-4674
Occupational Safety and Health Administration (Check your local phone book under U.S. Department of Labor)	

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **2,4-DINITROPHENOL**

CAS Number: 51-28-5
DOT Number: UN 1599 (Solution)
UN 1320 (Wetted)

RTK Substance number: 2950
Date: March 1999

HAZARD SUMMARY

* **2,4-Dinitrophenol** can affect you when breathed in and by passing through your skin.
* Contact can cause severe skin burns and eye irritation and burns.
* Breathing **2,4-Dinitrophenol** can irritate the nose, throat and lungs causing coughing and/or shortness of breath.
* Exposure to **2,4-Dinitrophenol** can cause headache, fatigue, nausea, vomiting, diarrhea, and muscle cramps. Higher levels can cause anxiety, seizures, and coma. This may be fatal.
* **2,4-Dinitrophenol** may damage the liver and kidneys.
* **2,4-Dinitrophenol** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
* Repeated exposure to **2,4-Dinitrophenol** can damage blood cells, causing anemia (low blood count).
* High or repeated exposure to **2,4-Dinitrophenol** can damage the eye, causing cataract (clouding of the eye) with loss of vision.
* **2,4-Dinitrophenol** can cause a rash with drying and itching of the skin.
* **2,4-Dinitrophenol** is HIGHLY EXPLOSIVE unless kept wet.

IDENTIFICATION

2,4-Dinitrophenol is a yellow crystalline (sand-like) powder, with a sweet, musty odor, which is used or transported in a liquid solution. It is used as an insecticide and in the manufacture of dyes, photochemicals, and explosives.

REASON FOR CITATION

* **2,4-Dinitrophenol** is on the Hazardous Substance List because it is cited by DOT, DEP, HHAG and EPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **2,4-Dinitrophenol**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

* It should be recognized that **2,4-Dinitrophenol** can be absorbed through your skin, thereby increasing your exposure.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **2,4-Dinitrophenol** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **2,4-Dinitrophenol** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **2,4-Dinitrophenol**:

* Contact can cause severe skin burns and eye irritation and burns.
* Breathing **2,4-Dinitrophenol** can irritate the nose, throat and lungs causing coughing and/or shortness of breath.
* Exposure to **2,4-Dinitrophenol** can cause headache, fatigue, nausea, vomiting, diarrhea, and muscle cramps. Higher levels can cause anxiety, seizures, and coma. This may be fatal.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **2,4-Dinitrophenol** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **2,4-Dinitrophenol** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* High exposure to **2,4-Dinitrophenol** may damage the developing fetus.

Other Long-Term Effects

* **2,4-Dinitrophenol** may damage the liver and kidneys.
* **2,4-Dinitrophenol** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
* Repeated exposure to **2,4-Dinitrophenol** can damage blood cells, causing anemia (low blood count).
* High or repeated exposure to **2,4-Dinitrophenol** can damage the eye, causing cataract (clouding of the eye) with loss of vision.
* **2,4-Dinitrophenol** can cause a rash with drying and itching of the skin.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

* Complete blood cell count.
* Liver and kidney function tests.
* Exam of the nervous system.
* Eye exam.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **2,4-Dinitrophenol**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer **2,4-Dinitrophenol** from drums or other storage containers to process containers.
* Before entering a confined space where **2,4-Dinitrophenol** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **2,4-Dinitrophenol** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **2,4-Dinitrophenol**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.

* On skin contact with **2,4-Dinitrophenol**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **2,4-Dinitrophenol**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **2,4-Dinitrophenol** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Use a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **2,4-Dinitrophenol**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear impact resistant eye protection with side shields or goggles.
* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **2,4-Dinitrophenol**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **2,4-Dinitrophenol** you should be trained on its proper handling and storage.
* **2,4-Dinitrophenol** must be KEPT WET or in solution as it can detonate or explode when HEATED or from FRICTION or SHOCK.
* **2,4-Dinitrophenol** reacts with STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) and AMMONIA to form shock sensitive materials.
* **2,4-Dinitrophenol** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ACID CHLORIDES; and ACID ANHYDRIDES.
* Store in tightly closed containers in a cool, well-ventilated area away from HEAT and LIGHT.
* Protect containers from SHOCK.
* Sources of ignition, such as smoking and open flames, are prohibited where **2,4-Dinitrophenol** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
* Metal containers involving the transfer of **2,4-Dinitrophenol** should be grounded and bonded.

* Use only non-sparking tools and equipment, especially when opening and closing containers of **2,4-Dinitrophenol**.
* Wherever **2,4-Dinitrophenol** is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?
A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **2,4-DINITROPHENOL**
DOT Number: **UN 1599 (Solution)**
UN 1320 (Wetted)
NAERG Code: **153 (Solution)**
113 (Wetted)
CAS Number: **51-28-5**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	Not Found	Not Rated
REACTIVITY	Not Found	Not Rated
EXPLOSIVE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* DRY **2,4-Dinitrophenol** is a FLAMMABLE SOLID and is HIGHLY EXPLOSIVE.
* Wetted **2,4-Dinitrophenol** or **2,4-Dinitrophenol** in solution may be COMBUSTIBLE or FLAMMABLE depending on the solvent.
* Use dry chemical, CO_2, water spray, or alcohol foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE, including *Nitrogen Oxides* and *Carbon Monoxide*.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use water spray to keep fire-exposed containers cool.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **2,4-Dinitrophenol** is spilled or leaked, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Keep spilled material wet and deposit into sealed containers.
* Ventilate area after clean-up is complete.
* Keep **2,4-Dinitrophenol** out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of **2,4-Dinitrophenol** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE (See page 3)

FIRST AID

In NJ, POISON INFORMATION 1-800-764-7661

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 2×10^{-5} mm Hg at 77°F (25°C)
Water Solubility: Very slightly soluble

OTHER COMMONLY USED NAMES

Chemical Name:

Phenol, 2,4-Dinitro

Other Names:

Solfo Black; 1-Hydroxy-2,4-Dinitrobenzene; Aldifen

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
Source Water Protection
Underground Injection Control
Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security

Consumer Factsheet on: ANTIMONY

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Antimony and how is it used?

Antimony is a metal found in natural deposits as ores containing other elements. The most widely used antimony compound is antimony trioxide, used as a flame retardant. It is also found in batteries, pigments, and ceramics/glass.

Why is Antimony being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for antimony has been set at 6 parts per billion (ppb) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 6 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found antimony to potentially cause the following health

effects when people are exposed to it at levels above the MCL for relatively short periods of time: nausea, vomiting and diarrhea.

Long-term: Antimony has the potential to cause the following effects from a lifetime exposure at levels above the MCL: AND/OR- Antimony is a (known/potential drinking water) human carcinogen. OR- No reliable data are available concerning health effects from long-term exposure to antimony in drinking water.

How much Antimony is produced and released to the environment?

In 1984, 64.5 million lbs. antimony ore was mined and refined. Production of the most commonly used antimony compound, the trioxide, increased during the 1980s to about 31 million lbs, reported in 1985. Industrial dust, auto exhaust and home heating oil are the main sources in urban air.

From 1987 to 1993, according to the Toxics Release Inventory antimony and antimony compound releases to land and water totaled over 12 million lbs. These releases were primarily from copper and lead smelting and refining industries. The largest releases occurred in Arizona and Montana. The greatest releases to water occurred in Washington and Louisiana.

What happens to Antimony when it is released to the environment?

Little is known about antimonys fate once released to soil. Some studies indicate that antimony is highly mobile in soils, while others conclude that it strongly adsorbs to soil. In water, it usually adheres to sediments. Most antimony compounds show little or no tendency to accumulate in aquatic life.

How will Antimony be Detected in and Removed from My Drinking Water?

The regulation for antimony became effective in 1994. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if antimony is present above 6 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of antimony so that it is consistently below that level. The following treatment methods have been approved by EPA for removing antimony: Coagulation/Filtration, Reverse Osmosis.

How will I know if Antimony is in my drinking water?

If the levels of antimony exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

MCLG: 6 ppb

MCL: 6 ppb

Antimony Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	330,064	12,003,373

Top Ten States *		
AZ	505	7,074,128
MT	0	2,338,697
TX	24,817	840,392
LA	55,414	344,762
WI	1,445	392,000
MO	784	188,266
WA	63,220	99,915
ID	2,600	140,250
TN	687	108,325
AL	27,536	69,503

Major Industries*		
Copper smelting, refining	505	7,074,128
Other nonferrous smelt.	17,015	2,383,947
Sec. nonferrous smelt.	1,459	803,398
Misc Indust. Organics	18,424	581,465
Porcelain plumb. fixtures	1,445	392,000
Petroleum refining	111,527	202,251
Misc Inorganic chems.	4,962	140,250
Plastics, resins	20	60,372
Storage batteries	0	45,952
Synthetic fibers	26,803	12,535

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated. Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general,

call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/antimony.html

Right to Know

Hazardous Substance Fact Sheet

Common Name: **ARSENIC**

Synonyms: Gray Arsenic; Arsen

Chemical Name: Arsenic

Date: June 1998 Revision: April 2008

CAS Number: 7440-38-2

RTK Substance Number: 0152

DOT Number: UN 1558

Description and Use

Arsenic is a silver-gray or white metallic, odorless, brittle solid. It is used as an alloying agent for heavy metals, and in solders, medicines and herbicides.

Reasons for Citation

- **Arsenic** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing. Seek medical attention.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	4	-
FLAMMABILITY	0	-
REACTIVITY	0	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Arsenic** can affect you when inhaled and may be absorbed through the skin.
- **Arsenic** is a CARCINOGEN and may cause reproductive damage. HANDLE WITH EXTREME CAUTION.
- Skin contact can cause irritation, burns, rash and loss of pigment
- Eye contact can cause irritation and burns.
- Inhaling **Arsenic** can irritate the nose and throat and can cause an ulcer or hole in the "bone" (septum) dividing the inner nose.
- Exposure to **Arsenic** can cause weakness, poor appetite, nausea, vomiting, headache, and even death.
- **Arsenic** may damage the nervous system and the liver.
- **Arsenic** is a noncombustible solid, but when in *dust* or *fine powder* form it can EXPLODE when exposed to heat, flame or hot surfaces.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.01 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.002 mg/m^3**, which should not be exceeded at any time.

ACGIH: The threshold limit value (TLV) is **0.01 mg/m^3** averaged over an 8-hour workshift.

- **Arsenic** is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Arsenic**:

- Skin contact can cause irritation, burns, rash and loss of pigment.
- Eye contact can cause irritation, burns and red, watery eyes.
- Inhaling **Arsenic** can irritate the nose and throat causing coughing and wheezing.
- Exposure to **Arsenic** can cause weakness, poor appetite, nausea, vomiting, headache, muscle cramps and even death.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Arsenic** and can last for months or years:

Cancer Hazard
- **Arsenic** is a CARCINOGEN in humans. It has been shown to cause skin and lung cancer.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard
- Chronic **Arsenic** exposure has been associated with spontaneous abortions and still births.
- There is limited evidence that **Arsenic** is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Effects
- Repeated skin contact can cause thickened skin and/or patchy areas of darkening and loss of pigment. Some persons may develop white lines on the nails.
- Long-term exposure can cause an ulcer or hole in the "bone" (septum) dividing the inner nose, hoarseness and sore eyes.
- **Arsenic** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
- **Arsenic** may damage the liver.

Medical

Medical Testing
Before first exposure and every 12 months thereafter, OSHA requires your employer to provide (for persons exposed to greater than **0.005 mg/m^3** of *Arsenic*) a work and medical history and exam which shall include:

- Chest x-ray
- Exam of the nose, skin and nails
- Test for urine **Arsenic**. This is most accurate at the end of the workday. Eating shellfish or fish may elevate **Arsenic** levels for up to two days. At NIOSH recommended exposure levels, urine **Arsenic** should not be greater than **100 micrograms per liter** of urine.

After suspected overexposure, repeat these tests and consider exam of the nervous system and liver function tests. Also examine your skin periodically for abnormal growth. Skin cancer from **Arsenic** can be easily cured when detected early.

OSHA requires your employer to provide you and your doctor with a copy of the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by **Arsenic**.

Conditions Made Worse By Exposure
- May scientists believe that skin changes such as thickening and pigment changes make those skin areas more likely to develop skin cancer.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Arsenic**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend *Nitrile*, *Natural Rubber* or *Silver Shield®* for gloves and DuPont *Tyvek®*, or the equivalent, as protective materials for clothing.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear impact resistant eye protection with side shields.
- Wear a face shield with goggles when working with corrosive, high irritating or toxic substance.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure not higher than **0.1 mg/m^3**, use a half-mask air purifying respirator equipped with high efficiency filters.
- Where the potential exists for exposure not higher than **0.5 mg/m^3**, use a full facepiece, air purifying respirator with high efficiency filters.
- Where the potential exists for exposure not higher than **5 mg/m^3**, use any powered-air purifying respirator with high efficiency filters or a half-mask supplied-air respirator operated in a positive pressure mode.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Arsenic**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Exposure to **5 mg/m^3** is immediately dangerous to life and health. If the possibility of exposure above **5 mg/m^3** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Arsenic** is noncombustible, however, **Arsenic** *dust* or *fine powder* can explode when exposed to heat, flame or hot surfaces.
- Use dry chemical, CO_2, water spray or foam as extinguishing agents.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Arsenic Oxides*.
- Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Arsenic** is spilled, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Collect powdered material in the most convenient and safe manner, or use a HEPA-filter vacuum for clean-up, and deposit in sealed containers.
- Ventilate area of spill after clean-up is complete.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Arsenic** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Arsenic** you should be trained on its proper handling and storage.

- A regulated, marked area should be established where **Arsenic** is handled, used or stored as required by the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- **Arsenic** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions.
- **Arsenic** reacts with ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and HYDROGEN GAS to produce toxic *Arsine gas*.
- **Arsenic** is not compatible with *powdered* METALS (such as ZINC, LITHIUM, RUBIDIUM and PLATINUM); BROMINE AZIDE; LEAD MONOXIDE; and MERCURY OXIDE.
- Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES and HEAT.
- DO NOT store in metal tanks.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **ARSENIC**

Synonyms: Gray Arsenic; Arsen
CAS No: 7440-38-2
Molecular Formula: As
RTK Substance No: 0152
Description: Silver-gray or white metallic, odorless, brittle solid

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
4 - Health **0 - Fire** **0 - Reactivity** **DOT#:** UN 1558 **ERG Guide #:** 152 **Hazard Class:** 6.1 (Poison)	**Arsenic** is noncombustible, however, *Arsenic dust* or *fine powder* can explode when exposed to heat, flame or hot surfaces. Use dry chemical, CO_2, water spray or foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE, including *Arsenic Oxides*. Use water spray to keep fire-exposed containers cool.	**Arsenic** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions. **Arsenic** reacts with ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and HYDROGEN GAS to produce toxic *Arsine gas*. **Arsenic** is not compatible with *powdered* METALS (such as ZINC, LITHIUM, RUBIDIUM and PLATINUM); BROMINE AZIDE; LEAD MONOXIDE; and MERCURY OXIDE.

SPILL/LEAKS

Isolation Distance:

Spills: 25 to 50 meters (75 to 150 feet)

Fire: 800 meters (1/2 mile)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up.

DO NOT wash into sewer.

Toxic to aquatic organisms.

PHYSICAL PROPERTIES

Odor Threshold:	Odorless
Flash Point:	Noncombustible solid
Vapor Pressure:	1 mm Hg at 701°F (372°C)
Specific Gravity:	5.7 (water = 1)
Water Solubility:	Insoluble
Boiling Point:	1,350°F (613°C)
Ionization Potential:	9.87 eV
Molecular Weight:	74.9

EXPOSURE LIMITS

OSHA:	0.01 mg/m^3, 8-hr TWA
NIOSH:	0.002 mg/m^3, 15-min Ceiling
ACGIH:	0.01 mg/m^3, 8-hr TWA
IDLH:	5 mg/m^3

PROTECTIVE EQUIPMENT

Gloves:	Natural Rubber, Nitrile or Silver Shield®
Coveralls:	DuPont Tyvek®
Respirator:	<0.1 mg/m^3 - Full facepiece APR with High efficiency filter <0.5 mg/m^3 -Supplied air

HEALTH EFFECTS

Eyes:	Irritation, burns, red and watery eyes
Skin:	Irritation, burns, itching, rash and loss of pigment
Inhalation:	Nose and throat irritation with coughing, wheezing and hoarseness
	Weakness, headache, nausea, vomiting, and muscle cramps
Chronic:	Cancer (skin and lung) in humans

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention.

Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer to a medical facility.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
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Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security

Consumer Factsheet on: BARIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Barium and how is it used?

Barium is a lustrous, machinable metal which exists in nature only in ores containing mixtures of elements. It is used in making a wide variety of electronic components, in metal alloys, bleaches, dyes, fireworks, ceramics and glass. In particular, it is used in well drilling operations where it is directly released into the ground.

Why is Barium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for barium has been set at 2 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 2 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: EPA has found barium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: gastrointestinal disturbances and muscular weakness.

Long-term: Barium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: high blood pressure.

How much Barium is produced and released to the environment?

The most common ores are found in AK, AR, CA, GA, KY, MO, NV, and TN. Barite was produced at 38 mines in these states in 1973, with Nevada supplying 50% of the tonnage. Barium is released to water and soil in the discharge and disposal of drilling wastes, from the smelting of copper, and the manufacture of motor vehicle parts and accessories.

From 1987 to 1993, according to the Toxics Release Inventory barium compound releases to land and water totaled over 57 million lbs. These releases were primarily from copper smelting industries. The largest releases occurred in Arizona and Utah. The largest direct releases to water occurred in Texas.

What happens to Barium when it is released to the environment?

In water, the more toxic soluble barium salts are likely to be converted to insoluble salts which precipitate. Barium does not bind to most soils and may migrate to ground water. It has a low tendency to accumulate in aquatic life.

How will Barium be detected in and removed from my drinking water?

The regulation for barium became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if barium is present above 2 ppm. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of barium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing barium: Ion Exchange, Reverse Osmosis, Lime Softening, Electrodialysis.

How will I know if Barium is in my drinking water?

If the levels of barium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 2 ppm

MCL: 2 ppm

Barium Releases to Water and Land: 1987 to 1993 (in pounds)

	Water	Land
TOTALS	928,448	57,063,031

Top Ten States *		
AZ	0	14,595,520
UT	1,500	13,423,164
VA	0	9,218,901
NM	0	5,233,790
IL	34,000	3,977,817
TN	0	2,586,906
AL	31,041	1,638,988
PA	15,582	1,216,362
TX	167,864	599,565
NJ	20,905	705,666

Major Industries*		
Copper smelting	1,500	31,958,310
Car parts, accessories	1,743	9,456,667
Industrial organics	132,511	4,106,827
Inorganic pigments	5,261	3,672,451
Gray, ductile iron	0	1,556,681
Steelworks, furnaces	256,582	679,999
Electrometallurgy	1,599	633,876
Paper mills	64,770	527,330

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/barium.html

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Drinking Water For Kids!

Consumer Factsheet on: BENZENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Benzene and how is it used?

Benzene is a clear, colorless aromatic liquid. It is highly flammable. The greatest use of benzene is as a building block for making plastics, rubber, resins and synthetic fabrics like nylon and polyester. Other uses include: as a solvent in printing, paints, dry cleaning, etc.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Benzol 90
Pyrobenzol
Polystream
Coal naphtha
Phene

Why is Benzene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for benzene has been set at zero because EPA believes this level of

protection would not cause any of the health effects described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All community water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found benzene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: temporary nervous system disorders, immune system depression, anemia.

Long-term: Benzene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: chromosome aberrations, cancer.

How much Benzene is produced and released to the environment?

Production of benzene has increased: from about 9.9 billion lbs. in 1984 to over 12 billion lbs. in 1993.

Benzene is released to air primarily from fumes and exhaust connected with its use in gasoline. Other sources are fumes from its production and use in manufacturing other chemicals. In addition, there are discharges into water from industrial effluents and losses during spills.

From 1987 to 1992, according to the Toxics Release Inventory, releases of benzene to water and land totalled over 2 million lbs. These releases were primarily from petroleum refining industries, with the greatest releases occurring in Texas.

What happens to Benzene when it is released to the environment?

If benzene is released to soil, it will either evaporate very quickly or leach to groundwater. It can be broken down by some soil microbes. It may also be degraded in some ground waters. If benzene is released to surface water, most of it should evaporate within a few hours. Though it does not degrade by reacting with water, it may be degraded by microbes. It is not likely to accumulate in aquatic organisms.

How will Benzene be Detected in and Removed from My Drinking Water?

The regulation for benzene became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if benzene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor the benzene levels.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of benzene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing benzene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Benzene is in my drinking water?

If the levels of benzene exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Benzene Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTAL	**564,546**	**1,539,385**
Top Six States*		
TX	1,436	1,135,994
AL	199,642	0
LA	137,599	4,347
CO	0	40,793
NM	0	38,199
IL	3	34,110
Major Industries*		
Petroleum refining	32,411	1,049,800
Primary Metal Ind.	133,339	18,078

Industrial chemicals	73,000	250,103
Alkalies, chlorine	122,240	0

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

List of Contaminants

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EPA Home | Privacy and Security Notice | Contact Us

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/benzene.html

Right to Know

Hazardous Substance Fact Sheet

Common Name: **BENZIDINE**

Synonyms: 4,4'-Bianiline; Diphenylenediamine

Chemical Name: [1,1'-Biphenyl]-4,4'-Diamine

Date: July 1998 Revision: July 2007

CAS Number: 92-87-5

RTK Substance Number: 0204

DOT Number: UN 1885

Description and Use

Benzidine is a white, grayish-yellow, or slightly reddish, crystalline (sand-like) powder. It is used in making dyes and chemicals, and as a reagent and microscopy stain.

EMERGENCY RESPONDERS >>>> SEE PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	4	-
FLAMMABILITY	1	-
REACTIVITY	0	-
CARCINOGEN MUTAGEN MAY BURN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Benzidine** is a CARCINOGEN--HANDLE WITH EXTREME CAUTION.
- **Benzidine** can affect you when inhaled and by passing through your skin.
- Contact can irritate the skin and eyes.
- Inhaling **Benzidine** can irritate the nose and throat.
- **Benzidine** may cause a skin allergy.

Reason for Citation

- **Benzidine** is on the Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of cool water for at least 15 minutes, occasionally lifting upper and lower lids. Remove contact lenses, if worn, while rinsing. Medical attention is necessary.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

Workplace Exposure Limits

OSHA: Recommends limiting exposure to the lowest feasible level.

NIOSH: Recommends that exposure to occupational carcinogens be limited to the lowest feasible concentration.

ACGIH: Recommends eliminating, to the fullest extent possible, all exposure to this carcinogen.

- **Benzidine** is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- As **Benzidine** is absorbed through your skin, contact should be eliminated.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzidine**:

- **Benzidine** can irritate the skin causing a rash or burning feeling on contact.
- Exposure can irritate the eyes, nose, and throat.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Benzidine** and can last for months or years:

Cancer Hazard
- **Benzidine** is a CARCINOGEN in humans. It has been shown to cause bladder cancer.
- Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.
- **Benzidine** is a MUTAGEN. It may cause genetic changes.

Reproductive Hazard
According to the information presently available to the New Jersey Department of Health and Senior Services, **Benzidine** has not been tested for its ability to affect reproduction.

Other Effects
- Skin allergy may occur with itching, redness and/or eczema-like rash. If this happens, future contact can trigger symptoms.

Medical

Medical Testing
Before beginning employment and at regular times after that, for those with frequent or potentially high exposures, the following is recommended:

- Urine cytology (a test for abnormal cells in the urine)

If symptoms develop or overexposure is suspected, the following is recommended:

- Evaluation by a qualified allergist will help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.

- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA **Benzidine** Standard (29 CFR 1910.1010).
- Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Benzidine**. Wear personal protective equipment made from material which can not be permeated and/or degraded by this substance. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- Safety equipment manufacturers recommend *Rubber* or *Nitrile* for gloves and DuPont *Tychem®* fabrics for solutions of **Benzidine** in *Methanol*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Eye protection is included in the recommended respiratory protection.
- Contact lenses should not be worn when working with this substance.

Respiratory Protection

Improper use of respirators is dangerous. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- At any exposure level, use a NIOSH approved supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Benzidine** may burn, but does not readily ignite.
- Use dry chemical, CO_2, water spray, an alcohol-resistant foam or other foaming agent.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Nitrogen Oxides*.
- Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Benzidine** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Collect using a vacuum with a HEPA filter or a wet method, and place in covered containers for disposal.
- Ventilate and wash area after clean-up is complete.
- It may be necessary to contain and dispose of **Benzidine** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Benzidine** you should be trained on its proper handling and storage.

- A regulated, marked area should be established where **Benzidine** is handled, used, or stored.
- **Benzidine** must be stored to avoid contact with NITRIC ACID and OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) since violent reactions occur.
- Store in tightly closed containers in a cool, well-ventilated area away from HEAT and DIRECT SUNLIGHT.
- Sources of ignition, such as smoking and open flames, are prohibited where **Benzidine** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include: Right to Know Information Resources, Public Presentations, General References, Industrial Hygiene Information, Surveys and Investigations, and Medical Evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **BENZIDINE**

Synonyms: 4,4'-Bianiline; Diphenylenediamine
CAS No: 92-87-5
Molecular Formula: $C_{12}H_{12}N_2$
RTK Substance No: 0204
Description: White to grayish-yellow or reddish powder, darkens on exposure to light or air.

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
4 - Health **1 - Fire** **0 - Reactivity** **DOT ID #:** UN 1885 **ERG Guide #:** 153 **Hazard Class:** 6.1 (Poisonous Material)	**Benzidine** may burn, but does not readily ignite. Use dry chemical, CO_2, water spray, an alcohol-resistant foam or other foaming agent. POISONOUS GASES ARE PRODUCED IN FIRE, including *Nitrogen Oxides*. Use water spray to keep fire-exposed containers cool.	**Benzidine** may react violently with NITRIC ACID and OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE). **Benzidine** is not compatible with HEAT and SUNLIGHT.

SPILL/LEAKS

Isolation Distance: 25 to 50 meters (80 to 160 feet)

Use a vacuum with a HEPA filter or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
Toxic to aquatic organisms.

PHYSICAL PROPERTIES

Odor Threshold:	No Information
Flash Point:	No Information
LEL:	N/A
UEL:	N/A
Relative Density:	1.25 (water = 1)
Relative Vapor Density:	6.36 (air = 1)
Water Solubility:	Soluble in hot water
Boiling Point:	752°F (400°C)
Melting Point:	239°F (115°C)

EXPOSURE LIMITS

OSHA:	Lowest feasible level
NIOSH:	Lowest feasible level
ACGIH:	Eliminate exposure if possible
IDLH LEVEL:	No Information

PROTECTIVE EQUIPMENT

Gloves:	Rubber, Nitrile
Coverall:	DuPont Tychem® fabrics (for **Benzidine** in 25% *Methanol*)
Boot:	Rubber
Respirator:	Supplied air

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation
Acute:	Nose and throat irritation
Chronic:	Cancer (bladder) in humans Skin allergy with itching and rash

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Flush eyes with large amounts of water for at least 15 minutes.
Remove contact lenses if worn.
Remove contaminated clothing. Wash contaminated skin with soap and water.
Transfer promptly to a medical facility.

Right to Know
Hazardous Substance Fact Sheet

Common Name: **BENZO(a)PYRENE**

Synonyms: 3,4-Benzopyrene; B[a]P

Chemical Name: Benzo[a]pyrene

Date: July 1998 Revision: October 2007

CAS Number: 50-32-8

RTK Substance Number: 0207

DOT Number: UN 3077

Description and Use

Benzo(a)pyrene is a pale yellow, crystalline solid or powder with a faint aromatic odor. In its pure form it is used as a laboratory reagent. It also forms as a gaseous by-product when certain carbon substances burn, such as coal tar chemicals, and is found in cigarette smoke.

Reasons for Citation

- **Benzo(a)pyrene** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact

- Remove contaminated clothing. Wash contaminated skin with soap and water.

Inhalation

- Remove the person from exposure.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	-
FLAMMABILITY	1	-
REACTIVITY	0	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Benzo(a)pyrene** can affect you when inhaled and by passing through the skin.
- **Benzo(a)pyrene** is a CARCINOGEN. HANDLE WITH EXTREME CAUTION.
- **Benzo(a)pyrene** may damage the developing fetus.
- Contact can irritate and burn the eyes.
- **Benzo(a)pyrene** can irritate the skin causing a rash or burning feeling on contact.
- Repeated exposure can cause thickening and darkening of the skin.
- Except in laboratories, **Benzo(a)pyrene** is usually found mixed with other "coal tar pitch" chemicals.
- *For more information, consult the Right to Know Hazardous Substance Fact Sheets on COAL TAR PITCH, CREOSOTE, CHRYSENE, and ANTHRACENE.*

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m^3** (as *Coal Tar Pitch Volatiles*) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.1 mg/m^3** (as the *Cyclohexane-extractable fraction*) averaged over a 10-hour workshift.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

- **Benzo(a)pyrene** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(a)pyrene**:

- Contact can irritate and burn the eyes.
- **Benzo(a)pyrene** can irritate the skin causing a rash or burning feeling on contact. Exposure to a combination of sunlight and this chemical can increase these effects.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(a)pyrene** and can last for months or years:

Cancer Hazard

- **Benzo(a)pyrene** is a PROBABLE CARCINOGEN in humans. There is some evidence that is causes stomach, skin, lung, blood, spleen, pancreas, and mammary cancer in animals.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- **Benzo(a)pyrene** may damage the developing fetus.
- There is limited evidence that **Benzo(a)pyrene** may damage the male and female reproductive systems.

Other Effects

- Repeated exposure can cause thickening and darkening of the skin and warts.

Medical

Medical Testing

There is no special test for this chemical. However, seek medical attention if illness occurs or overexposure is suspected.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- Sunlight may cause a rash to develop in people exposed to **Benzo(a)pyrene** and increases the risk of skin cancer.
- Tobacco smoke also contains **Benzo(a)pyrene**. Smoking may increase the risk of lung cancer with exposure to **Benzo(a)pyrene.**

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.

- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Use a Class I, Type B, biological safety hood when working with **Benzo(a)pyrene** in a laboratory.
- Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Benzo(a)pyrene**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend DuPont *Tychem® CPF-2, SL, CPF-4* and *Responder®* as protective materials for clothing.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear eye protection with side shields or goggles.
- Do not wear contact lenses when working with this substance.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **0.1 mg/m^3**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **80 mg/m^3** (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m^3** (as *Coal Tar Pitch Volatiles*) exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Benzo(a)pyrene** may burn, but does not readily ignite.
- Use dry chemical, CO_2, water spray or foam as extinguishing agents.
- POISONOUS GASES ARE PRODUCED IN FIRE.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Benzo(a)pyrene** is spilled, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Moisten spilled material first to reduce dust or use a HEPA-filter vacuum for clean-up.
- Ventilate and wash area after clean-up is complete.
- It may be necessary to contain and dispose of **Benzo(a)pyrene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP), Nuclear Regulatory Commission (NRC) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Benzo(a)pyrene** you should be trained on its proper handling and storage.

- A regulated, marked area should be established where **Benzo(a)pyrene** is handled, used, or stored.
- **Benzo(a)pyrene** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
- Store in tightly closed containers in a cool, well-ventilated area.
- Sources of ignition, such as smoking and open flames, are prohibited where **Benzo(a)pyrene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **BENZO(a)PYRENE**

Synonyms: 3,4-Benzopyrene; B[a]P
CAS No: 50-32-8
Molecular Formula: $C_{20}H_{12}$
RTK Substance No: 0207
Description: Pale yellow, crystalline solid or powder

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **1 - Fire** **0 - Reactivity** **DOT#:** UN 3077 **ERG Guide #:** 171 **Hazard Class:** 9 (Miscellaneous Hazardous Materials)	**Benzo(a)pyrene** may burn, but does not readily ignite. Use dry chemical, CO_2, water spray or foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE.	**Benzo(a)pyrene** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions.

SPILL/LEAKS

Isolation Distance: 50 meters (150 feet)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up.

Toxic to aquatic organisms.

PHYSICAL PROPERTIES

Odor Threshold:	Faint aromatic odor
Flash Point:	No information
Specific Gravity:	1.35
Vapor Density:	8.7 (air = 1)
Vapor Pressure:	5.49×10^9 mm Hg at 77°F (25°C)
Water Solubility:	Insoluble
Boiling Point:	590° - 594°F (310° - 312°C)
Melting Point:	347° - 354 F (175° - 179°C)

EXPOSURE LIMITS

OSHA:	0.2 mg/m^3, 8-hr TWA
NIOSH:	0.1 mg/m^3, 10-hr TWA
ACGIH:	lowest level possible
IDLH LEVEL:	80 mg/m^3 (as *Coal Tar Pitch Volatiles*)

PROTECTIVE EQUIPMENT

Gloves:	No information
Coveralls:	DuPont Tychem®, CPF-2, SL, CPF-4, Responder® (all >8-hr permeation time)
Boots:	No information
Respirator:	>0.1 mg/m^3 - Supplied air

HEALTH EFFECTS

Eyes:	Irritation and burns
Skin:	Irritation, rash and burning feeling
Chronic:	Cancer (stomach, skin, lung, blood, spleen, pancreas, and mammary) in animals. May affect the developing fetus Thickening and darkening of the skin and warts

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

Remove contaminated clothing and wash contaminated skin with soap and water.

Transfer to a medical facility.

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BIS (2-CHLOROETHOXY) METHANE**

CAS Number: 111-91-1
DOT Number: UN 2810

RTK Substance number: 2971
Date: April 2000

HAZARD SUMMARY

* **Bis (2-Chloroethoxy) Methane** can affect you when breathed in.
* Contact can irritate the skin and eyes.

IDENTIFICATION

Bis (2-Chloroethoxy) Methane is a colorless liquid. It is used as a solvent and an intermediate in the synthesis of polysulfide rubber.

REASON FOR CITATION

* **Bis (2-Chloroethoxy) Methane** is on the Hazardous Substance List because it is cited by DOT, DEP, HHAG and EPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Bis (2-Chloroethoxy) Methane**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Bis (2-Chloroethoxy) Methane**.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Bis (2-Chloroethoxy) Methane** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Bis (2-Chloroethoxy) Methane**:

* Contact can irritate the skin and eyes.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Bis (2-Chloroethoxy) Methane** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Bis (2-Chloroethoxy) Methane** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Bis (2-Chloroethoxy) Methane** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* **Bis (2-Chloroethoxy) Methane** has not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically pump liquid **Bis (2-Chloroethoxy) Methane** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Bis (2-Chloroethoxy) Methane** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Bis (2-Chloroethoxy) Methane**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Bis (2-Chloroethoxy) Methane**, immediately wash or shower to remove the chemical.
* Do not eat, smoke, or drink where **Bis (2-Chloroethoxy) Methane** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Bis (2-Chloroethoxy) Methane**. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential for overexposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **BIS (2-CHLOROETHOXY) METHANE**
DOT Number: **UN 2810**
NAERG Code: **153**
CAS Number: **111-91-1**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	1	-
REACTIVITY	-	-
POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Bis (2-Chloroethoxy) Methane** is a COMBUSTIBLE LIQUID.
* Use dry chemical, CO_2, or halon extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE, including *Chlorine*.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Bis (2-Chloroethoxy) Methane** is spilled or leaked, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of **Bis (2-Chloroethoxy) Methane** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE

* Prior to working with **Bis (2-Chloroethoxy) Methane** you should be trained on its proper handling and storage.
* **Bis (2-Chloroethoxy) Methane** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC).
* Store in tightly closed containers in a cool, well-ventilated area away from the SUN.
* Sources of ignition, such as smoking and open flames, are prohibited where **Bis (2-Chloroethoxy) Methane** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

FIRST AID

In NJ, for POISON INFORMATION call 1-800-764-7661

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

* Remove the person from exposure.

PHYSICAL DATA

Vapor Pressure: 0.1 mm Hg at 68°F (20°C)
Flash Point: 230°F (110°C)
Water Solubility: Slightly soluble

OTHER COMMONLY USED NAMES

Chemical Name:

Di-2-Chloroethylformal

Other Names:

Formaldehyde Bis (2-Chloroethyl) Acetal

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Consumer Factsheet on: BERYLLIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Beryllium and how is it used?

Beryllium is a metal found in natural deposits as ores containing other elements, and in some precious stones such as emeralds and aquamarine. The greatest use of beryllium is in making metal alloys for nuclear reactors and the aerospace industry.

Why is Beryllium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for beryllium has been set at 4 parts per billion (ppb) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 4 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: EPA has found barium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: inflammation of the lungs when inhaled; less toxic in drinking water.

Long-term: Beryllium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to bones and lungs; cancer.

How much Beryllium is produced and released to the environment?

Production of beryllium metal was 490,000 lbs. in 1986. It is released principally in the smoke stacks and ash wastes of power plants which burn coal. It is also found in discharges from other industrial and municipal operations. Rocket exhaust products also consist of various beryllium compounds.

From 1987 to 1993, according to the Toxics Release Inventory beryllium releases to land and water totaled over 340,000 lbs. These releases were primarily from copper rolling and drawing industries which use it as a hardener in alloys. The largest releases occurred in Pennsylvania and Ohio.

What happens to Beryllium when it is released to the environment?

Very little is known about what happens to beryllium compounds when released to the environment. It appears unlikely to leach to ground water when released to land. Erosion or runoff of beryllium compounds into surface waters is not likely to be in a soluble form.

How will Beryllium be detected in and removed from my drinking water?

The regulation for beryllium became effective in 1994. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if beryllium is present above 4 ppb. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of beryllium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing beryllium: Activated Alumina, Coagulation/filtration, Ion Exchange, Lime Softening, Reverse Osmosis.

How will I know if Beryllium is in my drinking water?

If the levels of beryllium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 4 ppb

MCL: 4 ppb

Beryllium Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	1,314	341,721

	Top Five States	
PA	653	174,250
OH	490	166,292
MI	5	1,000
TX	0	174
MN	142	0

	Major Industries	
Copper rolling, drawing	405	180,502
Nonferrous metal smelting	481	151,790
Nonferrous rolling, drawing	4	8,000
Aluminum foundries	5	1,000
Blast furnaces, steelworks	250	250
Petroleum refining	142	174

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Consumer Factsheet on: CADMIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Cadmium and how is it used?

Cadmium is a metal found in natural deposits as ores containing other elements. The greatest use of cadmium is primarily for metal plating and coating operations, including transportation equipment, machinery and baking enamels, photography, television phosphors. It is also used in nickel-cadmium and solar batteries and in pigments.

Why is Cadmium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for cadmium has been set at 5 parts per billion (ppb) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 5 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant if it occurs in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: EPA has found cadmium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nausea, vomiting, diarrhea, muscle cramps, salivation, sensory disturbances, liver injury, convulsions, shock and renal failure.

Long-term: Cadmium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: kidney, liver, bone and blood damage.

How much Cadmium is produced and released to the environment?

2.9 million lbs. of cadmium were produced in the US in 1986, and nearly twice that amount was imported in the same year. Cadmium occurs naturally in zinc, lead, copper and other ores which can serve as sources to ground and surface waters, especially when in contact with soft, acidic waters. Major industrial releases of cadmium are due to waste streams and leaching of landfills, and from a variety of operations that involve cadmium or zinc. In particular, cadmium can be released to drinking water from the corrosion of some galvanized plumbing and water main pipe materials.

From 1987 to 1993, according to EPAs Toxic Chemical Release Inventory, cadmium releases were primarily from zinc, lead and copper smelting and refining industries, with the largest releases occurring in Arizona and Utah.

What happens to Cadmium when it is released to the environment?

Some cadmium compounds are able to leach through soils to ground water. When cadmium compounds do bind to the sediments of rivers, they can be more easily bioaccumulated or re-dissolved when sediments are disturbed, such as during flooding. Its tendency to accumulate in aquatic life is great in some species, low in others.

How will Cadmium be detected in and removed from my drinking water?

The regulation for cadmium became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if cadmium is present above 5 ppb. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of cadmium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing cadmium: Coagulation/Filtration, Ion Exchange, Lime Softening, Reverse Osmosis.

How will I know if Cadmium is in my drinking water?

If the levels of cadmium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 5 ppb

MCL: 5 ppb

Cadmium Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land

TOTALS	**31,487**	**2,059,574**

	Top Seven States *	
AZ	503	433,035
UT	1,750	372,010
MT	0	315,965
TN	2,700	288,781
ID	250	225,761
MO	2,361	189,914
WI	0	106,000

	Major Industries*	
Zinc, lead smelting	5,061	831,948
Copper smelting, refining	2,253	805,045
Indust. inorganic chems	250	225,761
Electroplating, anodizing	0	106,000
Steelworks, blast furnaces	5	13,000
Inorganic pigments	5,140	7,000

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Right to Know

Hazardous Substance Fact Sheet

Common Name: **CHLOROBENZENE**

Synonyms: Benzene Chloride; Phenyl Chloride

Chemical Name: Benzene, Chloro-

Date: December 1999 Revision: January 2009

CAS Number: 108-90-7

RTK Substance Number: 0379

DOT Number: UN 1134

Description and Use

Chlorobenzene is a colorless to yellowish liquid with an almond-like odor. It is used as a solvent, chemical intermediate, and heat transfer medium.

Reasons for Citation

- **Chlorobenzene** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IRIS, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	-	3
FLAMMABILITY	-	3
REACTIVITY	-	0
FLAMMABLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Chlorobenzene** can affect you when inhaled and by passing through the skin.
- **Chlorobenzene** can irritate the skin causing a rash and/or burning feeling on contact.
- Exposure can irritate the eyes, nose and throat.
- Exposure to high concentrations can cause headache, dizziness, lightheadedness, and passing out.
- **Chlorobenzene** may damage the lungs, liver and kidneys.
- High exposure may affect the nervous system.
- **Chlorobenzene** is a FLAMMABLE LIQUID and a DANGEROUS FIRE HAZARD.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **75 ppm** averaged over an 8-hour workshift.

ACGIH: The threshold limit value (TLV) is **10 ppm** averaged over an 8-hour workshift.

- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chlorobenzene**:

- **Chlorobenzene** can irritate the skin causing a rash and/or burning feeling on contact.
- Exposure can irritate the eyes, nose and throat.
- Exposure to high concentrations can cause headache, dizziness, lightheadedness, trouble concentrating, lack of coordination, weakness and passing out.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Chlorobenzene** and can last for months or years:

Cancer Hazard
- While **Chlorobenzene** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard
- There is no evidence that **Chlorobenzene** affects reproduction. This is based on test results presently available to the NJDHSS from published studies.

Other Effects
- **Chlorobenzene** may damage the lungs, liver and kidneys.
- High exposure may affect the nervous system.

Medical

Medical Testing
For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- Lung function tests.
- Liver and kidney function tests

If symptoms develop or overexposure is suspected, the following is recommended:

- Exam of the nervous system

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by **Chlorobenzene**.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Before entering a confined space where **Chlorobenzene** may be present, check to make sure that an explosive concentration does not exist.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Chlorobenzene**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Barrier® for gloves, and Tychem® CPF 4, BR, LV, Responder®, and TK; and Trellchem® HPS and VPS, or the equivalent, as protective clothing materials.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **10 ppm**, use a NIOSH approved full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Chlorobenzene**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential exists for exposure over **100 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **1,000 ppm** is immediately dangerous to life and health. If the possibility of exposure above **1,000 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Chlorobenzene** is a FLAMMABLE LIQUID.
- Use dry chemical, CO_2 or foam as extinguishing agents.
- Water may not be effective in fighting fires, but may be used to blanket fire.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray to keep fire-exposed containers cool.
- Flow or agitation may generate electrostatic charges.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Chlorobenzene** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers for disposal.
- Ventilate area of spill or leak.
- Keep **Chlorobenzene** out of confined spaces, such as sewers, because of the possibility of an explosion.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Chlorobenzene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Chlorobenzene** you should be trained on its proper handling and storage.

- **Chlorobenzene** may react explosively with *powdered* SODIUM and mixtures of PHOSPHORUS TRIFLUORIDE and SODIUM.
- **Chlorobenzene** may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALKALI METALS (such as LITHIUM, ALUMINUM and POTASSIUM); NITRIC ACID; and DIMETHYL SULFOXIDE.
- Store in tightly closed containers in a cool, well-ventilated area away from HEAT SOURCES and DO NOT USE on hot surfaces or during welding.
- Sources of ignition, such as smoking and open flames, are prohibited where **Chlorobenzene** is used, handled, or stored.
- Metal containers involving the transfer of **Chlorobenzene** should be grounded and bonded.
- Use explosion-proof electrical equipment and fittings wherever **Chlorobenzene** is used, handled, manufactured, or stored.
- Use only non-sparking tools and equipment, especially when opening and closing containers of **Chlorobenzene**.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **CHLOROBENZENE**

Synonyms: Benzene Chloride; Phenyl Chloride
CAS No: 108-90-7
Molecular Formula: C_6H_5Cl
RTK Substance No: 0379
Description: Colorless to yellowish liquid with an almond-like odor

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **3 - Fire** **0 - Reactivity** **DOT#:** UN 1134 **ERG Guide #:** 130 **Hazard Class:** 3 (Flammable)	FLAMMABLE LIQUID Use dry chemical, CO_2 or foam as extinguishing agents. Water may not be effective in fighting fires, but may be used to blanket fire. POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*. CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool. Flow or agitation may generate electrostatic charges.	**Chlorobenzene** may react explosively with *powdered* SODIUM and mixtures of PHOSPHORUS TRIFLUORIDE and SODIUM. **Chlorobenzene** may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALKALI METALS (such as LITHIUM, ALUMINUM and POTASSIUM); NITRIC ACID; and DIMETHYL SULFOXIDE.

SPILL/LEAKS

Isolation Distance:
Small Spill: 50 meters (150 feet)
Large Spill: 300 meters (1,000 feet)
Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers for disposal.

Use only non-sparking tools and equipment, especially when opening and closing containers of **Chlorobenzene**.

Keep **Chlorobenzene** out of confined spaces, such as sewers, because of the possibility of an explosion.

DO NOT wash into sewer.

Chlorobenzene is harmful to aquatic life in very low concentrations.

PHYSICAL PROPERTIES

Odor Threshold:	Almond-like odor
Flash Point:	82°F (28°C)
LEL:	1.3%
UEL:	9.6%
Auto Ignition Temp:	1,099°F (593°C)
Vapor Density:	3.9 (air = 1)
Vapor Pressure:	8.8 mm Hg at 68°F (20°C)
Specific Gravity:	1.1 (water = 1)
Water Solubility:	Very slightly soluble
Boiling Point:	270°F (132°C)
Freezing Point:	-50°F (-46°C)
Ionization Potential:	9.1 eV
Molecular Weight:	112.6

EXPOSURE LIMITS

OSHA: 75 ppm, 8-hr TWA
ACGIH: 10 ppm, 8-hr TWA
IDLH: 1,000 ppm

The Protective Action Criteria values are:
PAC-1 = 10 ppm
PAC-2 = 150 ppm
PAC-3 = 400 ppm

PROTECTIVE EQUIPMENT

Gloves:	Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Barrier® (>8-hr breakthrough)
Coveralls:	Tychem® CPF 4, BR, LV, Responder®, and TK; and Trellchem® HPS and VPS (>8-hr breakthrough)
Respirator:	>10 ppm - Supplied air or SCBA

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation, rash and burning feeling
Inhalation:	Nose and throat irritation Headache, dizziness, lightheadedness, and passing out

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer promptly to a medical facility.

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
Source Water Protection
Underground Injection Control
Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: CHROMIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Chromium and how is it used?

Chromium is a metal found in natural deposits as ores containing other elements. The greatest use of chromium is in metal alloys such as stainless steel; protective coatings on metal; magnetic tapes; and pigments for paints, cement, paper, rubber, composition floor covering and other materials. Its soluble forms are used in wood preservatives.

Why is Chromium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for chromium has been set at 0.1 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 0.1 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can

reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: EPA has found chromium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: skin irritation or ulceration.

Long-term: Chromium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to liver, kidney circulatory and nerve tissues; skin irritation.

How much Chromium is produced and released to the Environment?

Production of the most water soluble forms of chromium, the chromate and dichromates, was in the range of 250,000 tons in 1992. Though chromium occurs in nature mostly as chrome iron ore and is widely found in soils and plants, it is rare in natural waters. The two largest sources of chromium emission in the atmosphere are from the chemical manufacturing industry and combustion of natural gas, oil, and coal.

From 1987 to 1993, according to the Toxics Release Inventory, chromium compound releases to land and water totaled nearly 200 million pounds. These releases were primarily from industrial organic chemical industries. The largest releases occurred in Texas and North Carolina. The largest direct releases to water occurred in Georgia and Pennsylvania.

What happens to Chromium when it is released to the environment?

When released to land, chromium compounds bind to soil are not likely to migrate to ground water. They are very persistent in water as sediments. There is a high potential for accumulation of chromium in aquatic life.

How will Chromium be detected in and removed from my drinking water?

The regulation for chromium became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if chromium is present above 0.1 ppm. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of chromium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing chromium: Coagulation/Filtration, Ion Exchange, Reverse Osmosis, Lime Softening.

How will I know if Chromium is in my drinking water?

If the levels of chromium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or

private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 0.1 ppm

MCL: 0.1 ppm

Chromium Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	**2,876,055**	**196,880,624**

	Top Ten States *	
TX	102,079	64,301,920
NC	43,522	55,217,044
IN	85,570	15,955,895
OH	51,830	8,319,600
UT	1,750	5,817,015
AR	2,300	3,532,000
KY	255	2,491,519
PA	110,149	2,337,905
GA	679,721	1,404,698

ID	91,750	1,404,870

	Major Industries*	
Indust. organics	3,272	120,707,814
Steelworks, Blast furn.	609,174	16,638,880
Electrometallurgy	33,269	10,796,928
Copper smelting, refining	1,750	5,817,015
Nonferrous smelting	2,300	3,532,000
Inorganic pigments	88,721	1,375,700
Pulp mills	985,800	224,198

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/chromium.html

Consumer Factsheet on: COPPER

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Copper and how is it used?

Copper is a metal found in natural deposits as ores containing other elements. It is widely used in household plumbing materials.

Why is Copper being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for copper has been set at 1.3 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Since copper contamination generally occurs from corrosion of household copper pipes, it cannot be directly detected or removed by the water system. Instead, EPA is requiring water systems to control the corrosiveness of their water if the level of copper at home taps exceeds an Action Level.

The Action Level for copper has also been set at 1.3 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to control this contaminant should it occur in drinking water at their customers home taps.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short- and long-term effects: Copper is an essential nutrient, required by the body in very small amounts. However, EPA has found copper to potentially cause the following health effects when people are exposed to it at levels above the Action Level. Short periods of exposure can cause gastrointestinal disturbance, including nausea and vomiting. Use of water that exceeds the Action Level over many years could cause liver or kidney damage. People with Wilsons disease may be more sensitive than others to the effect of copper contamination and should consult their health care provide

How much Copper is produced and released to the environment?

Copper may occur in drinking water either by contamination of the source water used by the water system, or by corrosion of copper plumbing. Corrosion of plumbing is by far the greatest cause for

concern. Copper is rarely found in source water, but copper mining and smelting operations and municipal incineration may be sources of contamination.

From 1987 to 1993, according to the Toxics Release Inventory copper compound releases to land and water totaled nearly 450 million lbs., of which nearly all was to land. These releases were primarily from copper smelting industries. The largest releases occurred in Utah. The largest direct releases to water occurred in Tennessee.

What happens to Copper when it is released to the environment?

All water is corrosive toward copper to some degree, even water termed noncorrosive or water treated to make it less corrosive. Corrosivity toward copper is greatest in very acidic water. Many of the other factors that affect the corrosivity of water toward lead can also be expected to affect the corrosion of copper.

How will Copper be detected in and removed from my drinking water?

The regulation for copper became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples from household taps twice a year and analyze them to find out if copper is present above 1.3 ppm in more than 10 percent of all homes tested. If it is present above this level, the system must continue to monitor this contaminant twice a year.

If contaminant levels are found to be consistently above the Action level, your water supplier must take steps to reduce the amount of copper so that it is consistently below that level. The following treatment methods have been approved by EPA for controlling copper: Corrosion control.

How will I know if Copper is in my drinking water?

If the water system fails to comply with any EPA or state treatment requirements, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 1.3 ppm

Action level: 1.3 ppm

Copper Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	1,538,148	442,082,245

	Top Ten States *	

UT	55,350	153,501,500
NM	0	130,682,387
AZ	2,636	104,619,532
MI	19,763	11,172,897
NY	66,57	10,017,766
MT	0	8,696,153
TN	301,417	1,208,804
MO	250	1,486,000
AL	41,213	513,536
MD	78,601	270,945

	Major Industries*	
Primary copper smelting	7,591	201,214,264
Other nonferrous smelt.	4,414	11,317,048
Plastic materials	44,422	9,637,850
Blast furnaces, steel	156,982	3,229,752
Poultry slaughtering	0	1,249,750
Copper rolling, drawing	17,253	941,075
Ind. organic chems	28,936	827,356
Prepared feeds, misc.	1,038	760,094
Ind. inorganic chems	220,503	527,458

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
Frequently Asked Questions
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National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Technical Factsheet on: 1,2-DICHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: cis-0.07; trans-0.1 mg/L
MCL: cis-0.07; trans-0.1 mg/L
HAL(child)- 1 day: cis-4; trans-20
: Longer-term: cis-3; trans-2

Health Effects Summary

Acute: EPA has found cis- and trans- 1,2-dichloroethylene to potentially cause central nervous system depression from short-term exposures at levels above the MCL.

Short-term exposures in drinking water which are considered "safe" for a 10-kg (22 lb.) child consuming 1 liter of water per day: for the cis form- a one-day exposure of 4 mg/L or upto a 7-year exposure to 3 mg/L. For the trans isomer: a one-day exposure of 20 mg/L or upto a 7-year exposure to 2 mg/L.

Chronic: Both cis- and trans-1,2-DCE have the potential to cause liver, circulatory and nervous system damage from long-term exposure at levels above the MCL. The trans isomer is approximately twice as potent as the cis-isomer in its ability to depress the central nervous system.

Cancer: There is inadequate evidence to state whether or not either cis- or trans-1,2-DCE have the potential to cause liver cancer from a lifetime exposure in drinking water.

Usage Patterns

Both the cis and trans forms - usually as a mixture - are used as a solvent for waxes, resins, and acetylcellulose; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls and in the extraction of oils and fats from fish and meat; as a chemical intermediate for making chlorinated compounds.

No data were available on recent production levels in the United States.

Release Patterns

Releases to the environment are expected to be limited to manufacturing plants in the Gulf Region of the United States. Since cis-and trans-1,2-DCE are not listed chemicals in the Toxics Release Inventory, data on releases during manufacture and handling are not available.

Trans-1,2-dichloroethylene may be released to the environment in air emissions and wastewater during its production and use as a solvent and extractant, in organic synthesis, and in the manufacture of perfumes, lacquers, and thermoplastics.

An assessment of the sources of trans-1,2-dichloroethylene is complicated by the fact that it is a priority pollutant while the cis isomer is not and the standard EPA methods of analysis do not allow the isomers to differentiated. This has resulted in monitoring reports erroneously listing the trans isomer when the cis isomer is present. The Michigan Department of Health has the capability of distinguishing these isomers and claims that it frequently finds the cis isomer and, if concentrations are high, they occasionally find traces of the trans isomer.

Environmental Fate

Both the cis- and trans-1,2-dichloroethylenes may be released to the environment in air emissions and wastewater during its production and use. Under anaerobic conditions that may exist in landfills, aquifers, or sediment one is likely to find 1,2-dichloroethylenes that are formed as breakdown products from the reductive dehalogenation of common industrial solvents trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane.

The cis-1,2-dichloroethylene is apparently the more common isomer found although it is mistakenly reported as the trans isomer. The trans-isomer, being a priority pollutant, is more commonly analyzed for and the analytical procedures generally used do not distinguish between isomers.

If 1,2-dichloroethylenes are released on soil, it should evaporate and leach into the groundwater where very slow biodegradation should occur. If released into water, 1,2-dichloroethylenes will be lost mainly through

volatilization.

In the atmosphere, 1,2-dichloroethylenes will be lost by reaction with photochemically produced hydroxyl radicals and scavenged by rain. Because it is relatively long-lived in the atmosphere, considerable dispersal from source areas should occur.

Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant.

Chemical/Physical Properties

CAS Number: cis- 156-59-2 trans- 156-60-5

Color/ Form/Odor: Colorless, odorless liquid

M.P.: cis- -80 C; trans- -50 C

B.P.: cis- 60.3 C; trans- 48 C

Vapor Pressure: cis- 273 mm Hg at 30 C; trans- 395 mm Hg at 30 C

Octanol/Water Partition (Kow): Log Kow = cis- 1.86; trans- 2.06

Density/Spec. Grav.: cis- 1.26 at 20 C trans- 1.28 at 20 C

Solubility: Soluble in water, cis- 3.5 g/L of water, trans- 6.3 g/L of water at 25 C

Soil sorption coefficient: Kocs of cis and trans isomers are estimated at 36 to 49; high to very high mobility in soil

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: cis- 0.00337 atm-cu m/mole; trans- 0.00672 atm-cu m/mole

Bioconcentration Factor: BCFs of cis and trans isomers are estimated at 15 to 22; not expected to bioconcentrate in aquatic organisms.

Trade Names/Synonyms: Both isomers- 1,2-DCE, Acetylene dichloride; cis- Z-1,2-dichloroethene; trans- E-1,2-dichloroethene, sym-dichloroethylene

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/dwh/t-voc/12-dich2.html

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **DINITROPHENOL**

CAS Number: 25550-58-7
DOT Number: UN 0076 (dry or wetted with less than 15% water)
UN 1599 (solution)
UN 1320 (wetted with not less than 15% water)

RTK Substance number: 0780
Date: October 1996 Revision: February 2003

HAZARD SUMMARY

* **Dinitrophenol** can affect you when breathed in and by passing through your skin.
* **Dinitrophenol** can irritate the skin. Long-term exposure may cause a skin allergy to develop.
* **Dinitrophenol** can irritate the eyes and can cause clouding of the eye lenses (cataracts).
* Breathing **Dinitrophenol** can irritate the nose and throat causing coughing and wheezing.
* High exposure to **Dinitrophenol** can affect the nervous system causing headache, nausea, vomiting, anxiety, convulsions (fits), and even death.
* Exposure to **Dinitrophenol** may damage the liver and kidneys.
* **Dinitrophenol** is HIGHLY EXPLOSIVE, FLAMMABLE and REACTIVE when DRY, and a DANGEROUS FIRE and EXPLOSION HAZARD.

IDENTIFICATION

Dinitrophenol is a yellow crystalline (sugar or sand-like) solid which is often mixed in a liquid solution. It is used in dyes and wood preservatives, and to make explosives.

REASON FOR CITATION

* **Dinitrophenol** is on the Hazardous Substance List because it is cited by DOT and EPA.
* This chemical is on the Special Health Hazard Substance List because it is **FLAMMABLE** and **REACTIVE** when DRY.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Dinitrophenol**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

* It should be recognized that **Dinitrophenol** can be absorbed through your skin, thereby increasing your exposure.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Dinitrophenol** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Dinitrophenol** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Dinitrophenol**:

* **Dinitrophenol** can irritate the skin and eyes.
* Breathing **Dinitrophenol** can irritate the nose and throat causing coughing and wheezing.
* High exposure to **Dinitrophenol** can affect the nervous system causing headache, nausea, vomiting, abdominal pain, thirst, sweating, anxiety, restlessness, weakness, dizziness, convulsions (fits), and even death.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Dinitrophenol and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Dinitrophenol** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* There is limited evidence that **Dinitrophenol** may damage the developing fetus.

Other Long-Term Effects

* **Dinitrophenol** may cause a skin allergy. If allergy develops, very low future exposures can cause itching and a skin rash.
* Repeated exposure can cause clouding of the eye lenses (cataracts).
* Exposure to **Dinitrophenol** may damage the liver and kidneys.

MEDICAL

Medical Testing

Before beginning employment and at regular times after that, the following is recommended:

* Eye exam for cataracts.

If symptoms develop or overexposure is suspected, the following may be useful:

* Liver and kidney function tests.
* Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **Dinitrophenol**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer **Dinitrophenol** or pump liquid **Dinitrophenol** from drums or other storage containers to process containers.
* Before entering a confined space where *dry* **Dinitrophenol** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Dinitrophenol** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Dinitrophenol**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Dinitrophenol**, whether or not known skin contact has occurred.

* Do not eat, smoke, or drink where **Dinitrophenol** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* For *dry* **Dinitrophenol** use a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Dinitrophenol**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* For solid **Dinitrophenol** wear impact resistant eye protection with side shields or goggles.
* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential for overexposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Dinitrophenol** you should be trained on its proper handling and storage.
* **Dinitrophenol** must be kept WET and protected from SHOCK, FRICTION and HEAT.
* **Dinitrophenol** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); and COMBUSTIBLES.
* Sources of ignition, such as smoking and open flames, are prohibited where **Dinitrophenol** is handled, used, or stored.
* Metal containers involving the transfer of **Dinitrophenol** should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of **Dinitrophenol**.
* Wherever **Dinitrophenol** is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Who is at the greatest risk from reproductive hazards?

A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?

A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<

Common Name: **DINITROPHENOL**
DOT Number: **UN 0076 (dry or wetted with less than 15% water)**
UN 1599 (solution)
UN 1320 (wetted with not less than 15% water)
NAERG Code: **153 (solution)**
113 (wetted with not less than 15% water)
CAS Number: **25550-58-7**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	4 (Dry)	-
REACTIVITY	4 (Dry)	-
FLAMMABLE, REACTIVE AND EXPLOSIVE WHEN DRY POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* *Dry* **Dinitrophenol** is a SEVERE EXPLOSION HAZARD WHEN EXPOSED TO FRICTION, HEAT OR SHOCK and is FLAMMABLE and REACTIVE
* POISONOUS GASES ARE PRODUCED IN FIRE, including *Nitrogen Oxides*.
* Use flooding quantities of water to extinguish fire. If water is not available, use dry chemical or earth.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Dinitrophenol** in solution is spilled or leaked, or *dry* **Dinitrophenol** is spilled, take the following steps:

* Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete.
* Remove all ignition sources.
* Wet spilled material with water and place in containers.
* Ventilate area of spill or leak after clean-up is complete.
* Keep **Dinitrophenol** out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of *dry* **Dinitrophenol** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water. Continue without stopping for at least 30 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Water Solubility: Slightly soluble

OTHER COMMONLY USED NAMES

Chemical Name:

Phenol, Dinitro-

Dinitrophenol is the common name for any combination of the following:

2,4-Dinitrophenol	CAS# 51-28-5
2,5-Dinitrophenol	CAS# 329-71-5
2,6-Dinitrophenol	CAS# 573-56-8

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
Source Water Protection
Underground Injection Control
Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: ETHYLBENZENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Ethylbenzene and how is it used?

Ethylbenzene is a colorless organic liquid with a sweet, gasoline-like odor. The greatest use - over 99 percent - of ethylbenzene is to make styrene, another organic liquid used as a building block for many plastics. It is also used as a solvent for coatings, and in making rubber and plastic wrap.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Ethylbenzol
Phenylethane

Why is Ethylbenzene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for ethylbenzene has been set at 0.7 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 0.7 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found ethylbenzene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: drowsiness, fatigue, headache and mild eye and respiratory irritation.

Long-term: Ethylbenzene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the liver, kidneys, central nervous system and eyes.

How much Ethylbenzene is produced and released to the environment?

Production of ethylbenzene has increased: from 6.9 billion lbs. in 1982 to 11.8 billion lbs in 1993. It is released to the air primarily from its use in gasoline. More localized may be due to waste water and spills from its production and industrial use.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, ethylbenzene releases to water and land totalled over 761,000 lbs. These releases were primarily from petroleum refining industries. The largest releases occurred in Texas. The largest direct releases to water occurred in Virginia.

What happens to Ethylbenzene when it is released to the environment?

Ethylbenzene will evaporate rapidly from water, and will be degraded by microbes. It binds only moderately to aquatic sediment and to soils. Thus, it may leach to ground water if released to land. Ethylbenzene has little potential for accumulating in aquatic life.

How will Ethylbenzene be Detected in and Removed from My Drinking Water?

The regulation for ethylbenzene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if ethylbenzene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of ethylbenzene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing ethylbenzene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Ethylbenzene is in my drinking water?

If the levels of ethylbenzene exceed the MCL, 0.7 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.7 ppm

Mcl: 0.7 ppm

Ethylbenzene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**47,293**	**714,580**
Top Ten States			
TX	9,870	480,164	
VI	1,233	72,245	
IL	31	44,789	
PR	0	23,980	
VA	17,997	1,950	
DE	3,460	13,324	
NJ	1,892	11,510	
NM	0	13,076	
WY	250	12,755	
LA	4,383	4,552	

Major Industries

Petroleum refining	55,201	718,884
Plastics, resins	12,384	9,212
Indust. Organics	10,683	9,781
Pharmaceuticals	14,090	0
Metal containers	0	11,510

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

List of Contaminants

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Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/ethylben.html

http://www.epa.gov/safewater/lcrmr/fs_consumer.html
Last updated on Thursday, August 24th, 2006.

Lead in Drinking Water

Consumer Factsheet on Lead in Drinking Water

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication: **National Primary Drinking Water Regulations**.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Lead and how is it used?

Lead is a metal found in natural deposits as ores containing other elements. It is sometimes used in household plumbing materials or in water service lines used to bring water from the main to the home.

Why is Lead being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for lead has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Since lead contamination generally occurs from corrosion of household lead pipes, it cannot be directly detected or removed by the water system. Instead, EPA is requiring water systems to control the corrosiveness of their water if the level of lead at home taps exceeds an Action Level.

The action level for lead has been set at 15 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to control this contaminant should it occur in drinking water at their customers home taps.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short- and Long-term effects: Lead can cause a variety of adverse health effects when people are exposed to it at levels above the action level for relatively short periods of time. These effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight increases in the blood pressure of some adults.

Long-term effects: Lead has the potential to cause the following effects from a lifetime exposure at levels above the action level: stroke and kidney disease; cancer.

How much Lead is produced and released to the environment?

Lead may occur in drinking water either by contamination of the source water used by the water system, or by corrosion of lead plumbing or fixtures. Corrosion of plumbing is by far the greatest cause for concern. All water is corrosive to metal plumbing materials to some degree. Grounding of household electrical systems to plumbing may also exacerbate corrosion. Over time, lead-containing plumbing materials will usually develop a scale that minimizes further corrosion of the pipe.

Lead is rarely found in source water, but lead mining and smelting operations may be sources of contamination. Eighty- eight percent of the lead mined in the US comes from seven mines in the New Lead Belt in southeastern Missouri. From 1987 to 1993, according to the Toxics Release Inventory lead compound releases to land and water totaled nearly 144 million lbs. These releases were primarily from lead and copper smelting industries. The largest releases occurred in Missouri, Arizona and Montana. The largest direct releases to water occurred in Ohio.

What happens to Lead when it is released to the environment?

When released to land, lead binds to soils and does not migrate to ground water. In water, it binds to sediments. It does not accumulate in fish, but does in some shellfish, such as mussels.

How will Lead be detected in and removed from my drinking water?

The regulation for lead became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples from household taps twice a year and analyze them to find out if lead is present above 15 ppb in more than 10 percent of all homes tested. If it is present above this level, the system must continue to monitor this contaminant twice a year.

If contaminant levels are found to be consistently above the Action level, your water supplier must take steps to reduce the amount of lead so that it is consistently below that level. The following treatment methods have been approved by EPA for controlling lead: Corrosion control.

How will I know if Lead is in my drinking water?

If the levels of lead exceed the Action Level, the system must notify the public via newspapers, radio, TV and other means. Customers will be informed of what they can do at home to lower their exposure to lead. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

MCLG: zero

Action level: 15 ppb

Lead Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	**970,827**	**143,058,771**

Top Twelve States *

MO	4,408	40,656,278
AZ	771	23,240,625
MT	0	20,822,517
UT	4,600	11,881,000
TX	1,988	11,515,211
OH	127,990	5,196,522
IN	62,894	4,851,940
TN	7,140	2,095,489
IL	26,601	1,930,000
WI	1,310	1,350,960
MN	0	1,313,895
NM	0	1,060,880

Major Industries*

Lead smelting, refining	31,423	68,996,819
Copper smelting	5,371	34,942,505
Steelworks, blast furn.	379,849	18,149,696
Storage batteries	0	1,867,292
China plumbing fixtures	1,310	1,350,960
Iron foundries	10,021	1,274,777
Copper mining	0	1,240,000

* Water/Land totals only include facilities with releases greater than 100,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

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Your state Department of Health/Environment is also a valuable source of information.

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U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
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Drinking Water For Kids!

Consumer Factsheet on: MERCURY

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Mercury and how is it used?

Mercury is a liquid metal found in natural deposits as ores containing other elements. Electrical products such as dry-cell batteries, fluorescent light bulbs, switches, and other control equipment account for 50% of mercury used.

Why is Mercury being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for mercury has been set at 2 parts per billion (ppb) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 2 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short- or Long-term: EPA has found mercury to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: kidney damage.

How much Mercury is produced and released to the environment?

Large amounts of mercury are released naturally from the earths crust. Combustion of fossil fuels, metal smelters, cement manufacture, municipal landfills, sewage, metal refining operations, r most notably, from chloralkali plants are important sources of mercury release. Nearly 8 million lbs. of mercury were produced in the U.S. in 1986.

From 1987 to 1993, according to EPAs Toxic Chemical Release Inventory, mercury releases to land and water totaled nearly 68,000 lbs. These releases were primarily from chemical and allied industries. The largest releases occurred in Tennessee and Louisiana. The largest direct releases to water occurred in West Virginia and Alabama.

What happens to Mercury when it is released to the environment?

Mercury is unique among metals in that it can evaporate when released to water or soil. Also, microbes can convert inorganic forms of mercury to organic forms which can be accumulated by aquatic life.

How will Mercury be detected in and removed from my drinking water?

The regulation for mercury became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if mercury is present above 2 ppb. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of mercury so that it is consistently below that level. The following treatment methods have been approved by EPA for removing mercury: Coagulation/Filtration; Granular Activated Carbon; Lime softening; Reverse osmosis.

How will I know if Mercury is in my drinking water?

If the levels of mercury exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 2 ppb

MCL: 2 ppb

Mercury Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	**6,971**	**60,877**

	Top Six States	
TN	164	29,161
LA	431	21,829
DE	117	3,860
OH	29	2,760
AL	1,462	4,001
WV	1,657	454

	Major Industries*	
Chemical, allied products	12,269	74,720
Electric lamps	0	2,750
Paper mills	2,500	0

Learn more about your drinking water!

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water bill or telephone books government listings are a good starting point.

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Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/mercury.html

Right to Know
Hazardous Substance Fact Sheet

Common Name: **METHYLENE CHLORIDE**

Synonyms: Dichloromethane; Methylene Dichloride

Chemical Name: Methane, Dichloro-

Date: May 2001 Revision: October 2008

CAS Number: 75-09-2

RTK Substance Number: 1255

DOT Number: UN 1593

Description and Use

Methylene Chloride is a colorless, volatile, liquid with a sweet odor. It is used as a paint and varnish remover, solvent for plastics, degreasing agent, propellant, and blowing agent.

- **ODOR THRESHOLD=25 to 150 ppm**
- Odor thresholds vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

Reasons for Citation

- **Methylene Chloride** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE PAGE 6

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	-	2
FLAMMABILITY	-	1
REACTIVITY	-	0
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Methylene Chloride** can affect you when inhaled and by passing through the skin
- **Methylene Chloride** should be handled as a CARCINOGEN and MUTAGEN--WITH EXTREME CAUTION.
- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Methylene Chloride** can irritate the nose, throat and lungs.
- Higher exposure can cause headache, nausea, dizziness, weakness and unconsciousness.
- **Methylene Chloride** may damage the liver and affect the kidneys and brain.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **25 ppm** averaged over an 8-hour workshift and **125 ppm**, not to be exceeded during any 15-minute work period.

NIOSH: Recommends that exposure to occupational carcinogens be limited to the lowest feasible concentration.

ACGIH: The threshold limit value (TLV) is **50 ppm** averaged over an 8-hour workshift.

- **Methylene Chloride** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Methylene Chloride**:

- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Methylene Chloride** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- Higher exposure can cause headache, nausea, fatigue, dizziness, lightheadedness, weakness and unconsciousness.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Methylene Chloride** and can last for months or years:

Cancer Hazard
- **Methylene Chloride** may be a CARCINOGEN in humans since it has been shown to cause liver and lung cancer in animals.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard
- There is limited evidence that **Methylene Chloride** causes spontaneous abortions.

Other Effects
- **Methylene Chloride** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.
- **Methylene Chloride** may damage the liver and affect the kidneys.
- Long-term exposure may affect the brain causing memory loss, poor coordination, and reduced thinking ability.

Medical

Medical Testing
Before first exposure and every 12 months thereafter, OSHA requires your employer to provide (for persons exposed to greater than **12.5 ppm** of *Methylene Chloride*):

- Complete work and medical history
- Thorough physical examination
- Liver and kidney function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- Lung function tests
- Exam of the nervous system
- Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as for headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

OSHA requires your employer to provide you and your doctor with a copy of the OSHA *Methylene Chloride* Standard (29 CFR 1910.1052).

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by **Methylene Chloride**.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Specific actions are required for this chemical by OSHA. Refer to the OSHA *Methylene Chloride* Standard (29 CFR 1910.1052).

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **Methylene Chloride**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend Polyvinyl Alcohol and Silver Shield®/4H® for gloves and Tychem® Responder® and TK; Zytron® 500; ONESuit® TEC; and Trellchem® HPS and VPS, or the equivalent, as protective materials for clothing.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
- Do not wear leather shoes. **Methylene Chloride** is absorbed into the leather and can not be removed by cleaning.

Eye Protection

- Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **25 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **2,300 ppm** is immediately dangerous to life and health. If the possibility of exposure above **2,300 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Methylene Chloride** may burn, but does not readily ignite.
- Use dry chemical, CO_2, water spray or foam as extinguishing agents.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*.
- Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Methylene Chloride** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers.
- Use water spray to keep containers cool.
- Ventilate area of spill or leak.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Methylene Chloride** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Methylene Chloride** you should be trained on its proper handling and storage.

- A regulated, marked area should be established where **Methylene Chloride** is handled, used or stored as required by the OSHA *Methylene Chloride* Standard (29 CFR 1910.1052).
- **Methylene Chloride** reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ALUMINUM); and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- **Methylene Chloride** is not compatible with LIQUID OXYGEN; TITANIUM; and AMINES.
- Store in tightly closed containers in a cool, well-ventilated area away from METALS and LIGHT.
- **Methylene Chloride** attacks some forms of PLASTIC, RUBBER and COATINGS, and will corrode IRON, some STAINLESS STEELS, COPPER and NICKEL in the presence of WATER.

Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health & Senior Services
Right to Know Program
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Common Name: **METHYLENE CHLORIDE**

Synonyms: Dichloromethane; Methylene Dichloride
CAS No: 75-09-2
Molecular Formula: CH_2Cl_2
RTK Substance No: 1255
Description: Colorless, volatile liquid with a sweet odor

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
2 - Health **1 - Fire** **0 - Reactivity** **DOT#:** UN 1593 **ERG Guide #:** 160 **Hazard Class:** 6.1 (Poison)	**Methylene Chloride** may burn, but does not readily ignite. Use dry chemical, CO_2, water spray or foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*. Use water spray to keep fire-exposed containers cool.	**Methylene Chloride** reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); CHEMICALLY ACTIVE METALS (such as POTASSIUM, SODIUM, MAGNESIUM and ALUMINUM); and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE). **Methylene Chloride** is not compatible with LIQUID OXYGEN; TITANIUM; and AMINES.

SPILL/LEAKS

Isolation Distance:

Small Spill: 30 meters (100 feet)

Large Spill: 60 meters (200 feet)

Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers.

DO NOT wash into sewer.

Methylene Chloride may be hazardous in the environment. Special attention should be given to ground water contamination.

PHYSICAL PROPERTIES

Odor Threshold:	25 to 150 ppm
Flash Point:	Nonflammable
LEL:	13%
UEL:	23%
Auto Ignition Temp:	1,033°F (556°C)
Vapor Density:	2.9 (air = 1)
Vapor Pressure:	440 mm Hg at 77°F (25°C)
Specific Gravity:	1.3 (water = 1)
Water Solubility:	Very slightly soluble
Boiling Point:	104°F (40°C)
Melting Point:	-142°F (-97°C)
Ionization Potential:	11.32 eV
Molecular Weight:	85

EXPOSURE LIMITS

OSHA:	25 ppm, 8-hr TWA; 125 ppm, STEL
NIOSH:	Lowest feasible concentration
ACGIH:	50 ppm, 8-hr TWA
IDLH:	2,300 ppm ERPG-1: 200 ppm, ERPG-2: 750 ppm; ERPG-3: 4,000 ppm

PROTECTIVE EQUIPMENT

Gloves:	Polyvinyl Alcohol and Silver Shield®/4H® (>8-hr breakthrough)
Coveralls:	Tychem® Responder® and TK; Zytron® 500; ONESuit® TEC; and Trellchem® HPS and VPS (>8-hr breakthrough)
Respirator:	>25 ppm - Supplied air

HEALTH EFFECTS

Eyes:	Irritation and burns
Skin:	Irritation and burns
Inhalation:	Nose, throat and lung irritation with coughing, wheezing and shortness of breath Headache, nausea, fatigue, dizziness, lightheadedness, and unconsciousness
Chronic:	Cancer (liver and lung) in animals

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention.

Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer promptly to a medical facility.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

NAPHTHALENE
CAS # 91-20-3

1-METHYLNAPHTHALENE
CAS # 90-12-0

2-METHYLNAPHTHALENE
CAS # 91-57-6

Division of Toxicology ToxFAQs™ August 2005

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

- Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- Naphthalene can become weakly attached to soil or pass through soil into underground water.
- In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- Naphthalene does not accumulate in the flesh of animals or fish that you might eat.
- 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- Drinking water from contaminated wells.
- Touching fabrics that are treated with moth repellents containing naphthalene.
- Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene

causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Humans Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using fireplaces or heating appliances in the their homes.

❑ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❑ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❑ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Technical Factsheet on: NICKEL

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

The MCL and MCLG for Nickel were remanded on February 9, 1995. This means that while many water suppliers continue to monitor nickel levels in their water, there is currently no EPA legal limit on the amount of nickel in drinking water. EPA is reconsidering the limit on nickel. This partially outdated fact sheet is provided for your information.

Drinking Water Standards

MCLG: 0.1 mg/l
MCL: 0.1 mg/l
HAL(child): 1- to 10-day: 1 mg/L; Longer-term: 0.5 mg/L

Health Effects Summary

Acute: EPA has not found nickel to potentially cause health effects from acute exposures at levels above the MCL.

Short-term exposures in drinking water considered "safe" for a 10-kg (22 lb.) child consuming one liter of water per day: a one- to ten-day exposure to 1 mg/L; upto a 7 year exposure to 0.5 mg/L.

Chronic: Nickel has the potential to cause the following health effects from long-term exposures at levels above the MCL: decreased body weight; heart and liver damage; dermatitis.

Cancer: There is no evidence that nickel has the potential to cause cancer from lifetime exposures in drinking water.

Usage Patterns

Production of nickel was 84.6 million lbs. in 1986, down slightly from 1982 report of almost 90 million lbs. In 1986 it was estimated that industries consumed nickel as follows: transportation, 25%, chemical industry, 15%; electrical equipment, 9%; construction, 9%; fabricated metal products, 9%; petroleum, 8%; household appliances, 7%; machinery, 7%; and other, 11%.

Nickel carbonate is used in nickel catalyst production for organic chemical manufacture, petroleum refining and edible oil hardening. Nickel oxide consumption in 1972 (representing over 30 million lbs. contained nickel) is estimated to have been as follows: 60% for stainless and heat resisting steels, 27% for other steel alloys, 8% for other nickel alloys, 2% for cast irons, and 3% for other uses.

Release Patterns

Nickel is found in many ores as sulfides, arsenides, antimonides & oxides or silicates; chief sources include chalcopyrite; others are pyrrhotite, pentlandite, garnierite, niccolite, millerite. The principal natural form of nickel oxide occurs in admixture with nickel sulfides in varying proportions in weathered ore. Nickel carbonate, found as the mineral zaratite, is a potential atmospheric and surface water pollutant.

Inadvertent formation of nickel carbonyl can occur in various industrial processes that use nickel catalysts, such as coal gasification, petroleum refining, and hydrogenation of fats and oils. Nickel oxide has been identified in residual fuel oil and in atmospheric emissions from nickel refineries. Trinickel disulfide is a major component in nickel refinery flue dust.

From 1987 to 1993, according to the Toxics Release Inventory nickel releases to land and water totalled nearly 27 million lbs., of which most was to land. These releases were primarily from nickel smelting/refining and steelworks industries. The largest releases occurred in Oregon and Arkansas. The largest direct releases to water occurred in Maryland and Georgia.

Environmental Fate

Nickel is one of the most mobile of the heavy metals in the aquatic environment. The mobility of nickel in the aquatic environment is controlled largely by the capability of various sorbents to scavenge it from solution. Although data are limited, it appears that in pristine environments, hydrous oxides of iron and manganese control nickel's mobility via co-precipitation and sorption. In polluted environments, the more prevalent organic material will keep nickel soluble. In reducing environments, insoluble nickel sulfide may be formed. Nickel chloride is water soluble and would be expected to release divalent nickel into the water.

The atmosphere is a major conduit for nickel as particulate matter. Contributions to atmospheric loading come from both natural sources and anthropogenic activity, with input from both stationary and mobile sources. Various dry and wet precipitation processes remove particulate matter as wash out or fallout from the atmosphere with transfer to soils and waters. Soil borne nickel may enter waters by surface runoff or by percolation into ground water.

Once nickel is in surface and ground water systems, physical and chemical interactions (complexation, precipitation/dissolution, adsorption/desorption, and oxidation/reduction) occur that will determine its fate and that of its constituents.

The only gaseous nickel compound of environmental importance is nickel carbonyl. Under ambient conditions in moist air, it decomposes to form nickel carbonate. Thus, in the atmosphere at concentrations near the ppb level, it has a half-life of about 30 minutes. The removal of nickel carbonyl by precipitation or by adsorption on surfaces has not been documented. Since this compound is soluble in water, precipitation scavenging is possible. Nothing is known about its reaction with natural surfaces or its uptake by vegetation. Thus, dry deposition rates cannot be predicted until some experimental investigations have been conducted.

Although nickel is bioaccumulated, the concentration factors are such as to suggest that partitioning into the biota is not a dominant fate process.

Chemical/Physical Properties

CAS Number: 7440-02-0

Color/ Form/Odor: Nickel is a silvery metal found only in combined form in nature.

Soil sorption coefficient: N/A; sorption related to that of iron/manganese oxides, organic matter.

Bioconcentration Factor: N/A; not expected to bioconcentrate

Common Ores: sulfide- chalcopyrite, heazlewoodite (disulfide); sulfate- morenosite; carbonate- zaratite; oxide- bunsenite; others- pyrrhotite, pentlandite, garnierite, niccolite, millerite

Solubilities:

acetate- 17% at 65 deg C
carbonate- 93 mg/L at 25 deg C
carbonyl- insoluble
chloride- 642 g/L at 20 deg C
cyanide- insoluble
disulfide- insoluble
fluoride- 40 g/L at 25 deg C
hydroxide- 0.13 g/L cold water
iodide- 1242 g/L at 0 deg C
nitrate- 48.5 Wt% at 20 deg C
oxide- 0.11 mg/L at 20 deg C
sulfate- 293 g/L at 0 deg C

Other Regulatory Information

Monitoring:

-- For Ground Water Sources:

Initial Frequency-1 sample once every 3 years

Repeat Frequency-If no detections for 3 rounds, once every 9 years

-- For Surface Water Sources:

Initial Frequency-1 sample annually

Repeat Frequency-If no detections for 3 rounds, once every 9 years

-- Triggers - If detect at > 0.1 mg/L, sample quarterly.

Analysis

Reference Source	Method Number
EPA 600/4-79-020	249.1; 249.1
NTIS PB 91-231498	200.7; 200.8; 200.9
Standard Methods	3111B; 3113; 3120

Treatment/Best Available Technologies: Ion Exchange, Lime Softening, Reverse Osmosis

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	**709,236**	**26,079,419**
Top Ten States *		
OR	459	6,256,532
AR	4,250	5,622,900
ID	1,000	2,200,250
IN	28,050	2,098,196
PA	19,680	2,052,736
AZ	767	984,817
TX	0	777,400
MD	77,200	666,637
CA	6,687	285,731
GA	61,100	193,111
Major Industries*		
Primary nonferrous meta	16,874	12,053,688
Blast furnaces + steel	304,891	6,784,227
Ind inorganic chems	22,689	2,519,468
Ind organic chems	109,141	1,105,934
Petroleum refining	186,499	949,411
Primary copper	1,272	996,817
Iron+steel foundries	500	409,000
Gray iron foundries	3,326	334,524
Inorganic pigments	62,394	193,111

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

For Additional Information:

EPA can provide further regulatory and other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **PENTACHLOROPHENOL**

CAS Number: 87-86-5
DOT Number: UN 3155

RTK Substance number: 1473
Date: September 1996 Revision: August 2002

HAZARD SUMMARY

* **Pentachlorophenol** can affect you when breathed in and by passing through your skin.
* **Pentachlorophenol** should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
* Contact can severely irritate and burn the skin and eyes with possible eye damage.
* Breathing **Pentachlorophenol** can irritate the nose and throat causing coughing and wheezing.
* Exposure can cause headache, sweating, weakness, trouble breathing, high fever, and pain in the chest and abdomen.
* **Pentachlorophenol** may damage the liver and kidneys.
* Long-term contact can cause an acne-like skin rash.

IDENTIFICATION

Pentachlorophenol is a colorless to white, sand-like solid. It has a pungent odor when hot and is used in making pesticides and fungicides, and as a wood preservative.

REASON FOR CITATION

* **Pentachlorophenol** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, HHAG, NFPA and EPA.
* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **0.5 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.5 mg/m^3** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **0.5 mg/m^3** averaged over an 8-hour workshift.

* **Pentachlorophenol** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Pentachlorophenol** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Pentachlorophenol** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Pentachlorophenol**:

* Contact can severely irritate and burn the skin and eyes with possible eye damage.
* Breathing **Pentachlorophenol** can irritate the nose and throat causing coughing and wheezing.
* Exposure can cause headache, sweating, weakness, trouble breathing, high fever, and pain in the chest and abdomen.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Pentachlorophenol** and can last for months or years:

Cancer Hazard

* There is limited evidence that **Pentachlorophenol** causes cancer in animals. It may cause cancer of the liver in animals.
* Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

* **Pentachlorophenol** may damage the developing fetus.
* There is limited evidence that **Pentachlorophenol** is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Long-Term Effects

* **Pentachlorophenol** may damage the liver and kidneys.
* Long-term contact can cause an acne-like skin rash.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

* Liver and kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer **Pentachlorophenol** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Pentachlorophenol** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Pentachlorophenol**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Pentachlorophenol**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Pentachlorophenol**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Pentachlorophenol** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Pentachlorophenol**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
* ACGIH recommends *Nitrile* as a protective material.

Eye Protection

* Wear eye protection with side shields or goggles.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
* Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **0.5 mg/m^3**, use a MSHA/NIOSH approved full facepiece respirator with an organic vapor cartridge and particulate prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Pentachlorophenol**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to **2.5 mg/m^3** is immediately dangerous to life and health. If the possibility of exposure above **2.5 mg/m^3** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Don't all chemicals cause cancer?
A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?
A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?
A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

Q: Should I be concerned if a chemical is a teratogen in animals?
A: Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that similar damage can occur in humans.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **PENTACHLOROPHENOL**
DOT Number: **UN 3155**
NAERG Code: **154**
CAS Number: **87-86-5**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	0
REACTIVITY	-	0
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Extinguish fire using an agent suitable for type of surrounding fire. **Pentachlorophenol** itself does not burn.
* POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Chlorinated Phenols*.
* CONTAINERS MAY EXPLODE IN FIRE.
* Use water spray to keep fire-exposed containers cool.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Pentachlorophenol** is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of **Pentachlorophenol** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE

* Prior to working with **Pentachlorophenol** you should be trained on its proper handling and storage.
* **Pentachlorophenol** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); and ORGANIC MATERIALS.
* Store in tightly closed containers in a cool, well-ventilated area away from SUNLIGHT.

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 0.0001 mm Hg at 77°F (25°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:

Phenol, Pentachloro-

Other Names:

PCP; Penta: Dowicide 7

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Consumer Factsheet on: SELENIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Selenium and how is it used?

Selenium is a metal found in natural deposits as ores containing other elements. The greatest use of selenium compounds is in electronic and photocopier components, but they are also widely used in glass, pigments, rubber, metal alloys, textiles, petroleum, medical therapeutic agents, and photographic emulsions.

Why is Selenium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for selenium has been set at 0.05 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.05 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: Selenium is an essential nutrient at low levels. However, EPA has found selenium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: hair and fingernail changes; damage to the peripheral nervous system; fatigue and irritability.

Long-term: Selenium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: hair and fingernail loss; damage to kidney and liver tissue, and the nervous and circulatory systems.

How much Selenium is produced and released to the environment?

Production in 1985 was reported to be 429,515 pounds. Selenium compounds are released to the air during the combustion of coal and petroleum fuels, and during the smelting and refining of other metals.

From 1987 to 1993, according to the Toxics Release Inventory selenium releases to land and water totaled over 1 million lbs. These releases were primarily from copper smelting industries. The largest releases occurred in Utah. The largest direct releases to water occurred in Indiana.

What happens to Selenium when it is released to the environment?

The toxicity of selenium depends on whether it is in the biologically active oxidized form, which occurs in alkaline soils. These conditions can cause plant uptake of the metal to be increased. It is known that selenium accumulates in living tissues.

How will Selenium be detected in and removed from my drinking water?

The regulation for selenium became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if selenium is present above 0.05 ppm. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of selenium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing selenium: Activated Alumina, Coagulation/Filtration, Lime Softening, Reverse Osmosis.

How will I know if Selenium is in my drinking water?

If the levels of selenium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 0.05 ppm

MCL: 0.05 ppm

Selenium Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	13,556	1,010,686

	Top Five States*	
UT	1,578	696,515
AZ	0	260,632
WI	0	45,000
IN	5,300	0
TX	359	4,920

	Major Industries*	
Copper smelting, refining	1,500	962,067
Metal coatings	0	45,000
Petroleum refining	8,949	977

* Land totals only include facilities with releases greater than 1000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **SILVER**

CAS Number: 7440-22-4
DOT Number: None

RTK Substance number: 1669
Date: January 1986 Revision: October 2002

HAZARD SUMMARY

* **Silver** *dust* can affect you when breathed in.
* Contact can irritate the skin and eyes.
* Breathing **Silver** *dust* can irritate the nose and throat.
* Repeated exposures to **Silver** *dust* can cause blue-gray discoloration (argyria) of the eyes, skin, nose, mouth, throat and internal body organs. This may take years to develop but is permanent.
* **Silver** may affect the kidneys.

IDENTIFICATION

Silver is a brilliant white metal. It is used in making jewelry, silverware and mirrors, and in photography, solders and electroplating.

REASON FOR CITATION

* **Silver** is on the Hazardous Substance List because it is regulated by OSHA cited by ACGIH, NIOSH, DEP, HHAG and EPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **0.01 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.01 mg/m^3** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **0.1 mg/m^3** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Silver** *dust* and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Silver** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Silver** *dust*:

* Contact can irritate the skin and eyes.
* Breathing **Silver** *dust* can irritate the nose and throat.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Silver** *dust* and can last for months or years:

Cancer Hazard

* There is no evidence that **Silver** *dust* causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Silver** *dust* has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* Repeated exposures to **Silver** *dust* can cause blue-gray discoloration (argyria) of the eyes, skin, nose, mouth, throat and internal body organs. This may take years to develop but is permanent.
* **Silver** *dust* may affect the kidneys.

MEDICAL

Medical Testing

Before beginning employment and at regular times after that, the following are recommended:

* Careful, periodic exams of the eyes, inner nose, throat and skin are useful.
* Kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* A few medications contain **Silver**. Caution is advised in the use of these medications for persons exposed to **Silver**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer **Silver** *dust* or *powder* from drums or other storage containers to process containers.
* Before entering a confined space where **Silver** *dust* or *powder* may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Silver** *dust* should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Silver** *dust*.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Silver** *dust*, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Silver** *dust*, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Silver** *dust* is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Silver** *dust*. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear impact resistant eye protection with side shields or goggles.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
* Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Silver** *dust*, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential exists for exposure over **0.25 mg/m^3**, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to **10 mg/m^3** is immediately dangerous to life and health. If the possibility of exposure above **10 mg/m^3** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Silver** you should be trained on its proper handling and storage.
* **Silver** *dust* or *powder* is not compatible with OXYGEN; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ACETYLENE; AMMONIA; HYDROGEN PEROXIDE; ETHYLENEIMINE; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) BROMOAZIDE; CHLORINE TRIFLUORIDE; OXALIC; ACID; and TARTARIC ACID.
* Store in tightly closed containers in a cool, well-ventilated area away from LIGHT and AIR.
* Sources of ignition, such as smoking and open flames, are prohibited where **Silver** *dust* or *powder* is used, handled, or stored.
* Metal containers involving the transfer of **Silver** *dust* or *powder* should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of **Silver** *dust* or *powder*.
* Wherever **Silver** *dust* or *powder* is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name: **SILVER**
DOT Number: **None**
NAERG Code: **No Citation**
CAS Number: **7440-22-4**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	Not Found	Not Rated
REACTIVITY	Not Found	Not Rated
FLAMMABLE DUST OR POWDER POISONOUS FUMES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* *Solid* **Silver** does not burn but is FLAMMABLE in *dust* or *powder* form.
* For fires involving **Silver** *metal* extinguish fire using an agent suitable for type of surrounding fire. **Silver** *metal* itself does not burn.
* For fires involving **Silver** *dust* or *powder* use dry chemical powder extinguishers.
* POISONOUS FUMES ARE PRODUCED IN FIRE.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Silver** in *dust* or *powder* form is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Remove all ignition sources.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* Keep **Silver** *dust* or *powder* out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
* It may be necessary to contain and dispose of **Silver** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

* Remove the person from exposure.
* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 0 mm Hg at 68°F (20°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:

Silver

Other Names:

Argentum; Shell Silver

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

U.S. ENVIRONMENTAL PROTECTION AGENCY

Ground Water & Drinking Water

Drinking Water and Health Basics
Frequently Asked Questions
Local Drinking Water Information
Drinking Water Standards
List of Contaminants & MCLs
Regulations & Guidance
Public Drinking Water Systems
Source Water Protection
Underground Injection Control
Data & Databases
Drinking Water Academy
Safe Drinking Water Act
National Drinking Water Advisory Council
Water Infrastructure Security
Drinking Water For Kids!

Consumer Factsheet on: TETRACHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Tetrachloroethylene and how is it used?

Tetrachloroethylene (PCE) is a colorless organic liquid with a mild, chloroform-like odor. Its greatest use is in the textile industry, and as a component of aerosol dry-cleaning products.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Ethylene tetrachloride
Perchloroethylene
PCE
Ankilostin
Didakene
Fedal-un
Nema
Perclene
Persec
Tetlen
Tetracap
Tetraleno
Tetropil

Antisal 1
Dow-per
Perawin
Perchlor
Percosolv
Perk
Perklone
Tetraguer
Tetralex
Tetravec

Why is Tetrachloroethylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for PCE has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver and may have an increased risk of getting cancer.

How much Tetrachloroethylene is produced and released to the environment?

Production of tetrachloroethylene was 405 million lbs in 1986. Major releases of tetrachloroethylene to air and water are from dry cleaning and industrial metal cleaning or finishing. Water pollution can occur from tetrachloroethylene leaching from vinyl liners in some types of pipelines used for water distribution, and during chlorination water treatment.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, tetrachloroethylene releases to land and water totalled over 1 million lbs. These releases were primarily from alkali and chlorine industries which use it to make other chemicals. The largest releases occurred in Louisiana and South Carolina.

What happens to Tetrachloroethylene when it is released to the environment?

PCE released to soil will readily evaporate or may leach slowly to the groundwater. Its break down by soil microbes is slow. PCE released to water will primarily evaporate and has little potential for accumulating in aquatic life.

How will Tetrachloroethylene be Detected in and Removed from My Drinking Water?

The regulation for tetrachloroethylene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if PCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant until the system has taken immediate steps to remediate the problem or the State has determined that the contaminant will remain reliably and consistently below the MCL.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of PCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing PCE: Granular activated carbon in combination with Packed Tower Aeration.

How will I know if Tetrachloroethylene is in my drinking water?

If the levels of PCE exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Tetrachloroethylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**297,602**	**750,104**
Top Ten States*			
LA	23,639	610,518	

SC	104,728	0
NH	62,150	0
NC	42,192	13,102
IL	0	40,500
TX	36,144	720
OH	0	32,170
IN	1,300	27,000
CO	0	11,000
IA	5,112	0

Major Industries*

Alkalis, chlorine	63,472	611,242
Leather tanning,finishing	62,150	0
Cotton fabric finishing	51,577	0
Misc textile finishing	48,082	2,000
Knit outwear mills	45,808	0
Misc. apparel, access.	0	40,500
Transportation Equip.	3,750	27,000
Ammunition	0	20,575
Misc Chem. preparations	0	11,102
Petroleum refining	0	11,000
Ordnance, accessories	0	10,100

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to

support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

List of Contaminants

Safewater Home | About Our Office | Publications | Links | Office of Water | En Español | Questions and Answers

EPA Home | Privacy and Security Notice | Contact Us

Last updated on Tuesday, November 28th, 2006
URL: http://www.epa.gov/safewater/contaminants/dw_contamfs/tetrachl.html

Consumer Factsheet on: THALLIUM

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Thallium and how is it used?

Thallium is a metal found in natural deposits as ores containing other elements. The greatest use of thallium is in specialized electronic research equipment.

Why is Thallium being regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for thallium has been set at 0.5 parts per billion (ppb) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 2 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the health effects?

Short-term: EPA has found thallium to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: gastrointestinal irritation; nerve damage.

Long-term: Thallium has the potential to cause the following effects from a lifetime exposure at levels above the MCL: changes in blood chemistry; damage to liver, kidney, intestinal and testicular tissues; hair loss.

How much Thallium is produced and released to the environment?

Thallium is not produced in the US. Approximately 4,500 lbs. of thallium and its compounds were reportedly imported in 1987. Man-made sources of thallium pollution are gaseous emission of cement

factories, coal burning power plants, and metal sewers. The leaching of thallium from ore processing operations is the major source of elevated thallium concentrations in water. Thallium is a trace metal associated with copper, gold, zinc, and cadmium.

What happens to Thallium when it is released to the environment?

Thallium does not long persist if released to water, but does have a strong tendency to accumulate in aquatic life. If released to land, it may bind to alkaline soils, but may otherwise migrate to ground water.

How will Thallium be detected in and removed from my drinking water?

The regulation for thallium became effective in 1994. Between 1993 and 1995, EPA required your water supplier to collect water samples once and analyze them to find out if thallium is present above 2 ppb. If it is present above this level, the system must continue to monitor this contaminant every 3 months.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of thallium so that it is consistently below that level. The following treatment methods have been approved by EPA for removing thallium: Activated alumina; Ion Exchange.

How will I know if Thallium is in my drinking water?

If the levels of thallium exceed the MCL, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

Drinking Water Standards:

MCLG: 0.5 ppb

MCL: 2 ppb

Thallium Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS	**2,606**	**2,770**

	Top Five States	
TX	6	2,020
OH	1,500	0
MN	1,100	0
CO	0	500

IN	0	250

	Major Industries*	
Primary copper smelting	1,856	765
Petroleum refining	750	1,255
Primary nonferrous metals	0	500
Blast furnaces, steelworks	0	250

Learn more about your drinking water!

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Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

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Consumer Factsheet on: TOLUENE

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As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Toluene and how is it used?

Toluene is an organic liquid with a sweet, benzene-like odor. The largest chemical use for toluene is to make benzene and urethane.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Methylbenzene
Methacide
Phenylmethane
Toluol
Antisal 1A

Why is Toluene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for toluene has been set at 1 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has also been set at 1 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found toluene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: minor nervous system disorders such as fatigue, nausea, weakness, confusion.

Long-term: Toluene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: more pronounced nervous disorders such as spasms, tremors, impairment of speech, hearing, vision, memory, coordination; liver and kidney damage.

How much Toluene is produced and released to the environment?

Production of toluene was 6.4 billion lbs in 1993. It is released into the atmosphere principally from the volatilization of petroleum fuels and toluene-based solvents and thinners and from motor vehicle exhaust. It is also released in wastewaters or by spills on land during the storage, transport and disposal of fuels and oils.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, toluene releases to land and water totalled over 4 million lbs., primarily from petroleum refining industries. The largest releases occurred in Texas and California. The largest releases directly to water occurred in Connecticut and West Virginia.

What happens to Toluene when it is released to the environment?

Toluene released to soil will be lost by evaporation from near-surface soil and by leaching to the groundwater. Its breakdown by soil microbes is slow. Toluene evaporates within a few hours when released to water, and it has little tendency to accumulate in aquatic life.

How will Toluene be Detected in and Removed from My Drinking Water?

The regulation for toluene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and

analyze them to find out if toluene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of toluene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing toluene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Toluene is in my drinking water?

If the levels of toluene exceed the MCL, 1 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 1 ppm

Mcl: 1 ppm

Toluene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS* (in pounds)		**732,310**	**3,672,041**
Top Ten States*			
TX	16,285	969,210	
CA	0	930,000	
CT	316,068	0	
OK	0	287,000	
VA	27,500	216,000	
VI	2,970	191,504	
IL	56	180,824	
MI	0	129,226	
WV	117,523	1,377	
SC	6,000	89,578	

Major Industries*		
Petroleum refining	227,196	2,580,941
Medicinals, botanicals	301,585	1,108
Petroleum/coal prods.	38,856	287,000
Misc Ind. Chemicals	179,576	107,159
Gaskets, sealing devices	4,002	216,000
Wood office furniture	0	129,226
Plastics, resins	57,661	39,139
Wood home furniture	30,000	65,444
Paints, allied products	5,927	88,024

* Water/Land totals only include facilities with releases greater than 10,000 lbs.

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ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TOTAL PETROLEUM HYDROCARBONS (TPH)

Agency for Toxic Substances and Disease Registry ToxFAQs August 1999

This fact sheet answers the most frequently asked health questions (FAQs) about total petroleum hydrocarbons (TPH). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: TPH is a mixture of many different compounds. Everyone is exposed to TPH from many sources, including gasoline pumps, spilled oil on pavement, and chemicals used at home or work. Some TPH compounds can affect your nervous system, causing headaches and dizziness. TPH has been found in at least 23 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are total petroleum hydrocarbons?

(Pronounced tōt′l pə-trō′lē-əm hī′drə-kär′bənz)

Total petroleum hydrocarbons (TPH) is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of TPH at a site.

TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water. These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals.

Some chemicals that may be found in TPH are hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene, and fluorene, as well as other petroleum products and gasoline components. However, it is likely that samples of TPH will contain only some, or a mixture, of these chemicals.

What happens to TPH when it enters the environment?

- ❑ TPH may enter the environment through accidents, from industrial releases, or as byproducts from commercial or private uses.
- ❑ TPH may be released directly into water through spills or leaks.
- ❑ Some TPH fractions will float on the water and form surface films.
- ❑ Other TPH fractions will sink to the bottom sediments.
- ❑ Bacteria and microorganisms in the water may break down some of the TPH fractions.
- ❑ Some TPH fractions will move into the soil where they may stay for a long time.

How might I be exposed to TPH?

- ❑ Everyone is exposed to TPH from many sources.
- ❑ Breathing air at gasoline stations, using chemicals at home or work, or using certain pesticides.
- ❑ Drinking water contaminated with TPH.
- ❑ Working in occupations that use petroleum products.
- ❑ Living in an area near a spill or leak of petroleum products.
- ❑ Touching soil contaminated with TPH.

How can TPH affect my health?

Some of the TPH compounds can affect your central nervous system. One compound can cause headaches and dizziness at high levels in the air. Another compound can cause a nerve disorder called "peripheral neuropathy," consisting of numbness in the feet and legs. Other TPH compounds can cause effects on the blood, immune system, lungs, skin, and eyes.

Animal studies have shown effects on the lungs, central nervous system, liver, and kidney from exposure to TPH compounds. Some TPH compounds have also been shown to affect reproduction and the developing fetus in animals.

How likely is TPH to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that one TPH compound (benzene) is carcinogenic to humans. IARC has determined that other TPH compounds (benzo[a]pyrene and gasoline) are probably and possibly carcinogenic to humans. Most of the other TPH compounds are considered not to be classifiable by IARC.

Is there a medical test to show whether I've been exposed to TPH?

There is no medical test that shows if you have been exposed to TPH. However, there are methods to determine if you have been exposed to some TPH compounds. Exposure to kerosene can be determined by its smell on the breath or clothing. Benzene can be measured in exhaled air and a breakdown product of benzene can be measured in urine. Other TPH compounds can be measured in blood, urine, breath, and some body tissues.

Has the federal government made recommendations to protect human health?

There are no regulations or advisories specific to TPH. The following are recommendations for some of the TPH fractions and compounds:

The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration has set an exposure limit of 500 parts of petroleum distillates per million parts of air (500 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Immune system: Body organs and cells that fight disease.

Pesticides: Chemicals used to kill pests.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for total petroleum hydrocarbons (TPH). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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Consumer Factsheet on: TRICHLOROETHYLENE

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National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Trichloroethylene and how is it used?

Trichloroethylene is a colorless or blue organic liquid with a chloroform-like odor. The greatest use of trichloroethylene is to remove grease from fabricated metal parts and some textiles.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

1,1,2-Trichloroethylene
Acetylene trichloroethylene
Algylen
Anameth
Benzinol
Chlorilen
CirCosolv
Germalgene
Lethurin
Perm-a-chlor
Petzinol
Philex
TRI-Plus M

Vitran

Why is Trichloroethylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for trichloroethylene has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 5 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

How much Trichloroethylene is produced and released to the environment?

Production of trichloroethylene has increased from just over 260,000 lbs. in 1981 to 320 million lbs. in 1991. Major environmental releases of trichloroethylene are due to air emissions from metal degreasing plants. Wastewater from metal finishing, paint and ink formulation, electrical/electronic components, and rubber processing industries also may contain trichloroethylene.

From 1987 to 1993, according to the Toxics Release Inventory, trichloroethylene releases to water and land totalled over 291,000 lbs. These releases were primarily from steel pipe and tube manufacturing industries. The largest releases occurred in Pennsylvania and Illinois. The largest direct releases to water occurred in West Virginia.

What happens to Trichloroethylene when it is released to the environment?

Trichloroethylene released to soil will either evaporate or leach into ground water. If released to water, it will also quickly evaporate. It has only a moderate potential to accumulate in aquatic life.

How will Trichloroethylene be Detected in and Removed from My Drinking Water?

The regulation for trichloroethylene became effective in 1989. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if TCE is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant until the system has taken immediate steps to remediate the problem or the State has determined that the contaminant will remain reliably and consistently below the MCL.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of TCE so that it is consistently below that level. The following treatment methods have been approved by EPA for removing TCE: Granular activated carbon in combination with Packed Tower Aeration.

How will I know if Trichloroethylene is in my drinking water?

If the levels of trichloroethylene exceed the MCL, 5 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 5 ppb

Trichloroethylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**100,293**	**191,088**
Top Six States*			
PA	0	33,450	
IL	0	30,711	
GA	3,742	17,532	
TX	0	21,000	
MA	0	19,920	

WV	12,822	0	

Major Industries

Steel pipe, tubes	31	39,288
Misc. Indust. Organics	27,708	0
Car parts, access.	4,405	19,920
Plating, polishing	3,342	20,100
Wool fabric mills	3,942	18,081

* State totals only include facilities with releases greater than 10,000 lbs.

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Your state Department of Health/Environment is also a valuable source of information.

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Consumer Factsheet on: VINYL CHLORIDE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Vinyl Chloride and how is it used?

Vinyl chloride is a colorless organic gas with a sweet odor. It is used in the manufacture of numerous products in building and construction, automotive industry, electrical wire insulation and cables, piping, industrial and household equipment, medical supplies, and is depended upon heavily by the rubber, paper, and glass industries.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Chlorethene
Chlorethylene
Monochloroethene
Monovinyl chloride (MVC)
Trovidur

Why is Vinyl Chloride being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for vinyl chloride has been set at zero because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 2 parts per billion (ppb) because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found vinyl chloride to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: damage to the nervous system.

Long-term: Vinyl chloride has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the liver and nervous system; cancer.

How much Vinyl Chloride is produced and released to the environment?

Production of vinyl chloride in 1993 was nearly 14 billion lbs. Its major release to the environment will be as emissions and wastewater at polyvinyl chloride (PVC) plastics production and manufacturing facilities. Small quantities of vinyl chloride can be released to food since it is used to make many food wrappings and containers.

From 1987 to 1993, according to EPA's Toxic Release Inventory, vinyl chloride releases to water and land totalled over 38,000 lbs. These releases were primarily from plastics materials and resins industries. The largest releases occurred in Louisiana and Delaware.

What happens to Vinyl Chloride when it is released to the environment?

Vinyl chloride released to soil will either quickly evaporate, be broken down by microbes or may leach to the groundwater. It also rapidly evaporates from water, but does not degrade there. It will not accumulate in aquatic life.

How will Vinyl Chloride be Detected in and Removed from My Drinking Water?

The regulation for vinyl chloride became effective in 1989. Between 1993 and 1995,

EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if vinyl chloride is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of vinyl chloride so that it is consistently below that level. The following treatment methods have been approved by EPA for removing vinyl chloride: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Vinyl Chloride is in my drinking water?

If the levels of vinyl chloride exceed the MCL, 2 ppb, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: zero

Mcl: 2 ppb

Vinyl Chloride Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**21,693**	**17,038**
Top Five States			
LA	12,600	0	
DE	86	8,829	
OH	3,360	0	
PA	0	3,290	
SC	0	3,100	
Major Industries			
Plastics, resins	19,489		13,375

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water bill or telephone books government listings are a good starting point.

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Consumer Factsheet on: XYLENES

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National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Xylene and how is it used?

A xylene is any of a group of very similar organic compounds. They are clear liquids with a sweet odor. The greatest use of xylenes is as a solvent which is much safer than benzene. Other uses include: in gasoline as part of the BTX component (benzene-toluene-xylene); Xylene mixtures are used to make phthalate plasticizers, polyester fiber, film and fabricated items.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Dimethyl benzene
Xylol
Methyltoluene
Violet 3

Why is Xylene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for xylenes has been set at 10 parts per million (ppm) because EPA

believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 10 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found xylenes to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: disturbances of cognitive abilities, balance, and coordination.

Long-term: Xylenes has the potential to cause the following effects from a lifetime exposure at levels above the MCL: damage to the central nervous system, liver and kidneys.

How much Xylene is produced and released to the environment?

Production of xylenes was 6.84 billion lbs. in 1993. Major environmental releases of xylenes are due to evaporation from the refining and use of petroleum products. It may also be released by leaks or spills during the transport and storage of gasoline and other fuels. Xylenes are a natural products of many plants, and are a component of petroleum and coal tar.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, xylene releases to land and water totalled nearly 4.8 billion lbs. These releases were primarily from petroleum refining industries. The largest releases occurred in Texas. The largest direct releases to water occurred in New Jersey and Georgia.

What happens to Xylene when it is released to the environment?

Most of the xylenes are released into the atmosphere where they are quickly degraded by sunlight. When released to soil or water, xylenes will quickly evaporate. They may leach into ground water and persist there for several years. There is little potential for accumulation in aquatic life.

How will Xylene be Detected in and Removed from My Drinking Water?

The regulation for xylenes became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if xylenes is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of xylenes so that it is consistently below that level. The following treatment methods have been approved by EPA for removing xylenes: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Xylene is in my drinking water?

If the levels of xylenes exceed the MCL, 10 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 10 ppm

Mcl: 10 ppm

Xylene Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	Land
TOTALS (in pounds)		**875,943**	**3,897,738**
Top Ten States*			
TX	30,853	2,099,734	
NJ	294,437	280,759	
IL	36	206,990	
IN	0	145,079	
AL	34,361	59,022	
CA	0	91,500	
MI	0	86,774	
GA	68,310	15,000	
VA	50,100	33,000	

WA	27,860	52,360	

Major Industries*

Petroleum refining	131,817	2,678,958
Metal barrels, drums	5	289,542
Textile finishing, misc.	278,454	0
Misc. Industrial chems.	95,706	69,696
Extruded Aluminum prod.	1,265	138,798
Furniture, fixtures	0	91,500
Cotton fabric finishing	68,310	15,000
Wood office furniture	0	67,677
Pharmaceuticals	52,285	3,100
Paper mills	52,480	2,122

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

List of Contaminants

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ZINC**

CAS Number: 7440-66-6
DOT Number: UN 1436
DOT Hazard Class: 4.3 (Water Reactive/ Dangerous When Wet)

RTK Substance number: 2021
Date: February 1989 Revision: October 2005

HAZARD SUMMARY

* **Zinc** can affect you when breathed in.
* **Zinc** *fragments* or *dust particles* can irritate and scratch the eyes.
* Exposure to **Zinc** can cause *"metal fume fever."* This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.
* **Zinc** *fume* may be released when welding galvanized metal.
* **Zinc** *dust* and *powder* are FLAMMABLE and DANGEROUS FIRE HAZARD.

IDENTIFICATION

Solid **Zinc** is a soft white metal with a bluish tinge. It is used as a coating on iron and steel, and in making brass metal alloys. **Zinc** *powder* is grayish in color and is used in making paint and dyestuffs.

REASON FOR CITATION

* **Zinc** is on the Hazardous Substance List because it is cited by DOT, DEP and EPA.
* This chemical is on the Special Health Hazard Substance List because the *dust* and *powder* are **FLAMMABLE**.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Zinc**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

* **Zinc** may form metal fumes which present different hazards than the substance itself.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Zinc** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Zinc**:

* **Zinc** *fragments* or *dust particles* can irritate and scratch the eyes.
* Exposure to **Zinc** can cause *"metal fume fever."* This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Zinc** and can last for months or years:

Cancer Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Zinc** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

* **Zinc** appears to affect the male reproductive system (including sperm count). Further testing is required to assess its potential to cause reproductive harm.

Other Long-Term Effects

* **Zinc** has not been tested for other chronic (long-term) health effects.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer **Zinc** *powder* from drums or other storage containers to process containers.
* Before entering a confined space where **Zinc** *dust* or *powder* may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Zinc** *dust* or *powder* should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Zinc** *dust* or *powder*.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* Wash any areas of the body that may have contacted **Zinc** *dust* or *powder* at the end of each workday, whether or not known skin contact has occurred.
* For **Zinc** *dust* or *powder* use a vacuum to reduce dust during clean-up.
* Do not eat, smoke, or drink where **Zinc** *dust* or *powder* is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* Maintain all surfaces as free as possible from accumulations of **Zinc** *dust* or *powder*.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Zinc** *dust* and *powder*. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Wear eye protection with side shields or goggles.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* For processes where **Zinc** is heated, refer to the respiratory protection recommendations on the *NJDHSS HAZARDOUS SUBSTANCE FACT SHEET ON ZINC OXIDE.*
* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Zinc**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Zinc** you should be trained on its proper handling and storage.
* **Zinc** *dust* and *powder* react with WATER and MOIST AIR to produce *flammable Hydrogen gas* and HEAT. The HEAT may ignite the *Hydrogen gas.*
* **Zinc** *dust* and *powder* in contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) may cause fires and explosions.
* **Zinc** *dust* and *powder* must be stored to avoid contact with SULFUR; METALS (such as POTASSIUM, and SODIUM, MAGNESIUM); AMMONIUM NITRATE; CARBON DISULFIDE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); METAL SALTS; HALOGENS; AMINES; CHLORINATED HYDROCARBONS; and METAL OXIDES since violent reactions occur.
* Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES.
* Sources of ignition, such as smoking and open flames, are prohibited where **Zinc** *dust* or *powder* is used, handled, or stored.
* Metal containers involving the transfer of **Zinc** *dust* or *powder* should be grounded and bonded.
* Use only non-sparking tools and equipment, especially when opening and closing containers of **Zinc** *dust* or *powder.*

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Can men as well as women be affected by chemicals that cause reproductive system damage?

A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

Q: Who is at the greatest risk from reproductive hazards?

A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

IRIS is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<

Common Name: **ZINC**
DOT Number: **UN 1436**
DOT Hazard Class: **4.3 (Water Reactive/Dangerous When Wet)**
NAERG Code: **136**
CAS Number: **7440-66-6**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	3	-
REACTIVITY	1	-
FLAMMABLE DUST AND POWDER DO NOT USE WATER, FOAM, HALON OR CO_2 POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Zinc** *dust* and *powder* are FLAMMABLE and may form EXPLOSIVE MIXTURES WITH AIR.
* Use sand, lime, soda ash or dry chemicals appropriate for extinguishing metal fires.
* DO NOT USE WATER, FOAM, HALON or CO_2 extinguishing agents.
* POISONOUS GASES ARE PRODUCED IN FIRE including *Zinc Oxide fumes.*
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Zinc** *powder* is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Remove all ignition sources.
* Cover spill with dry sand or vermiculite.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* DO NOT USE WATER OR WET METHOD.
* Ventilate area of spill.
* It may be necessary to contain and dispose of **Zinc** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

HANDLING AND STORAGE (See page 3)

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

* Remove the person from exposure.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Water Solubility: Reactive

OTHER COMMONLY USED NAMES

Chemical Name:

Zinc

Other Names:

Blue Powder; Granular Zinc; Emanay Zinc Dust

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Appendix E

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

PROPERTIES OF CHEMICALS of CONCERN IN DESIGNATED GROUNDWATER

The following chemicals of concern (COCs) have been detected in the Designated Groundwater at the Site with concentrations exceeding the ingestion PCL:

- Arsenic
- Beryllium
- Cadmium
- Chromium
- Lead
- Selenium
- Benzene
- Toluene
- 1,2,4-TMB
- Cis-1,2-DCE
- Ethylbenzene
- Toluene
- VC
- 1-Methylnaphthalene
- TPH

Soil and groundwater analytical data tables are presented in **Tables 1A to 1E and Tables 2A to 2D,** respectively (presented in **Appendix F**). The analytical data tables present the concentrations of each COC in soil and groundwater in comparison to their respective ingestion and non-ingestion PCLs.

Figures 7-1 to 7-9 (previously presented in **Appendix B**) depict the horizontal extent of the groundwater ingestion PCLE zone for the above listed COCs. No other COCs were detected at concentrations above the Tier 1 Residential PCLs (ingestion PCLs). The groundwater bearing zone for which this MSD applies is located at a maximum estimated depth of approximately 46 feet bgs, where a competent, red, confining clay unit was encountered, which limits the migration of groundwater COCs. Groundwater was first encountered beneath the Designated Property in the shallow water-bearing zone at depths of approximately 8 feet bgs.

The chemical properties of the COCs listed above in this section are provided in the chemical abstract and fact sheet located in **Appendix D**. In general, all of the COCs are metals, which are not soluble in water, and VOCs and TPH, which are somewhat soluble in water to many parts per million. The chlorinated VOCs are denser than water and tend to sink in groundwater if present above the solubility limit. Gasoline and other aromatic VOCs are lighter than water and tend to float in groundwater if present above the solubility limit. 1-Methylnapthalene, an SVOC, was also detected in groundwater with a concentration exceeding the ingestion PCL. SVOCs are generally not very soluble with water and tend to float in groundwater if present above the solubility limit. Based on concentrations reported in the groundwater, there is no indication that a dense or light NAPL is present at the Designated Property.

Appendix E

Groundwater Ingestion PCLE Zone Descriptions by COC

Arsenic was detected in the groundwater with a maximum concentration of 0.1 mg/L in temporary monitoring well LTE-TMW-70, located north of Buildings 03 and 12 in the area of a former tank hold. The concentration of 0.1 mg/L exceeds the ingestion PCL of 0.010 mg/L for arsenic. Since arsenic is not volatile, no air-inhalation (non-ingestion) PCL has been established. Arsenic was detected above the ingestion PCL in numerous temporary and permanent monitoring wells at the Site, but in most cases was just above the ingestion PCL.

Beryllium was detected in the groundwater with a maximum concentration of 0.0048 mg/L in temporary monitoring well LTE-TMW-53, located south of Building 10B. The concentration of 0.0048 mg/L exceeds the ingestion PCL of 0.004 mg/L for beryllium. Since beryllium is not volatile, no air-inhalation (non-ingestion) PCL has been established. This is the only location where beryllium was detected above the ingestion PCL.

Cadmium was detected in the groundwater with a maximum concentration of 0.0092 mg/L in temporary monitoring well LTE-TMW-04, located west of Building 14. The concentration of 0.0092 mg/L exceeds the ingestion PCL of 0.005 mg/L for cadmium. Since cadmium is not volatile, no air-inhalation (non-ingestion) PCL has been established. Cadmium was detected above the ingestion PCL in a few other temporary monitoring wells near Building 04 and Buildings 10 and 10A with concentrations just above the ingestion PCL.

Lead was detected in the groundwater with a maximum concentration of 0.099 mg/L in temporary monitoring well ESE-TMW-35, located inside Building 06A in the area of the landfill and fill material. The concentration of 0.099 mg/L exceeds the ingestion PCL of 0.015 mg/L for lead. Since lead is not volatile, no air-inhalation (non-ingestion) PCL has been established. Lead was detected above the ingestion PCL in a few other temporary monitoring wells in the vicinity of Building 04, 04A, and 10B with concentrations just above the ingestion PCL.

Mercury was detected in the groundwater with a maximum concentration of 0.0065 mg/L in temporary monitoring well ESE-TMW-15, located west of Building 21. The concentration of 0.0065 mg/L exceeds the ingestion PCL of 0.002 mg/L but does not exceed the non-ingestion PCL of 0.94 mg/L. This is the only location where mercury was detected above the ingestion PCL in the groundwater.

Selenium was detected in the groundwater with a maximum concentration of 0.15 mg/L in temporary monitoring well ESE-TMW-34, located south of Building 06 near the former oil-water separator. The concentration of 0.15 mg/L exceeds the ingestion PCL of 0.05 mg/L. Since selenium is not volatile, no air-inhalation (non-ingestion) PCL has been established. Selenium was detected above the ingestion PCL is several other temporary and permanent monitoring wells distributed across the Site with concentrations just above the ingestion PCL.

Appendix E

Benzene was detected in the groundwater with a maximum concentration of 3.2 mg/L in monitoring well ESE-MW-13 located northeast of Building 06 in the area of a former tank hold. The concentration of 3.2 mg/L exceeds the ingestion PCL of 0.005 mg/L but does not exceed the non-ingestion PCL of 180 mg/L. Benzene was detected above the ingestion PCL in three areas, all where former underground storage tanks (USTs) were located: west of Building 32, northeast of Building 06, and north of Buildings 03 and 12.

Cis-1,2-DCE was detected with a maximum concentration of 0.13 mg/L in temporary monitoring well ESE-TMW-28, located south of Building 16B where hazardous waste was formerly stored. The concentration of 0.13 mg/L exceeds the ingestion PCL of 0.070 mg/L but does not exceed the non-ingestion PCL of 16,000 mg/L. Cis-1,2-DCE was not detected above ingestion PCLs in any other locations.

Ethylbenzene was detected with a maximum concentration of 1.4 mg/L in temporary monitoring well ESE-TMW-42, located northeast of Building 06 where former USTs were located. The concentration of 1.4 mg/L exceeds the ingestion PCL of 0.70 mg/L but does not exceed the non-ingestion PCL of 16,000 mg/L. Ethylbenzene was detected above ingestion PCLs in one other area at the Site, the location of former USTs west of Building 32.

Toluene was detected with a maximum concentration of 9.4 mg/L in temporary monitoring well ESE-TMW-41, located northeast of Building 06 where former USTs were located. The concentration of 9.4 mg/L exceeds the ingestion PCL of 1.0 mg/L but does not exceed the non-ingestion PCL of 64,000 mg/L. Toluene was detected above ingestion PCLs in one other area, the location of former USTs west of Building 32.

1,2,4-Trimethylbenzene was detected with a maximum concentration of 0.62 mg/L in temporary monitoring well ESE-TMW-04, located west of Building 32 where former USTs were located. The concentration of 0.62 mg/L exceeds ingestion PCL of 0.24 mg/L but does not exceed the non-ingestion PCL of 190 mg/L. 1,2,4-Trimethylbenzene was detected above the ingestion PCL in only one other location also in the area west of Building 32 where former USTs were located.

Vinyl chloride was detected with a maximum concentration of 0.012 mg/L in temporary monitoring well TER-TMW-29, located south of Building 13B. The concentration of 0.012 mg/L exceeds the ingestion PCL of 0.002 mg/L but does not exceed the non-ingestion PCL of 3.8 mg/L. Vinyl chloride was detected above ingestion PCLs in only one other location south of Building 16B where hazardous waste was formerly stored.

TPH was detected with a maximum concentration of 370 mg/L for C_6-C_{35} range TPH in temporary monitoring well TER-TMW-28, located north of Building 19 where former USTs were located. The concentration of 370 mg/L exceeds the ingestion PCL of 0.98 mg/L for TPH but does not exceed the non-ingestion PCL of 7,500 mg/L for C_6-C_{35} range TPH. TPH was detected just above the ingestion PCL in numerous locations across the Site; however, with exception to the 1-methylnapthalene, SVOCs and polycyclic aromatic hydrocarbons (PAHs) were not detected above ingestion PCLs in groundwater at the Site.

Appendix E

1-Methylnapthalene was detected with a maximum concentration of 0.035 mg/L in temporary monitoring well ESE-TMW-41, located northeast of Building 06 where former USTs were located. The concentration of 0.035 mg/L exceeds the ingestion PCL of 0.031 mg/L. Since 1-methylnapthalene is non-volatile, no air-inhalation (non-ingestion) PCL has been established. 1-Methylnapthalene was not detected above ingestion PCLs in any other locations.

Appendix F

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

COC TABLES

The attached soil analytical data table, **Tables 1A to 1E**, contains the concentrations of each COC detected above its ingestion PCL in soil and the respective ingestion and non-ingestion PCL. When analyzed for VOCs, SVOCs, or PAHs, the entire list was included in the laboratory analysis; however, only those COCs with detections above the ingestion PCL are listed.

Analytical results identified concentrations of antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc, benzene, chlorobenzene, cis-1,2-DCE, ethylbenzene, PCE, TCE, methylene chloride, 1,2,3-trichloropropane, benzo(a)pyrene, benzidine, 2,4,-dinitrophenol, bis(2-chloroethoxy)methane, 2,6-dinitrophenol, pentachlorophenol, and TPH above the soil ingestion PCLs (refer to **BOLD** data in **Tables 1A to 1E** for incidents of exceedance).

The attached groundwater analytical data table, **Tables 2A to 2D**, contains the concentrations of each COC in groundwater and their respective critical PCLs both with and without an MSD. Data in **BOLD** indicates concentrations that exceed the ingestion PCL. There are no concentrations of COCs in groundwater that exceed the non-ingestion PCL.

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 32																	
ESE-SB-95	3-5	7/30/08	NA	0.59J	71	NA	0.3	7.4	NA	NA	8.4	0.0071J	NA	0.43	<0.57	NA	NA
ESE-TMW-14	3-5	6/24/08	<1.2	0.77J	NA	0.31	0.36J	6.8	NA	1.1J	4.4	0.0027J	4.6	<1.2	<0.60	<1.2	12
ESE-FD-3	3-5	6/24/08	<1.2	<1.2	NA	0.43	0.33	6	NA	2.7	3.4	0.003J	5.8	<1.2	<0.60	<1.2	7.9
Building 32D, 32E, 32F, and Associated Area																	
ESE-SB-01	3-5	6/16/08	NA	0.35J	110	NA	2.1	14	NA	NA	29	0.015J	NA	4.1	<0.62	NA	NA
ESE-FD-1	3-5	6/16/08	NA	<1.1	71	NA	0.15J	9.6	NA	NA	39	0.029	NA	<1.1	0.32J	NA	NA
ESE-SB-04	1-3	6/16/08	0.79J	<1.2	NA	1.1	0.22J	15	NA	5.2	14	<0.025	22	<1.2	0.54J	<1.2	24
ESE-SB-06	3-5	6/16/08	NA	<1.3	200	NA	0.28J	26	NA	NA	20	0.0094J	NA	0.47J	1.1	NA	NA
ESE-SB-10	3-5	6/19/08	<1.2	1.4	NA	0.87	0.35	13	NA	7.6	12	0.051	10	1.3	<0.61	<1.2	25
ESE-SB-10	13-15	6/19/08	<1.2	<1.2	NA	0.35	2	11	NA	2.6	10	0.0014J	3.1	<1.2	<0.62	<1.2	15
ESE-SB-11	1-3	6/19/08	<1.4	0.85J	NA	1.9	5.1	26	NA	9.9	31	0.0096J	12	<1.4	<0.73	<1.4	25
ESE-SB-12	3-5	6/19/08	<1.1	0.52J	NA	0.33	0.75	3.9	NA	1.5	4.3	<0.023	2.3	<1.1	<0.57	<1.1	4.9
ESE-SB-13	3-5	6/19/08	<1.4	0.83J	NA	1.1	2.5	17	NA	6.4	18	0.012J	10	4.7	<0.69	<1.4	43
ESE-SB-14	3-5	6/19/08	<1.3	4	NA	0.76	<0.32	9.3	NA	3.2	10	<0.026	4.8	<1.3	<0.65	<1.3	13
ESE-SB-15	3-5	6/19/08	<1.2	4.4	NA	1.2	0.12J	15	NA	10	11	<0.025	17	<2.5O	<0.62	<1.2	33
ESE-SB-16	3-5	6/19/08	<1.4	3.6	NA	1.6	0.1J	19	NA	8.8	28	0.012J	10	<1.4	<0.69	<1.4	33
ESE-SB-29	13-15	6/27/08	0.84J	<1.2	NA	0.39	0.37	16	NA	18	22	0.025	14	1.9	<0.60	<2.4O	49
ESE-SB-88	3-5	7/30/08	NA	2	200	NA	0.55	12	NA	NA	12	0.0032J	NA	<1.2	<0.62	NA	NA
ESE-FD-18	3-5	7/30/08	NA	0.9	130	NA	0.96	16	NA	NA	25	0.037	N	<1.3	<0.63	NA	NA
ESE-TMW-01	3-5	6/17/08	<1.2	4.2	NA	0.57	1	9.3	NA	14	78	0.054	5.8	<1.2	<0.58	<1.2	270
ESE-TMW-04	3-5	6/17/08	<1.2J	3.2	NA	0.25J	0.19J	3.7	NA	1.7	2.6J	<0.024	3.3	<1.2	<0.60	0.55J	8.4J
ESE-TMW-04	13-15	6/18/08	<1.3	5.4	NA	2.8	0.14J	11	NA	8.4	19	<0.026	12	<1.3	<0.64	<1.3	19
ESE-TMW-04	30-31	6/17/08	<1.2	2.2	NA	0.11J	0.14J	1.8	NA	0.65J	1.8	<0.025	1.2J	<1.2	<0.62	0.46J	6.8
ESE-TMW-05	3-5	6/17/08	<1.2	5.8	NA	1.4	0.16J	12	NA	7.1	15	0.0092J	18	<1.2	<0.62	<1.2	26
ESE-FD-2	3-5	6/17/08	<1.2	2.7	NA	0.69	0.15J	10	NA	2.8	9.8	0.0043J	6.5	<1.2	<0.61	<1.2	16
ESE-TMW-05	13-15	6/17/08	<1.2	1.9	NA	0.27	0.12J	2.8	NA	1.7	10	0.003J	2	<1.2	<0.59	<1.2	5.1
ESE-TMW-06	3-5	6/18/08	<1.2	1.3	NA	0.86	0.33	12	NA	5	13	0.015J	6	1.6	<0.61	<1.2	18
ESE-TMW-06	13-15	6/18/08	<1.2	0.53J	NA	0.3	0.2J	5.7	NA	2	5.2	0.0019J	2	1J	<0.60	<1.2	9.2
ESE-TMW-06	32-35	6/18/08	<1.2	1.2J	NA	0.4	1.2	7.3	NA	6.9	28	0.0072J	2.3	3.1	<0.63	<1.2	740
ESE-TMW-07	3-5	6/18/08	NA	2.5	120	NA	1.8	10	NA	NA	17	0.0032J	NA	6.6	<0.60	NA	NA
ESE-TMW-07	13-15	6/18/08	NA	NA	NA	NA	<0.3	NA	NA	NA	8.7	NA	NA	0.42J	NA	NA	NA
ESE-TMW-08	3-5	6/18/08	<1.2	1.4	NA	2	0.7	12	NA	6.4	15	<0.025	8.7	1.5	<0.63	<1.2	19
ESE-TMW-09	3-5	6/23/08	<1.2	2.1	NA	0.78	0.94	16	NA	33	260	0.019J	11	2.4	<0.59	<1.2	180
ESE-TMW-09	13-15	6/23/08	<1.2	1.7	NA	0.58	0.36	7.4	NA	3.2	9.3	<0.023	3.9	<1.2	<0.58	<1.2	11
ESE-TMW-10	3-5	6/23/08	<1.2	<1.2	NA	1.1	0.28J	16	NA	6.9	12	<0.025	26	<1.2	0.83	1.6	27
ESE-TMW-10	13-15	6/23/08	<1.2	<1.2	NA	0.52	0.047J	9.2	NA	1.6	9.6	<0.023	5.4	<1.2	<0.58	2.2	11
ESE-TMW-11	3-5	6/23/08	<1.2	<1.2	NA	0.96	0.25J	16	NA	6.8	18	0.0066J	19	<1.2	0.58J	<12O	31
ESE-TMW-11	13-15	6/23/08	<1.2	<1.2	NA	0.48	<0.29	9.6	NA	1.6	9.5	<0.023	5.6	1J	0.21J	0.49J	11
ESE-TMW-12	3-5	6/23/08	<1.4	0.4J	NA	1.4	0.34	26	NA	8.1	20	0.008J	19	0.49J	1.1	12	34
ESE-TMW-12	13-15	6/23/08	<1.2	0.76J	NA	0.45	0.054J	8.7	NA	1.8	8.3	<0.024	6	0.74J	0.19J	3.7	12
ESE-TMW-13	3-5	6/23/08	<1.2	<1.2	NA	0.64	0.1J	13	NA	4.4	9	0.0098J	8	0.86J	0.42J	4.3	21
ESE-TMW-48	3-5	7/21/08	<1.2	1.2	NA	0.79	0.32	16	NA	7.8	14	0.0065J	19	<1.2	0.52J	<1.2	34
Building 15, 21, and Lot along Clinton Drive																	
ESE-SB-17	3-5	6/19/08	<1.2	<1.2	NA	0.11J	<0.29	3.5	NA	0.96J	3.4	0.0091J	0.66J	<1.2	<0.59	<1.2	3.1
ESE-SB-18	3-5	6/19/08	<1.2	2.4	NA	0.56	<0.30	7.5	NA	2.6	17	0.011J	2.8	<1.2	<0.61	<1.2	7.3
ESE-SB-20	3-5	6/26/08	3.3	7.8	NA	0.35	5.6	58	NA	720	660	0.82	23	9	0.39J	<1.2	1800
ESE-SB-20	13-15	6/26/08	1.9	1.8	NA	0.8	1.5	7.5	NA	5.6	11	<0.025	7.8	<1.2	<0.62	1.6	10
ESE-SB-21	3-5	6/26/08	<1.2	2.9	NA	0.86	0.77	15	NA	27	88	0.057	6.2	2.9	<0.61	<1.2	120
ESE-FD-5	3-5	6/26/08	<1.2	0.73J	NA	0.84	0.41	18	NA	4.9	23	0.01J	10	1.8	0.7	7.3	30
ESE-SB-22	3-5	6/26/08	<1.2	1.6	NA	1.3	0.41	13	NA	7.2	12	0.076	7.3	2.3	<0.60	<1.2	28
ESE-SB-23	3-5	6/26/08	<1.2	2.4	NA	0.67	0.34	9	NA	6.2	8.5	0.002J	9.4	1.6	<0.59	<1.2	12
ESE-SB-24	3-5	6/26/08	<1.2	1.1J	NA	0.39	0.32	6.9	NA	3.9	14	0.039	2.9	1.7	<0.61	<1.2	11
ESE-SB-25	3-5	6/26/08	<1.2	0.72J	NA	0.85	0.3J	9.4	NA	6.6	8	0.0044J	4.8	1.9	<0.60	<1.2	14
ESE-SB-26	3-5	6/26/08	<1.2	1.6	NA	0.63	0.35	11	NA	5	9.9	0.016J	5.6	2.2	<0.58	<1.2	15
ESE-SB-30	3-5	6/30/08	<1.2	0.96J	NA	0.67	1.2	7.3	NA	3.8	9	0.011J	5.1	2.7	<0.62	<1.2	15
ESE-SB-98	3-5	8/6/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.2	NA	NA	NA
ESE-FD-22	3-5	8/6/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.2	NA	NA	NA
ESE-TMW-15	3-5	6/24/08	0.88J	1.4	NA	0.49	0.53	12	NA	5.6	7.9	0.012J	8	<1.2	<0.59	<1.2	16
ESE-TMW-16	3-5	6/24/08	<1.2	0.8J	NA	0.66	0.49	12	NA	4.1	8.3	0.01J	8	0.46J	<0.61	<1.2	14
ESE-TMW-21	3-5	6/25/08	<1.2	1.7	NA	0.55	<0.30	6.8	NA	1.7	5.2	<0.024	3.2	<1.2	<0.60	<1.2	9.7
ESE-TMW-21	13-15	6/25/08	<1.2	1.7	NA	0.28	<0.30	3.5	NA	1.5	2.8	<0.024	4	<1.2	<0.61	<1.2	4.9
ESE-TMW-22	3-5	6/25/08	<1.2	1.1J	NA	0.38	<0.30	4.3	NA	3.8	10	0.086	2.8	<1.2	<0.60	<1.2	17
Building 32C																	
ESE-SB-07	3-5	6/16/08	NA	1.3J	220	NA	0.33J	25	NA	NA	18	0.0071J	NA	0.66J	1.3	NA	NA
ESE-SB-08	3-5	6/16/08	NA	<1.3	160	NA	0.29J	25	NA	NA	25	0.016J	NA	1J	0.87	NA	NA
ESE-SB-09	3-5	6/16/08	NA	0.69J	230	NA	0.067J	14	NA	NA	7.4	0.031	NA	1.3	0.39J	NA	NA
ESE-SB-19	3-5	6/23/08	<1.3	1.5	NA	1.5	0.38	23	NA	6.2	23	0.013J	19	0.51J	1.1	13	30
ESE-SB-19	13-15	6/23/08	<1.2	<1.2	NA	0.14	0.11J	5.4	NA	3	3.5	<0.023	6.4	<1.2	0.21	<5.8O	7.6
ESE-SB-34	3-5	6/30/08	<1.3	2.1	NA	1.7	4.3	23	NA	7.5	31	0.0086J	13	3	<0.64	<1.3	22
ESE-SB-97	3-5	7/30/08	NA	NA	NA	NA	NA	NA	NA	NA	440	NA	NA	NA	<0.57	NA	NA
ESE-SB-97	13-15	7/30/08	NA	NA	NA	NA	NA	NA	NA	NA	21	NA	NA	NA	NA	NA	NA
ESE-TMW-17	3-5	6/24/08	1.2	4.5	NA	0.86	0.76	15	NA	9.6	17	0.0093J	16	<1.2	<0.61	<6.1O	29
ESE-TMW-18	3-5	6/24/08	1.8	1.3J	NA	1.5	0.96	28	NA	7.8	17	0.0057J	15	<1.4	<0.69	<1.4	30
ESE-TMW-19	3-5	6/24/08	1J	1.3J	NA	1.3	0.86	23	NA	10	22	0.01J	13	<1.3	<0.67	<1.3	35
ESE-TMW-23	3-5	6/25/08	<1.1	2.2	NA	0.85	<0.28	9.5	NA	3.2	6.6	0.0042J	4.4	<1.1	<0.57	<1.1	14
ESE-FD-4	3-5	6/25/08	<1.1	2.9	NA	0.83	<0.29	6.7	NA	2.9	6.8	<0.023	4.4	<1.1	<0.57	<1.1	11
Building 16B and Associated Areas																	
ESE-SB-27	3-5	6/27/08	<1.2	5.9	NA	0.9	0.38	11	NA	6.2	10	<0.025	9.4	1.8	<0.62	<1.2	9.2
ESE-SB-28	0-2	6/27/08	<1.2	2.2	NA	1.3	0.49	12	NA	15	61	0.023J	12	2.4	<0.61	<1.2	45
ESE-SB-28	3-5	6/27/08	<1.2	1.3	NA	0.59	0.29J	8.2	NA	3.3	5.1	<0.024	6.1	1.3	<0.61	<1.2	10
ESE-SB-31	3-5	6/30/08	<1.2	0.47J	NA	1.4	3.5	19	NA	4	20	0.004J	8.7	0.72J	<0.62	<1.2	11
ESE-FD-6	3-5	6/30/08	<1.3	0.57J	NA	1.2	3.1	18	NA	3.9	14	0.0029J	8.7	1.8	<0.65	<1.3	13
ESE-SB-32	3-5	6/30/08	0.74J	<1.2	NA	0.82	2.9	14	NA	5.4	14	<0.023	9.8	6.7	<0.58	0.77J	6.8
ESE-SB-33	3-5	6/30/08	1.2	6.2	NA	2.7	3	15	NA	16	17	<0.023	21	1J	<0.58	<1.2	16
ESE-SB-35	3-5	6/30/08	1.2	2.6	NA	0.91	2.1	11	NA	140	63	0.0026J	12	6.8	<0.58	<1.2	46
ESE-SB-89	3-5	7/30/08	NA	NA	NA	NA	NA	NA	NA	NA	67	NA	NA	NA	NA	NA	NA
ESE-SB-91	3-5	7/30/08	NA	NA	NA	NA	NA	NA	NA	NA	460	NA	NA	NA	NA	NA	NA
ESE-SB-94	3-5	7/30/08	NA	NA	NA	NA	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA
ESE-TMW-20	3-5	6/24/08	0.79J	1.2J	NA	1.3	0.76	23	NA	7.1	16	0.0087J	13	1.1J	<0.67	<1.3	27
ESE-TMW-24	3-5	6/25/08	<1.3	3.6	NA	1.2	<0.32	17	NA	6.3	13	0.0095J	7.5	<1.3	<0.64	<1.3	26
ESE-TMW-25	3-5	6/25/08	<1.1	4.8	NA	0.39	<0.28	6.1	NA	3	13	<0.022	4.2	<1.1	<0.56	<1.1	6.1
ESE-TMW-26	3-5	6/25/08	<1.1	2.2	NA	0.66	<0.28	9.1	NA	3.3	5.6	0.0022J	5.4	<1.1	<0.57	<1.1	7.6
ESE-TMW-27	3-5	6/25/08	<1.2	3.6	NA	1.8	<0.30	12	NA	4.5	11	0.0084J	5.7	<1.2	<0.60	<1.2	15
ESE-TMW-28	3-5	6/30/08	0.89J	1.6	NA	0.73	1.2	5.8	NA	2.5	5.6	0.0024J	5.9	7.1	<0.62	<1.2	8.6
ESE-MW-06	3-5	8/4/08	NA	NA	NA	NA	NA	NA	NA	NA	94	NA	NA	NA	NA	NA	NA
ESE-FD-21	3-5	8/4/08	NA	NA	NA	NA	NA	NA	NA	NA	49	NA	NA	NA	NA	NA	NA
ESE-MW-06	14-15	10/9/08	14J	<5.6	NA	0.11	2.7	750J6	NA	66	77	0.029	100J5	19	2.2	47	100
ESE-MW-06	19-20	10/9/08	17	<6.0 O	NA	<0.12	1.3	410	NA	66	120	0.042	65	13	4.4	<12 O	140

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ESE-MW-06	34-35	10/9/08	1.2J	7.4	NA	1	0.24J	180	NA	59	45	0.024J	52	<1.3	<0.64	<6.4 O	73
Building 9 and Open Parking Lots along Clinton Drive																	
ESE-SB-66	3-5	7/8/08	<1.3	1.8	NA	1.8	0.56	17	NA	150B	110	0.022J	18	<1.3	<0.64	<1.3	59
ESE-FD-10	3-5	7/8/08	<1.2	0.83J	NA	1.5	0.21J	24	NA	4.8	15	0.0022J	25	<1.2	0.62J	12	30
ESE-SB-66	13-15	7/8/08	<1.2	10	NA	2.2	0.67	17	NA	120B	40	<0.025	25	<6.2 O	<0.62	<1.2	40
ESE-TMW-43	3-5	7/21/08	<1.4	2.2	NA	0.9	0.22J	16	NA	5.4	13	0.0099J	12	<1.4	0.52J	9.1	19
ESE-FD-17	3-5	7/21/08	<1.3	2.5	NA	1.2	0.25J	18	NA	5.6	14	0.011J	12	1.9	0.5J	9.4	20
ESE-TMW-44	3-5	7/21/08	<1.3	1.7	NA	1.1	0.18J	14	NA	5	12	0.0023J	17	0.47J	0.4J	<1.3	18
ESE-TMW-45	3-5	7/21/08	<1.3	2.1	NA	0.95	0.23J	17	NA	4.8	13	0.018J	12	0.88J	0.44J	8.4	21
ESE-TMW-46	3-5	7/21/08	<1.2	3.3	NA	0.81	0.26J	16	NA	3.3	8.9	0.012J	11	0.73J	0.58J	9.4	20
ESE-TMW-47	3-5	7/21/08	<1.2J3	2.1	NA	0.84	0.31J	15	NA	4.1	11	0.03	7.9	0.5J	0.65J	8	20
Building 06B and 06E																	
ESE-SB-36	3-5	6/30/08	0.91J	0.78J	NA	0.56	0.39	12	NA	4.5	6.8	0.09	7.3	<1.2	<0.58	<1.2	15
ESE-SB-37	3-5	6/30/08	<1.1	0.76J	NA	0.64	0.28J	7.7	NA	4.2	4.3	0.0021J	6.1	<1.1	<0.56	<1.1	11
ESE-SB-38	1-3	7/1/08	NA	0.91J	66	NA	1.6	9.7	NA	NA	11	0.0024J	NA	3.4	<0.59	NA	NA
ESE-SB-38	13-15	7/1/08	NA	NA	NA	NA	NA	NA	NA	NA	2.7	NA	NA	NA	NA	NA	NA
ESE-SB-39	1-3	7/1/08	NA	1.4	140	NA	2.7	16	NA	NA	13	0.0026J	NA	9	<0.60	NA	NA
ESE-SB-41	1-3	7/1/08	NA	<1.2	110	NA	1.7	8.2	NA	NA	27	0.032	NA	3.2	<0.60	NA	NA
ESE-SB-41	13-15	7/1/08	NA	NA	NA	NA	NA	NA	NA	NA	8.6	NA	NA	NA	NA	NA	NA
ESE-SB-42	3-5	7/1/08	NA	1.3	100	NA	2.4	14	NA	NA	14	0.016J	NA	<1.2	<0.61	NA	NA
ESE-SB-42	13-15	7/1/08	<1.2B3	<1.2	NA	0.1J	0.065J	1.6	NA	0.98J	2	<0.024	1.7	<1.2	<0.61	<1.2	2.4
ESE-SB-43	3-5	7/1/08	NA	<1.2	40	NA	1.4	7.3	NA	NA	9.4	<0.024	NA	<1.2	<0.59	NA	NA
ESE-SB-45	4-6	7/2/08	<1.2	2.2	NA	0.78	<0.31	15	NA	6.2	14	0.027	5.9	<1.2	<0.62	<1.2	32
ESE-SB-45	13-15	7/2/08	<1.2	0.63J	NA	0.17	<0.30	2.3	NA	1.6	2.7	<0.024	1.6	<1.2	<0.61	<1.2	3.5
ESE-FD-8	13-15	7/2/08	0.83J, J6	0.99J	NA	0.18	<0.31	2.6	NA	2.3	2.3	<0.025	2.1	<1.2	<0.62	<1.2	4.4
ESE-SB-46	3-5	7/2/08	NA	2.3	120	NA	2.7	14	NA	NA	12	0.009J	NA	4.1	<0.60	NA	NA
ESE-SB-47	3-5	7/2/08	0.67J	1.2J	NA	0.39	2.2	42	NA	12	44	0.017J	120	9.9	<0.62	<1.2	60
ESE-SB-48	3-5	7/2/08	<1.2	10	NA	1.4	0.091J	10	NA	8.5	74	0.0071J	20	<1.2	<0.59	<12.	16
ESE-SB-48	8-10	7/2/08	1.1J	1.5	NA	0.28	0.96	13	NA	45	120	0.027	6.3	<1.2	1	<1.2	130
ESE-SB-49	3-5	7/2/08	<1.1	1.7	NA	0.77	<0.28	7	NA	4.7	7.1	0.018J	4.8	<1.1	<0.56	<1.1	11
ESE-SB-50	3-5	7/2/08	<1.1	4.4	NA	0.39	0.64	9.4	NA	32	89	0.19	17	<1.1	<0.57	<1.1	190
ESE-SB-50	7-8	7/2/08	<1.2	2.7	NA	0.27	3.8	66	NA	150	840	0.11	13	<1.2	2.4	<1.2	310
ESE-SB-50	13-15	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	4.9	NA	NA	NA	NA	NA	NA
ESE-SB-51	3-5	7/2/08	<1.2	3	NA	1.2	<0.29	9.7	NA	6.3	14	0.0051J	7.9	<1.2	<0.58	<1.2	18
ESE-SB-52	3-5	7/3/08	<1.2	<1.2	NA	0.1J, J3	0.23J	1.4	NA	<1.2	1.6	<0.024	0.84J	0.85J	<0.61	<1.2	1.6J
ESE-FD-9	3-5	7/3/08	1J	0.78J	NA	0.49	0.57	15	NA	13	29	0.017J	7.1	<1.2	0.46J	<1.2	52
ESE-SB-53	3-5	7/3/08	1.2	2.4	NA	<0.11	0.47	18	NA	6.2	95	0.086	3.7	<1.1	0.32J	<1.1	220
ESE-SB-105	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	5.4	NA	NA	NA	NA	NA	NA
ESE-SB-116	3-5	11/3/2009	<1.2	1.8	NA	0.56	0.23	9.3	NA	8.8	21	0.020	7.7	<1.2	0.21	<1.2	31
ESE-TMW-29	3-5	7/9/08	0.6J	0.88J	NA	0.83	0.36	9	NA	5.6	6.7	<0.023	9.8	<1.2	<0.58	<1.2	12
ESE-FD-12	3-5	7/9/08	1J	1.4	NA	0.84	0.43	9.5	NA	5.4	7.7	<0.024	9.8	<1.2	0.26J	<1.2	12
ESE-TMW-29	13-15	7/9/08	1J	1.5	NA	0.56	0.48	9.6	NA	5.2	5.6	<0.025	12	<1.2	<0.62	<1.2	16
ESE-TMW-30	3-5	7/9/08	1.7	10	NA	3.7	0.72	18	NA	14	12	<0.025	30	<1.2	<0.62	<2.5 O	31
ESE-TMW-30	13-15	7/9/08	<1.2	0.53J	NA	0.12J	0.14J	1.6	NA	0.68J	1.2	<0.025	2.3	0.81J	<0.62	<1.2	2.7
ESE-TMW-31	3-5	7/9/08	0.87J	1.9	NA	0.93	0.43	8.3	NA	6.5	11	0.021J	9.4	<1.1	<0.56	<1.1	11
ESE-TMW-31	13-15	7/9/08	<1.1	<1.1	NA	0.37	0.28	5.9	NA	2.1	7.7	<0.022	5.3	<1.1	<0.56	0.46J	7.1
ESE-TMW-32	3-5	7/9/08	1.1J	0.69J	NA	0.24	0.83	12	NA	23	84	0.032	6.9	<1.3	0.56J	<1.3	120
ESE-TMW-32	13-15	7/9/08	0.71J, J6	0.34J	NA	0.17	0.21J	3.1	NA	1.6	2.3	<0.023	2.3J3	0.54J	0.41J	0.68J	<1.7J3
ESE-TMW-50	3-5	11/3/2009	<5.9	4.4	NA	0.78	0.52	10	NA	5.4	22	0.024	15	<5.9	<3.0	<5.9	25
Building 06, 06A, 06C, 06D, and 06F																	
ESE-SB-40	1-3	7/1/08	<1.2	5.8	NA	1.2	<0.31	17	NA	8.2	18	0.03	9	<1.2	<0.62	<1.2	26
ESE-FD-7	1-3	7/1/08	<1.2	2.6	NA	0.75	0.77	16	NA	10	30	0.081	12	<1.2	<0.62	<1.2	47
ESE-SB-40	10-12	7/1/08	<6.4 O	6.4	NA	0.73	4.4	23	NA	110	1700	0.91	20	<6.4 O	<0.64	<6.4 O	2300
ESE-SB-40	13-15	7/1/08	<19 O	<1.9	NA	0.17J	6.5	68	NA	120	1100	1.5	<19 O	25	<9.5 O	<19 O	1200
ESE-SB-44	3-5	7/1/08	3.2	4.1	NA	0.32	2.9	30	NA	160	460	0.92	37	7.6	0.55J	<2.3 O	490
ESE-SB-44	10-12	7/1/08	27	12	NA	0.52	2	46	NA	400	2300	35	12	<6.8 O	8.2	<1.4	1300
ESE-SB-44	13-15	7/1/08	NA	NA	NA	NA	NA	NA	NA	NA	2200	3.2	NA	NA	NA	NA	NA
ESE-SB-54	3-5	7/3/08	7.5	30	NA	0.024	14	140	NA	1400	4700	5.8	130	<1.2	3.2	<1.2	4000
ESE-SB-54	13-15	7/3/08	<1.2	1.6	NA	1.1	0.35	6.3	NA	5.5	11	<0.023	7.5	<1.2	<0.58	<1.2	7.9
ESE-SB-55	3-5	7/3/08	7.2	15	NA	0.11J	24	64	NA	1100	3200	1.2	62	<1.2	5.2	<12 O	3900
ESE-SB-55	8-10	7/3/08	12	20	NA	<0.12	15	75	NA	1000	3400	0.59	230	<2.5 O	7.8	<12 O	3500
ESE-SB-55	13-15	7/3/08	<1.1	<1.1	NA	0.47	0.21J	3.9	NA	1.1J	4.9	<0.022	2.8	<1.1	<0.56	0.58J	6.9
ESE-SB-56	3-5	7/7/08	<1.2	1.2J	NA	0.48	1.1	11	NA	150	110	0.11	9.4	1.6	<0.62	<1.2	210
ESE-FD-10	3-5	7/7/08	3.4J	2.7	NA	0.27	1.8	20	NA	68	120	0.12	11	<1.2	0.45J	<1.2	200
ESE-SB-56	10-12	7/7/08	<5.8 O	5.3	NA	0.21	6.7	120	NA	700	1600	0.54	150	2	1.3	<1.2	1100
ESE-SB-56	13-15	7/7/08	NA	NA	NA	NA	NA	NA	NA	2600	2600	NA	NA	NA	NA	NA	NA
ESE-SB-57	3-5	7/7/08	<6.2 O	9.6	NA	0.32	30	92	NA	610	2600	0.93	48	4.6J,O	2.6J,O	<6.2 O	25000
ESE-SB-57	10-12	7/7/08	13	<1.2	NA	0.2	15	18	NA	960	1200	1.3	22	15	1.7	1.7	2200
ESE-SB-57	13-15	7/7/08	NA	NA	NA	NA	NA	NA	NA	3.2	9	NA	NA	NA	NA	NA	NA
ESE-SB-58	3-5	7/7/08	8.1	18	NA	0.14	6	35	NA	1000	1600	7.4	33	<6.5 O	1.8J,O	<6.5 O	1700
ESE-SB-58	13-15	7/7/08	NA	NA	NA	NA	NA	NA	NA	2.6	9.4	NA	NA	NA	NA	NA	NA
ESE-SB-59	3-5	7/7/08	0.76J	1.9	NA	0.39	2.6	44	NA	80	570	0.14	17	0.99J	0.26J	<1.1	1000
ESE-SB-59	13-15	7/7/08	NA	NA	NA	NA	NA	NA	NA	NA	7.4	NA	NA	NA	NA	NA	NA
ESE-SB-60	3-5	7/7/08	<1.2	1.4	NA	0.84	1.6	22	NA	81	150	0.27	27	1.2	<0.62	<1.2	220
ESE-SB-60	13-15	7/7/08	<1.2	<1.2	NA	0.61	0.75	12	NA	20	69	0.12	6.1	3.6	<0.61	<1.2	80
ESE-SB-61	3-5	7/7/08	<1.2	2	NA	0.47	1.9	26	NA	130	270	0.11	13	2.4	<0.58	<1.2	640
ESE-SB-61	13-15	7/7/08	<1.2	1.3	NA	0.69	0.74	12	NA	13	54	0.067	7.2	<1.2	<0.59	<1.2	82
ESE-SB-62	3-5	7/7/08	<1.1	<1.1	NA	0.19	0.32	5.9	NA	7	51	0.024	3.8	<1.1	<0.56	<1.1	260
ESE-SB-62	10-12	7/7/08	<1.2	1.2	NA	0.49	0.84	8.9	NA	15	110	0.34	5.2	2.5	<0.59	<1.2	140
ESE-SB-62	13-15	7/7/08	<1.2J6	<1.2	NA	0.12J	0.64	8.7	NA	17J3	130J6	0.19	3.1	1.9	<0.60	<1.2	410V
ESE-SB-63	3-5	7/7/08	<6.2 O	<6.2 O	NA	0.54	1.4	20	NA	190	370	0.49	21	<6.2 O	1.2	<25 O	370B
ESE-SB-63	13-15	7/7/08	<10.	<10 O	NA	<0.20	0.35J	13	NA	8.6	76	0.024J	9	<10 O	<1.0	<200 O	92B
ESE-SB-64	2-4	7/7/08	<24 O	55	<0.12	<0.12	54	88	NA	1000	6600	0.12	140	10 O	10 O	65	13000B
ESE-SB-64	13-15	7/7/08	26	<0.12	<0.12	<0.12	27	160	NA	10000	4300	0.41	290	<23 O	<23 O	<23 O	13000
ESE-SB-65	3-5	7/7/08	<6.3 O	<6.3 O	NA	0.12	3	110	NA	290	980	1.5	56	<12 O	4.3	29	880
ESE-SB-65	13-15	7/7/08	NA	NA	NA	NA	0.59	NA	NA	NA	79	NA	NA	NA	NA	<1.2	NA
ESE-SB-67	3-5	7/8/08	<1.2	5.7	NA	0.64	0.42	8.8	NA	84B	17	<0.025	5.6	<1.2	<0.62	<1.2	16
ESE-SB-67	13-15	7/8/08	<1.2	0.33J	NA	0.52	0.055J	7.8	NA	2.2	4.2	<0.024	10	<1.2	0.26J	3.2	12
ESE-SB-68	3-5	7/8/08	<1.2	<1.2	NA	0.54	3.2	22	NA	26	84	0.27	13	<1.2	18	7.6	73
ESE-SB-68	13-15	7/8/08	NA	NA	NA	NA	NA	NA	NA	37	27	0.022J	N	NA	NA	NA	NA
ESE-SB-69	3-5	7/8/08	<1.2	1.6	NA	0.47	1.7	57	NA	70	230	0.14	28	<2.4 O	1.3	0.38J	290
ESE-SB-69	13-15	7/8/08	NA	NA	NA	NA	0.42	NA	NA	14	78	NA	N	NA	NA	<1.2	NA
ESE-SB-70	3-5	7/8/08	<1.2	<1.2	NA	0.39	0.091J	14	NA	2.2	8.7	<0.023	9.1	<1.2	0.46J	5.2	14
ESE-SB-70	13-15	7/8/08	NA	NA	NA	NA	NA	NA	NA	7.6	8.1	NA	N	NA	NA	NA	NA
ESE-SB-71	3-5	7/8/08	<5.9 O	<5.9	NA	0.58	0.79	24	NA	69	160	0.42	21	<5.9 O	0.87	3.3	210
ESE-SB-71	13-15	7/8/08	NA	NA	NA	NA	0.078J	NA	NA	3	13	NA	NA	NA	NA	<1.2	NA
ESE-SB-72	3-5	7/8/08	<1.2	0.87J	NA	0.48	0.57	21	NA	21	92	0.14	13	<1.2	0.72	3.8	130
ESE-SB-72	13-15	7/8/08	NA	NA	NA	NA	<0.28	NA	NA	3.2	7.4	NA	NA	NA	NA	<1.1	NA
ESE-SB-73	3-5	7/10/08	<26 O	6.4	NA	0.42	13	120	NA	810	3200	0.56	240	15J	9.8	62	2600
ESE-SB-73	13-15	7/10/08	NA	NA	NA	NA	NA	NA	NA	98	130	NA	NA	NA	NA	NA	NA

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ESE-SB-74	3-5	7/10/08	17	2.1J	NA	0.27	12	98	NA	840	5600	1.3	180	21J	9.4	27	4400
ESE-SB-74	13-15	7/10/08	NA	NA	NA	NA	NA	NA	NA	1300	3900	NA	N	NA	NA	NA	NA
ESE-SB-75	3-5	7/10/08	<6.1	3.4J	NA	0.092J	18	320	NA	7000	1100	0.53	390	23J	13	33	4200
ESE-SB-75	13-15	7/10/08	NA	NA	NA	NA	NA	NA	NA	1000	5800	NA	NA	NA	NA	NA	NA
ESE-SB-76	3-5	7/10/08	<6.0 O	23	NA	0.2	14	120	NA	900B	2900B	1.8	70	7.9	4.9	<6.0 O	3100
ESE-FD-13	3-5	7/10/08	<24 O	<1.2	NA	0.42	12	52	NA	350	1600	1.6	63	13	0.74	1.4	2400
ESE-SB-76	10-12	7/10/08	<1.2	12	NA	0.19	8.1	60	NA	600B	1600B	0.26	45	<1.2	3.5	<1.2	1600
ESE-SB-76	13-15	7/10/08	NA	NA	NA	NA	NA	NA	NA	13	79	NA	N	NA	NA	NA	NA
ESE-SB-77	3-5	7/12/08	1.5	6.8	NA	<0.13	0.83	53	NA	100	11	<0.025	71	<1.3	0.24J	<1.3	8.3
ESE-SB-77	13-15	7/12/08	NA	NA	NA	NA	NA	NA	NA	1.4	15	0.03	N	NA	NA	NA	NA
ESE-SB-81	3-5	7/12/08	<1.3	4.5	NA	0.64	0.64	15	NA	11	47	0.037	6.6	<1.3	<0.64	<1.3	46
ESE-SB-81	13-15	7/12/08	NA	NA	NA	NA	NA	NA	NA	5.4	8.4	NA	N	NA	NA	NA	NA
ESE-SB-82	3-5	7/12/08	<1.1	3.1	NA	0.55	1.6	24	NA	68	170	0.14	11	0.48J	0.33J	<1.1	330
ESE-SB-82	13-15	7/12/08	NA	NA	NA	NA	NA	NA	NA	600V, J3	3100V, J3	NA	NA	NA	NA	NA	NA
ESE-SB-83	3-5	7/12/08	<5.7 O	9J3	NA	0.33J3	3.5J3	48J3, J5	NA	150J3, J5	550J5, J5	0.19	12	<1.1J6, J3	0.65J3	<1.1	880J3, J5
ESE-SB-83	13-15	7/12/08	NA	NA	NA	NA	NA	NA	NA	NA	2900V	NA	NA	NA	NA	NA	NA
ESE-SB-84	3-5	7/16/08	4.5	<1.2	NA	0.59	9.5	74	NA	370	850	0.47	120	12	2.1	0.42J	950
ESE-FD-16	3-5	7/16/08	15	0.84	NA	0.31	18	470	NA	870	1700	0.48	470	11	<0.61	<1.2	1800
ESE-SB-84	13-15	7/16/08	NA	NA	NA	NA	NA	NA	NA	2.2	16	NA	NA	NA	NA	NA	NA
ESE-SB-99	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	530	NA	NA	NA	NA	NA	NA
ESE-FD-23	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	600	NA	NA	NA	NA	NA	NA
ESE-SB-99	6-8	8/12/08	76B	17	NA	0.11J	12	44	NA	100	2600	3.3	<7.3 O	94	<3.6 O	17	3600
ESE-SB-100	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	150	NA	NA	NA	NA	NA	NA
ESE-SB-100	13-15	8/12/08	<1.3	1.6	NA	0.33	0.074J	4.8	NA	2.5	4.6	0.0046J	3.3	<1.3	<0.64	<1.3	6.9
ESE-SB-101	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	220	NA	NA	NA	NA	NA	NA
ESE-SB-102	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	580	NA	NA	NA	NA	NA	NA
ESE-SB-102	10-12	8/12/08	120B	42	NA	<0.25	10	55	NA	300	1200	3.8	<25 O	160	2.4J	40	4200
ESE-SB-102	15-16	8/12/08	<9.5 O	17	NA	0.38	30	61	NA	740	3200	1.8	66	<95 O	<4.8 O	27	4200
ESE-SB-103	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	94	NA	NA	NA	NA	NA	NA
ESE-SB-104	3-5	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	180	NA	NA	NA	NA	NA	NA
ESE-SB-104	13-15	8/12/08	<1.2	1.7	NA	0.58	0.069	6.9	NA	2.6	5.2	0.0052	4.4	<1.2	<0.60	<1.2	10
ESE-SB-106	3-5	8/20/08	4.7	2.8	NA	1.2	2.8	17	NA	7.9	19	0.18	18	4.7	<0.69	4.2	39
ESE-SB-106	13-15	8/20/08	<1.4	3.4	NA	0.92	<0.34	18	NA	19	61	0.047	15	<1.4	<0.68	<1.4	130
ESE-SB-107	3-5	8/20/08	15	18	NA	1	4.4	110	NA	79	340	0.019J	27	3	<0.68	7.8	360
ESE-SB-107	13-15	8/20/08	<1.2	0.62J	NA	0.21	<0.31	4.8	NA	3.3	4.8	0.0038J	1.6	<1.2	<0.62	<1.2	6.2
ESE-SB-108	3-5	8/20/08	2.4	0.53J	NA	0.36	1.6	8.4	NA	5.7	7.9	0.013J	3.1	<1.2	<0.60	1.1J	14
ESE-SB-108	13-15	8/20/08	<1.2	0.53J	NA	0.14	<0.30	2.6	NA	1.9	2.8	0.0039J	1.2J	<1.2	<0.60	<1.2	9.3
ESE-SB-109	3-5	8/20/08	4	0.51	NA	0.72	1.9	9.2	NA	5.2	14	0.024	4.7	<6.0	<0.60	1.7	14
ESE-SB-109	7-8	8/20/08	1.3	0.38	NA	0.81	1	5.8	NA	2	14	0.018	3.9	<1.2	<0.58	1.7	7.2
ESE-SB-109	13-15	8/20/08	<1.2	1.1	NA	0.42	<0.31	6	NA	11	25	0.25	4.1	<1.2	<0.62	<1.2	28
ESE-SB-110	3-5	8/20/08	20	2.9	NA	0.27	6.6	29	NA	460	1600	3.9	27	19	2.4	6.6	1600
ESE-SB-110	13-15	8/20/08	<1.3	1.6	NA	1	<0.32	22	NA	5.8	8.5	0.0057	22	<1.3	<0.65	<1.3	31
ESE-SB-111	3-5	8/20/08	0.74	6.3	NA	0.52	2.4	27	NA	150	630	0.24	22	<1.4	<0.68	<1.4	710
ESE-SB-111	13-15	8/20/08	<1.4	5.8	NA	0.58	0.4	110	NA	42	4600	1.8	11	<1.4	0.84	<1.4	260
ESE-SB-112	3-5	8/20/08	<1.2	5.8	NA	0.82	1.7	24	NA	95	270	<0.024	21	<1.2	<0.61	<1.2	330
ESE-SB-112	13-15	8/20/08	<1.2	0.73J	NA	0.6	<0.30	5.6	NA	3.4	6	<0.024	4.9	<1.2	<0.61	<1.2	9.2
ESE-SB-113	3-5	10/1/08	<14 O	13	NA	0.16	3.9	51	NA	280	1400	1.3	70	<29 O	<3.6 O	<7.3 O	5700
ESE-SB-113	13-15	10/1/08	<12 O	18	NA	0.27	<1.5 O	6.3	NA	32	75	0.089	16	<12 O	<3.0 O	<1.2	270
ESE-SB-114	3-5	10/1/08	<1.3	3.6	NA	0.51	1.1	23	NA	130	560	0.39	22	<6.5 O	<0.65	<1.3	510
ESE-FD-32	3-5	10/1/08	9	2.8	NA	0.56	0.12J	5.5	NA	20	830	0.21	3.3	<1.2	<0.59	<1.2	39
ESE-SB-114	13-15	10/1/08	<1.2	2.2	NA	0.64	0.093J	7.2	NA	3	27	0.016J	4.2	<1.2	<0.61	<1.2	25
ESE-SB-115	3-5	10/3/08	<1.2	1.4	NA	0.38	0.14J	5.4	NA	2.6	8.9	0.037	6.2	7.1	0.36J	5.8	12
ESE-FD-33	3-5	10/3/08	<1.3	1.8	NA	0.45	0.26	9.4	NA	5.3	10	0.049	8.3	7.5	0.55	7.1	25
ESE-SB-115	13-15	10/3/08	<1.2	2.4	NA	1.1	0.18J	13	NA	6.3	9.3	0.0057J	14	7.5	0.27J	8.2	19
ESE-SB-118	3-3.5	6/29/09	<1.2	4.2	NA	1.3	0.19	31	NA	120	190	0.057	22	<0.33	<0.16	<0.30	220
ESE-SB-119	3-3.5	6/29/09	<1.2	3.6	NA	1.1	0.16	28	NA	55	98	0.079	22	<0.33	<0.16	<0.30	290
ESE-TMW-33	2-4	7/14/08	0.8J	2.3	NA	1.5	0.99	34	NA	16	30	0.32	15	<1.4	<0.69	<1.4	80
ESE-TMW-33	13-15	7/14/08	10J	64	NA	<0.12	14	81	NA	14000	2400	0.37	300	8.1J	3.6J	<12 O	4200
ESE-TMW-33	33-35	7/14/08	NA	NA	NA	NA	NA	NA	NA	3.5	6.4	NA	NA	NA	NA	NA	NA
ESE-TMW-34	3-5	7/14/08	0.78J	2.3	NA	0.91	2.3	28	NA	100	270	0.22	41	2	0.3J	<1.2	590
ESE-FD-15	3-5	7/14/08	<1.1	0.58J	NA	0.87	0.87	14	NA	22	79	0.31	14	1.6	<0.57	<1.1	140
ESE-TMW-34	13-15	7/14/08	<1.2	1.7	NA	0.99	0.69	14	NA	12	29	0.061	13	1.1J	<0.61	<1.2	74
ESE-TMW-35	3-5	7/14/08	0.67J	<1.2	NA	0.72	0.97	40	NA	77	94	0.063	17	1.5	<0.61	<1.2	130
ESE-TMW-38	3-5	7/16/08	5.3	2	NA	0.53	6.2	70	NA	300	600	1.4	120	12	0.2	1.4	850
ESE-TMW-38	13-15	7/16/08	NA	NA	NA	NA	NA	NA	NA	9.2	85	NA	NA	NA	NA	NA	NA
ESE-MW-09	26-28	8/13/08	<1.3	18	NA	1.8	0.15J	22	NA	26	20	0.0074J	31	<1.3	<0.64	<1.3	67
ESE-MW-15	3-5	8/15/08	23	2.8	NA	0.27	8.4	22	NA	410	1500	0.35	16	<6.1 O	2.4	6.3	1000
ESE-MW-19	3-5	8/21/08	<1.2	3.1	NA	0.68	<0.31	11	NA	4	9.4	0.0046	6.6	<1.2	<0.62	<1.2	16
ESE-FD-28	3-5	8/21/08	<1.2	2.6	NA	1.6	<0.31	14	NA	4.5	12	0.0044	11	<1.2	<0.62	<1.2	20
ESE-MW-19	13-15	8/21/08	<1.2	3	NA	0.87	<0.31	16	NA	26	41	0.018	12	<1.2	<0.62	<1.2	88
ESE-MW-20	19-21	8/29/08	4.3	0.62	NA	0.56	1.5	7.8	NA	3	17	0.021	4.2	<1.2	<0.61	1.3	48
ESE-FD-30	19-21	8/29/08	4	1.6	NA	0.59	1.4	7.1	NA	0.43J	25	0.0081J	3.6	0.43J	<0.57	0.96J	46
ESE-MW-23	33-35	10/6/08	65	48	NA	<0.13	40	160	NA	1200	3600	1.2	99	31	13	<13 O	9600
ESE-MW-23	38-40	10/6/08	7.8	5.1	NA	1.3	0.87	24	NA	27	48	0.036	23	0.6J	<0.67	<1.3	120
ESE-MW-24	37-39	10/9/08	<1.2	4	NA	0.95	0.33	15	NA	18	48	0.0048J	19	<1.2	<0.59	<1.2	98
ESE-FD-34	37-39	10/9/08	<1.2	4.6	NA	0.94	0.2J	14	NA	32	32	0.005J	19	<1.2	<0.60	<1.2	71
Building 11, NEC of Building 6 and Associated Areas																	
ESE-SB-78	3-5	7/12/08	<1.2	1.9	NA	1	0.65	22	NA	7.8	8.1	0.0062J	15	<1.2	<0.62	<1.2	29
ESE-SB-79	3-5	7/12/08	0.65J	2	NA	1.2	0.55	23	NA	7.2	9.8	<0.023	11	<1.2	<0.58	<1.2	24
ESE-FD-14	3-5	7/12/08	<1.2	<1.2	NA	0.51	0.45	13	NA	8.2	15	0.071	7.1	<1.2	<0.58	<1.2	32
ESE-SB-79	6-8	7/12/08	<1.1	0.88J	NA	0.56	0.37	12	NA	3	6.2	<0.022	7.6	<1.1	<0.56	<1.1	9.4
ESE-SB-86	3-5	7/17/08	<2.4 O	3.9	NA	2.7	0.4	21	NA	7.2	17	0.005J	22	<1.2	0.65	13	26
ESE-SB-86	13-15	7/17/08	NA	NA	NA	NA	NA	NA	NA	6.3	NA	NA	NA	NA	NA	<1.2	NA
ESE-SB-87	3-5	7/17/08	<1.3	3.5	NA	0.68	0.47	19	NA	19	38	0.014J	18	<1.3	0.73	1.6	67
ESE-TMW-36	3-5	7/14/08	<1.2	2.3	NA	0.74	0.52	11	NA	4.7	7.1	<0.024	10	<1.2	<0.61	<1.2	12
ESE-TMW-36	13-15	7/14/08	<1.3	0.54J	NA	1.4	0.47	14	NA	7.8	18	<0.025	18	<1.3	<0.63	<6.3 O	20
ESE-TMW-37	3-5	7/14/08	<1.2	3.2	NA	1	0.9	21	NA	34	43	0.012J	12	0.92J	<0.62	<1.2	64
ESE-TMW-37	6-8	7/14/08	<1.3	3.3	NA	0.82	0.59	13	NA	14	9.5	<0.026	9.1	<1.3	<0.64	<1.3	15
ESE-TMW-37	13-15	7/14/08	<2.4	3.2	NA	1.4	0.64	11	NA	7.9	6.6	<0.024	17	<2.4 O	<1.2	<2.4	20
ESE-TMW-37	16-18	7/14/08	<1.3	2	NA	0.91	0.47	9.1	NA	6.7	8	<0.025	12	<1.3	<0.64	<1.3	15
Building 04 and Adjacent Parking Lots																	
LTE-SB-51	2-4	7/10/08	<1.2	2	NA	1	2.6	16	NA	6.6	13	0.0054	12	9.8	<0.60	0.89	29
LTE-SB-52	2-4	7/26/08	<1.2	1.4	NA	0.73	0.32	11	NA	8.1	13	0.0051	4.2	1.8	<0.59	<1.2	13
LTE-TMW-53	2-4	7/11/08	<1.2	0.94	NA	0.83	0.32	12	NA	12	63	0.072	9	<1.2	0.37	5	57
LTE-TMW-53	22-24	7/11/08	<1.2	0.46	NA	0.67	<0.29	8.6	NA	2	4	<0.024	6.1	<1.2	<0.59	2.8	6.4
LTE-TMW-54	2-4	6/30/08	<1.1	<1.1	NA	1.4	2.4	16	NA	4.5	15	0.0049	7.2	0.62	<0.56	<1.1	11
LTE-TMW-54	24-26	6/30/08	<1.2	0.83	NA	0.24	0.4	3.2	NA	0.92	3	<0.024	3.9	<1.2	<0.59	<1.2	4
LTE-TMW-55	4-6	6/25/08	<1.2	3.4	NA	1.2	<0.31	17	NA	6.3	8.3	0.0048	14	<1.2	<0.62	<1.2	30
LTE-TMW-55	20-22	6/25/08	<1.2	4.6	NA	0.62	<0.31	4.4	NA	3.8	5.6	<0.025	7.4	<1.2	<0.62	<1.2	12

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 04A and 10B																	
LTE-TMW-56	4-6	6/25/08	<1.2	4.1	NA	1	<0.31	15	NA	6.6	6.8	<0.025	11	<1.2	<0.62	<1.2	24
LTE-TMW-56	16-18	6/25/08	0.88	3.4	NA	1.9	<0.30	76	NA	9.2	14	<0.024	22	<1.2	<0.59	<2.4	27
LTE-TMW-58	4-6	6/25/08	2	5.9	NA	0.99	0.42	69	NA	62	320	0.063	12	<1.2	<0.58	<5.8	400
LTE-TMW-58	8-10	6/25/08	<1.2	5.0	NA	0.76	0.53	15	NA	30	91	1.1	7.7	<1.2	1.5	<1.2	170
Building 10 and 10A																	
LTE-SB-59	0-2	6/26/08	<1.1	<5.6	NA	0.24	0.57	5.8	<2.0	16	45	0.02	4.2	13	<0.56	<1.1	76
LTE-SB-61	2-4	6/24/08	<1.2	1.7	NA	0.75	0.72	12	NA	14	36	0.045	4.2	2.5	<0.62	<1.2	50
LTE-TMW-57	2-4	7/10/08	<1.3	<1.3	NA	0.88	3.4	19	NA	4.6	13	0.0042	7.5	<1.3	<0.64	<1.3	18
LTE-TMW-57	18-20	7/10/08	<1.2	1.3	NA	0.56	1.1	7.1	NA	1.7	8.1	<0.023	6.2	2.6	<0.58	<1.2	9.8
LTE-TMW-60	2-4	6/26/08	1	2.8	NA	0.7	0.56	58	<2.0	24	41	0.037	14	5	<0.60	<1.2	130
LTE-TMW-60	14-16	6/26/08	<1.2	1.4	NA	1.1	0.34	10	<2.0	12	8.5	<0.024	10	1.3	<0.61	<1.2	16
Building 8, 14, 14A, and 14B																	
LTE-SB-12	2-4	6/24/08	<1.2	0.77	NA	0.58	0.44	10	NA	5.8	26	0.016	6.7	<1.2	<0.59	<1.2	14
LTE-SB-14	2-4	6/23/08	8.4	<5.7	NA	0.54	2.8	590	NA	71	240	0.091	33	5.2	1.1	<5.7	750
LTE-SB-14	22-24	6/23/08	<1.2	<1.2	NA	0.4	0.25	4.8	NA	2.5	9.1	0.011	4	<1.2	<0.59	<1.2	14
LTE-SB-14	22-24	6/23/08	<1.3	0.51	NA	0.44	0.43	38	NA	7.7	54	0.0046	6.2	1.3	<0.63	<1.3	52
LTE-SB-15	4-6	6/24/08	<1.2	1.4	NA	0.62	0.38	16	NA	5.1	9.8	0.0073	2.6	2	<0.62	<1.2	15
LTE-SB-16	2-4	6/24/08	0.72	2.4	NA	0.18	0.56	4.3	NA	1.8	2.3	<0.022	3.1	17	<0.54	1.5	10
LTE-SB-65	4-6	7/14/08	<1.2	1.8	NA	0.74	0.52	12	NA	7.4	19	<0.024	5.2	1.2	<0.60	<1.2	20
LTE-SB-65	18-20	7/14/08	<1.2	<1.2	NA	0.32	0.31	4.8	NA	3.8	3.5	<0.024	5.5	3.2	<0.60	<1.2	10
LTE-SB-66	2-4	7/8/08	0.71	1.4	NA	0.73	0.51	20	NA	8.2	26	0.028	6.6	0.73	<0.62	<1.2	28
LTE-SB-75	2-4	8/12/08	<1.2	<1.2	NA	0.36	0.26	6.1	NA	4.6	46	0.016	2.7	2.3	<0.58	<1.2	21
LTE-SB-75	8-10	8/12/08	<1.2	0.56	NA	0.63	0.19	13	NA	3.1	10	<0.024	4.6	2.4	<0.60	<1.2	17
LTE-SB-76	2-4	8/12/08	2.9	0.38	NA	0.28	0.34	8.2	NA	23	110	0.0039	4.4	6.2	<0.61	<1.2	54
LTE-SB-76	8-10	8/12/08	<1.1	2.3	NA	0.8	0.23	11	NA	4	15	<0.023	4.9	3.4	<0.57	<1.1	15
LTE-SB-77	2-4	8/12/08	<1.2	0.8	NA	0.3	0.36	19	NA	24	73	0.04	4.7	5.9	<0.59	<1.2	76
LTE-SB-77	8-10	8/12/08	<1.2	0.52	NA	0.66	0.25	11	NA	2.7	6.4	<0.024	3.9	2.6	<0.59	<1.2	15
LTE-SB-78	2-4	8/12/08	<1.2	1.6	NA	0.24	0.28	12	NA	13	100	0.044	5	<1.2	0.24	<1.2	77
LTE-SB-78	8-10	8/12/08	<1.2	1.3	NA	0.83	0.093	9.1	NA	2.4	6.9	<0.023	6.5	<1.2	<0.58	1.7	14
LTE-SB-79	2-4	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	30	0.021	NA	<1.2	NA	NA	NA
LTE-SB-79	8-10	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	4.6	NA	NA	<1.2	NA	NA	NA
LTE-SB-80	2-4	8/12/08	<1.2	NA	NA	NA	NA	NA	NA	NA	19	NA	NA	<1.2	NA	NA	NA
LTE-SB-80	8-10	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	9.5	NA	NA	<1.3	NA	NA	NA
LTE-SB-81	2-4	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	140	0.028	NA	<1.2	NA	NA	NA
LTE-SB-82	2-4	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	13	0.047	NA	NA	NA	NA	NA
LTE-SB-82	8-10	8/12/08	NA	NA	NA	NA	NA	NA	NA	NA	13	NA	NA	NA	NA	<1.1	NA
LTE-TMW-01	2-4	6/24/08	3.7	3.4	NA	0.41	26	8.5	NA	44	1000	0.084	9.6	<1.2	<0.62	<6.2	3200
LTE-TMW-01	22-24	6/24/08	<1.2	0.36	NA	0.21	0.25	3.1	NA	1.8	3.9	0.005	4.2	<1.2	<0.62	<1.2	11
LTE-TMW-02	2-4	6/27/08	6.6	6.1	NA	0.76	1.4	400	NA	29	67	<0.023	40	8.1	<0.56	<5.6	240
LTE-TMW-02 (Dup)	2-4	6/27/08	1.3	<1.0	NA	0.45	0.36	82	NA	6.7	16	0.0095	7.3	3.3	<0.51	<1.0	33
LTE-TMW-02	12-14	6/27/08	4.1	2	NA	0.49	0.93	260	NA	14	85	0.0098	100	8.4	<0.57	<1.1	80
LTE-TMW-03	2-4	6/24/08	0.84	2	NA	<0.10	1	7.4	NA	15	50	0.034	5.7	<5.2	<2.6	<1.0	43
LTE-TMW-03	22-24	6/24/08	<1.4	1.9	NA	1	0.59	6.9	NA	4	14	0.0088	4.6	<1.4	<0.72	<1.4	30
LTE-TMW-03 (Dup)	22-24	6/24/08	<1.2	0.96	NA	0.28	0.29	3.4	NA	2.2	6.4	0.0075	4.4	<1.2	<0.61	<1.2	9.9
LTE-TMW-04	0-2	6/25/08	<1.1	5.6	NA	0.65	1.4	24	NA	99	340	<0.023	16	<2.3	0.86	<1.1	520
LTE-TMW-04	20-22	6/25/08	<1.2	0.8	NA	0.29	<0.31	5.8	NA	2.1	4.5	<0.025	4.2	<1.2	0.2	<1.2	8
LTE-TMW-05	5-6	6/23/08	<1.1	3	NA	0.83	0.5	16	NA	7.9	18	0.0054	8.1	1.9	<0.53	<1.1	26
LTE-TMW-05	22-24	6/23/08	<1.2	<1.2	NA	0.21	0.22	3.4	NA	1.7	2.6	<0.023	2.4	<1.2	<0.58	<1.2	5.2
LTE-TMW-08	2-4	6/23/08	<1.1	2.8	NA	0.52	0.68	13	NA	100	73	0.014	3.3	1.8	<0.55	<1.1	91
LTE-TMW-08	12-14	6/23/08	<1.1	2	NA	0.99	0.39	10	NA	4.7	7.6	0.0031	8.8	0.94	<0.57	<1.1	11
LTE-TMW-13	2-4	6/24/08	<1.2	<5.8	NA	2.7	1.6	17	NA	13	41	<0.023	4.3	6.2	<0.58	<5.8	76
LTE-TMW-13	22-24	6/24/08	<1.2	0.65	NA	0.45	0.22	5.3	NA	2.3	5.4	0.016	3.1	<1.2	<0.58	<1.2	7
TER-TMW-07 0-3 FT	0-3	7/29/08	1	NA	NA	NA	NA	NA	NA	NA	45	NA	NA	NA	NA	NA	NA
Former Asphalt Plant, Buildings 18 and 18A																	
TER-SB-11 0-3 FT	0-3	7/10/08	0.92 J	NA	NA	NA	NA	NA	NA	NA	52	NA	NA	NA	NA	NA	NA
TER-SB-11 0-3 FT (DUP)	0-3	7/10/08	1.1	NA	NA	NA	NA	NA	NA	NA	110	NA	NA	NA	NA	NA	NA
TER-SB-12 0-3 FT	0-3	7/11/08	<0.52	NA	NA	NA	NA	NA	NA	NA	20	NA	NA	NA	NA	NA	NA
TER-SB-13 0-3 FT	0-3	7/11/08	17	NA	NA	NA	NA	NA	NA	NA	730	NA	NA	NA	NA	NA	NA
TER-SB-13 3-6 FT	3-6	7/11/08	<0.52	NA	NA	NA	NA	NA	NA	NA	6.4	NA	NA	NA	NA	NA	NA
TER-SB-13-A 0-3 FT	0-3	8/14/08	20	NA	NA	NA	NA	NA	NA	NA	420	NA	NA	NA	NA	NA	NA
TER-SB-13-A 3-6 FT	3-6	8/14/08	4.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-13-B 0-3 FT	0-3	8/14/08	1	NA	NA	NA	NA	NA	NA	NA	30	NA	NA	NA	NA	NA	NA
TER-SB-13-C 0-3 FT	0-3	8/14/08	13	NA	NA	NA	NA	NA	NA	NA	300	NA	NA	NA	NA	NA	NA
TER-SB-13-D 0-3 FT	0-3	8/14/08	<0.52	NA	NA	NA	NA	NA	NA	NA	34	NA	NA	NA	NA	NA	NA
TER-SB-13-D 6-8 FT	6-8	8/14/08	0.65	NA	NA	NA	NA	NA	NA	NA	5.2	NA	NA	NA	NA	NA	NA
TER-SB-13-E 0-3 FT	0-3	8/14/08	17	NA	NA	NA	NA	NA	NA	NA	210	NA	NA	NA	NA	NA	NA
TER-SB-13-E 3-6 FT	3-6	8/14/08	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-13-F 0-3 FT	0-3	8/14/08	<0.52	NA	NA	NA	NA	NA	NA	NA	21	NA	NA	NA	NA	NA	NA
TER-SB-13-G 0-3 FT	0-3	8/14/08	<0.52	NA	NA	NA	NA	NA	NA	NA	35	NA	NA	NA	NA	NA	NA
TER-SB-13-H 0-3 FT	0-3	8/14/08	17	NA	NA	NA	NA	NA	NA	NA	600	NA	NA	NA	NA	NA	NA
TER-SB-13-H 3-6 FT	3-6	8/14/08	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-14 0-3 FT	0-3	7/11/08	<0.52	NA	NA	NA	NA	NA	NA	NA	60	NA	NA	NA	NA	NA	NA
TER-SB-14 0-3 FT (DUP)	0-3	7/11/08	16	NA	NA	NA	NA	NA	NA	NA	450	NA	NA	NA	NA	NA	NA
TER-SB-15 0-3 FT	0-3	7/29/08	<0.52	NA	NA	NA	NA	NA	NA	NA	74	NA	NA	NA	NA	NA	NA
TER-SB-16 0-3 FT	0-3	7/29/08	<0.52	NA	NA	NA	NA	NA	NA	NA	54	NA	NA	NA	NA	NA	NA
TER-SB-16 0-3 FT (DUP)	0-3	7/29/08	<0.52	NA	NA	NA	NA	NA	NA	NA	82	NA	NA	NA	NA	NA	NA
TER-SB-17 0-3 FT	0-3	7/11/08	4.1	NA	NA	NA	NA	NA	NA	NA	180	NA	NA	NA	NA	NA	NA
TER-SB-17 3-6 FT	3-6	7/11/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-22 0-3 FT	0-3	7/14/08	5.3	<1.4	NA	NA	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA
TER-SB-22 3-6 FT	3-6	7/14/08	<2.6	<1.4	NA	NA	NA	NA	NA	NA	19	NA	NA	NA	NA	NA	NA
TER-SB-22 3-6 FT (DUP)	3-6	7/14/08	<2.6 O	<1.4 O	NA	NA	NA	NA	NA	NA	25	NA	NA	NA	NA	NA	NA
TER-SB-23 0-3 FT	0-3	7/14/08	<2.6	<1.4	NA	NA	NA	NA	NA	NA	52	NA	NA	NA	NA	NA	NA
TER-SB-23 3-6 FT	3-6	7/14/08	5	<1.4	NA	NA	NA	NA	NA	NA	60	NA	NA	NA	NA	NA	NA
TER-SB-24 0-3 FT	0-3	7/14/08	<2.6	<1.4	NA	NA	NA	NA	NA	NA	66	NA	NA	NA	NA	NA	NA
TER-SB-24 3-6 FT	3-6	7/14/08	<5.2	<2.7	NA	NA	NA	NA	NA	NA	12	NA	NA	NA	NA	NA	NA
TER-SB-25 0-3FT	0-3	7/15/08	NA	2.5	NA	NA	NA	NA	NA	NA	0.19	NA	NA	NA	NA	NA	NA
TER-SB-25 3-6FT	3-6	7/15/08	NA	2.4	NA	NA	NA	NA	NA	NA	42	NA	NA	NA	NA	NA	NA
TER-SB-26 0-3FT	0-3	7/15/08	NA	2.9	NA	NA	NA	NA	NA	NA	16	NA	NA	NA	NA	NA	NA
TER-SB-26 3-6FT	3-6	7/15/08	NA	2.9	NA	NA	NA	NA	NA	NA	3.7	NA	NA	NA	NA	NA	NA
TER-SB-26 6-9FT	6-9	7/15/08	NA	1.6	NA	NA	NA	NA	NA	NA	25	NA	NA	NA	NA	NA	NA
TER-SB-27 0-3FT	0-3	7/15/08	NA	2.3	NA	NA	NA	NA	NA	NA	15	NA	NA	NA	NA	NA	NA
TER-SB-27 0-3 FT (DUP)	0-3	7/15/08	NA	2.2	NA	NA	NA	NA	NA	NA	22	NA	NA	NA	NA	NA	NA
TER-SB-27 3-6 FT	3-6	7/15/08	NA	1.9	NA	NA	NA	NA	NA	NA	11	NA	NA	NA	NA	NA	NA
TER-SB-28 0-3 FT	0-3	7/15/08	NA	2.3	NA	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA
TER-SB-28 3-6 FT	3-6	7/15/08	NA	1.8	NA	NA	NA	NA	NA	NA	21	NA	NA	NA	NA	NA	NA
TER-SB-29 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	NA	NA	NA	NA	110	NA	NA	NA	<0.16	NA	NA
TER-SB-32 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	NA	NA	NA	NA	7.8	NA	NA	NA	<1.6	NA	NA
TER-SB-32 0-3 (DUP)	0-3	7/17/08	NA	NA	NA	NA	NA	NA	NA	NA	57	NA	NA	NA	<0.16	NA	NA

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TER-SB-33 2-4 FT	2-4	7/1/08	1.1 J	0.74 J	64	0.6	1.4	15	NA	2.7	10	0.0069 J	3.9	2.5	<0.16	<0.3	14
TER-SB-34 2-4 FT	2-4	7/1/08	<0.52	<0.27	75	0.5	1.5	6.6	NA	1.5	11	0.011 J	2.9	4.1	<0.16	<0.30	8.6
TER-SB-35 2-4FT	2-4	7/1/08	<0.52	2.4	72	0.92	0.15 J	10	NA	4.7	13	0.0063 J	2.8	<0.33	<0.16	<0.3	16
TER-SB-36 2-4 FT	2-4	7/1/08	0.83 J	<0.27	88	0.61	3	15	NA	19	180	0.028	9.4	1.8	<0.16	<0.3	130
TER-TMW-13 0-3 FT	0-3	7/22/08	NA	NA	NA	NA	NA	NA	NA	NA	<0.48	NA	NA	NA	<0.81	NA	NA
TER-TMW-13 0-3FT (DUP)	0-3	7/22/08	NA	NA	NA	NA	NA	NA	NA	NA	<0.48	NA	NA	NA	<0.81	NA	NA
TER-TMW-14 0-2 FT	0-2	7/1/08	5	<1.4	110	0.36	6.4	130	NA	30	330	0.26	7.4	48	<0.81 O	<1.5	350
TER-TMW-09 0-3 FT	0-3	7/11/08	3.1	NA	NA	NA	NA	NA	NA	NA	310	NA	NA	NA	NA	NA	NA
TER-TMW-10 0-3 FT	0-3	7/29/08	<0.52	NA	NA	NA	NA	NA	NA	NA	70	NA	NA	NA	NA	NA	NA
TER-TMW-11 0-3 FT	0-3	7/15/08	<0.52	NA	NA	NA	NA	NA	NA	NA	21	NA	NA	NA	NA	NA	NA
TER-TMW-11 3-6 FT	3-6	7/15/08	<0.52	NA	NA	NA	NA	NA	NA	NA	12	NA	NA	NA	NA	NA	NA
TER-TMW-12 0-3 FT	0-3	7/14/08	4.6	<1.4	NA	NA	NA	NA	NA	NA	8.6	NA	NA	NA	NA	NA	NA
TER-TMW-12 12-15 FT	12-15	7/14/08	<0.52	<0.27	NA	NA	NA	NA	NA	NA	5.1	NA	NA	NA	NA	NA	NA
TER-TMW-12 3-6 FT	3-6	7/14/08	<0.52	<0.27	NA	NA	NA	NA	NA	NA	8.8	NA	NA	NA	NA	NA	NA
TER-TMW-12 3-6 FT (DUP)	3-6	7/14/08	4.7 JO	<1.4 O	NA	NA	NA	NA	NA	NA	35	NA	NA	NA	NA	NA	NA
TER-TMW-15 0-3 FT	0-3	7/16/08	2	1.5	900	0.35	1.8	62	NA	50	100	0.38	27	<0.33	0.5	<0.30	110
TER-TMW-16 0-3 FT	0-3	7/16/08	2.4	1.9	140	1.7	1.6	30	NA	16	19	0.0022	34	<0.33	<0.16	<0.30	52
Building 01 and Associated Areas																	
LTE-SB-45	4-6	7/10/08	<1.3	1.2	NA	1.6	2.8	18	NA	4.9	14	<0.026	8.8	<1.3	<0.64	<1.3	17
LTE-SB-47	0-0	7/1/08	2	3.8	NA	0.75	1	18	NA	8.7	11	<0.024	18	20	<0.61	1.5	32
LTE-TMW-42	2-4	7/11/08	<1.2	1.1	NA	0.62	0.18	11	NA	4	8	<0.023	10	<1.2	0.53	2.5	16
LTE-TMW-42	18-20	7/11/08	<1.4	<1.4	NA	0.41	<0.34	3.8	NA	2.3	5.2	<0.027	4	<1.4	<0.69	2.1	5.8
LTE-TMW-42 (Dup)	18-20	7/11/08	<1.2	<1.2	NA	0.23	<0.30	2.2	NA	1.1	1.7	<0.024	1.7	<1.2	<0.60	0.76	3
LTE-TMW-43	2-4	7/11/08	<1.3	0.84	NA	NA	0.28	18	NA	7.1	12	0.0052	23	<1.3	0.71	4.7	28
LTE-TMW-43	18-20	7/11/08	<1.1	<5.7	NA	0.3	<0.28	5.2	NA	2.6	3.3	<0.023	5.3	<1.1	<0.57	<1.1	9.2
LTE-TMW-44	2-4	7/11/08	<1.2	0.71	NA	1.5	0.27	18	NA	5	12	<0.024	12	<1.2	0.68	10	21
LTE-TMW-44	22-24	7/11/08	<1.2	<6.2	NA	0.43	0.2	6	NA	5.2	5.4	<0.025	10	<6.2	<0.62	<1.2	12
Building 03 and Associated Areas																	
LTE-SB-25	4-6	7/10/08	1.5	0.75	NA	1.1	2.8	20	NA	10	13	0.003	19	11	<0.68	<1.4	38
LTE-SB-25 (Dup)	4-6	7/10/08	<1.3	<1.3	NA	1.1	2.7	16	NA	4.8	12	<0.027	6.3	<1.3	<0.67	<1.3	18
LTE-SB-26	2-4	6/27/08	<1.2	<1.2	NA	0.67	0.21	16	NA	5.5	15	0.01	15	<1.2	0.52	<1.2	32
LTE-SB-49	24-26	7/11/08	<1.2	1.7	NA	0.67	0.32	14	NA	8.3	11	<0.024	26	<1.2	0.61	<1.2	27
Parking Areas South of Buildings 03 and 12																	
LTE-TMW-20	4-6	7/2/08	<1.2	<1.2	NA	0.051	<0.30	0.96	NA	0.51	1.9	<0.024	<1.2	<1.2	<0.61	<1.2	1.5
LTE-TMW-20	18-20	7/2/08	<1.2	0.98	NA	0.24	<0.29	4.2	NA	2.7	2.6	<0.023	4.2	<1.2	<0.58	<1.2	7.4
LTE-TMW-22	4-6	7/2/08	<1.2	3	NA	0.67	<0.31	11	NA	12	46	0.038	6.8	<1.2	<0.63	<1.2	60
LTE-TMW-22	12-14	7/2/08	<1.2	3	NA	0.33	<0.30	10	NA	3.2	3.8	0.0045	3.4	<1.2	<0.61	<1.2	6.7
Building 13A and 13B																	
TER-SB-01 3-6 FT	3-6	7/29/08	0.85	NA	NA	NA	NA	NA	NA	NA	7.7	NA	NA	NA	NA	NA	NA
TER-SB-02 0-3FT	0-3	7/28/08	3.4	NA	NA	NA	NA	NA	NA	NA	42	NA	NA	NA	NA	NA	NA
TER-SB-02 0-3FT (DUP)	0-3	7/28/08	4.3	NA	NA	NA	NA	NA	NA	NA	64	NA	NA	NA	NA	NA	NA
TER-SB-03 0-3FT	0-3	7/28/08	2.5	NA	NA	NA	NA	NA	NA	NA	28	NA	NA	NA	NA	NA	NA
TER-SB-04 0-3 FT	0-3	7/29/08	0.88	NA	NA	NA	NA	NA	NA	NA	35	NA	NA	NA	NA	NA	NA
TER-SB-06 0-3 FT	0-3	7/17/08	3.7	<0.27	110	0.59	1.4	220	12	26	29	0.0086	21	2.8	0.38	<3.0	110
TER-SB-07 6-9 FT	6-9	7/16/08	<0.52	1.8	220	1	0.21	19	NA	3.7	14	0.0069	10	<0.33	0.61	2.6	12
TER-SB-07 9-12 FT	9-12	7/16/08	<0.52	<0.27	68	0.47	0.11	39	NA	2.6	8.1	<0.0015	6.8	<0.33	0.5	<1.5	12
TER-SB-08 0-3 FT	0-3	7/17/08	1.3	5.0	66	<0.038	1.4	47	NA	17	130	0.018	7.1	2.4	<0.16	<1.5	130
TER-SB-09 0-3 FT	0-3	7/17/08	20	<0.27	370	0.084	4.7	1000	NA	350	120	0.024	66	4.3	3	<15	1000
TER-SB-108 0-3FT	0-3	7/22/08	42	190	320	<0.19	3.1	2200	8	140	380	0.026	180	71	38	<30	480
TER-SB-108 3-6 FT	3-6	7/22/08	<0.52	NA	NA	NA	NA	NA	NA	NA	4.8	NA	NA	NA	NA	NA	NA
TER-SB-108-A 0-3 FT	0-3	8/20/08	13	<1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-B 0-3 FT	0-3	8/20/08	33	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-B 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-C 0-3 FT	0-3	8/20/08	30	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-C 3-6 FT	3-6	8/20/08	1.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-D 0-3 FT	0-3	8/20/08	35	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-D 0-3FT (DUP)	0-3	8/20/08	36	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-D 3-6 FT	3-6	8/20/08	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-E 0-3 FT	0-3	8/20/08	35	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-E 3-6 FT	3-6	8/20/08	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-F 0-3 FT	0-3	8/20/08	32	<2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-F 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-G 0-3FT	0-3	8/20/08	34	6.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-G 3-6 FT	3-6	8/20/08	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108-H 0-3 FT	0-3	8/21/08	<0.52	0.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109 0-3 FT	0-3	7/22/08	17	<0.54	320	0.93	0.47	1700	20	83	330	0.031	100	<0.65	<0.32	<6.0	1300
TER-SB-109 3-6 FT	3-6	7/22/08	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-A 0-3FT	0-3	8/15/08	18	4.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-A 3-6 FT	3-6	8/15/08	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-B 0-3 FT	0-3	8/15/08	19	<1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-B 0-3FT (DUP)	0-3	8/15/08	47	<1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-B 3-6 FT	3-6	8/15/08	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-C 0-3 FT	0-3	8/15/08	17	8.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-C 3-6 FT	3-6	8/15/08	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-D 0-3 FT	0-3	8/15/08	19	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-D 3-6 FT	3-6	8/15/08	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-E 0-3 FT	0-3	8/15/08	10	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-F 0-3 FT	0-3	8/15/08	24	<1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-F 3-6 FT	3-6	8/15/08	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-G 0-3 FT	0-3	8/15/08	15	5.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-G 3-6 FT	3-6	8/15/08	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-H 0-3 FT	0-3	8/15/08	17	<1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109-H 3-6 FT	3-6	8/15/08	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-110 0-3 FT	0-3	7/22/08	0.66	0.85	28	0.15	0.38	56	2.7	15	90	0.015	7.9	<0.33	<0.16	<0.30	220
LTE-TMW-17	2-4	7/7/08	<1.2	1.6	NA	1.3	0.15	16	NA	4.3	13	0.023	13	<1.2	0.51	7.8	16
LTE-TMW-17	12-14	7/7/08	<5.8	<5.8	NA	0.54	<0.29	14	NA	3.8	11	0.014	9.2	<1.2	<0.58	<23	12
LTE-TMW-18	2-4	6/24/08	55	<5.4	NA	<0.54	5.6	2500	NA	38	45	0.014	140	36	8.1	<210	350
LTE-TMW-18	18-20	6/24/08	<1.2	0.65	NA	0.47	0.29	5.6	NA	3.4	7.3	0.0042	3.6	<1.2	<0.60	<1.2	9.3
TER-TMW-08 0-3 FT	0-3	7/17/08	19	<0.27	170	0.15	7.7	770	12	56	160	0.029	93	<1.6	2.3	<15	2600
TER-TMW-08 3-6 FT	3-6	7/17/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-A 0-3 FT	0-3	8/20/08	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-A 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-B 0-3 FT	0-3	8/20/08	32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-B 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-C 0-3 FT	0-3	8/20/08	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-C 0-3FT DUP	0-3	8/20/08	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-C 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-D 0-3 FT	0-3	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-F 0-3 FT	0-3	8/20/08	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TER-TMW-08-F 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-G 0-3 FT	0-3	8/20/08	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-H 0-3 FT	0-3	8/20/08	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08-H 3-6 FT	3-6	8/20/08	<0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-29 0-3 FT	0-3	7/22/08	0.86	2.6	66	0.34	0.8	100	1.8	16	98	0.0054	10	<0.33	<0.16	<0.60	460
LTE-TMW-67	2-4	7/7/08	<1.3	1.6	NA	0.6	0.2	20	NA	3.8	14	0.02	13	<1.3	0.84	12	32
LTE-TMW-67	18-20	7/7/08	<1.2	<1.2	NA	0.17	<0.29	4.8	NA	2.6	3.6	0.014	7.2	<1.2	<0.58	<1.2	12
Building 13 Slab																	
TER-SB-49 0-3 FT	0-3	7/9/08	0.83 J	<0.27	NA	0.3	0.48	23	NA	2.3	14	<0.0015	4.4	0.69 J	0.46 J	<0.30	26
TER-SB-49 3-6 FT	3-6	7/9/08	0.64 J	<0.27	NA	0.21	0.48	14	NA	1.9	13	0.0021 J	3.7	<0.33	<0.16	<0.30	26
TER-SB-50 0-3 FT	0-3	7/9/08	1.6	1.6	NA	0.26	0.91	45	NA	14	24	0.0026 J	8.7	<0.33	<0.16	<1.5 O	62
TER-SB-50 3-6 FT	3-6	7/9/08	0.83 J	1.8	NA	0.56	0.48	8.88	NA	6.1	21	0.0093 J	6.1	<0.33	<0.16	<0.30	45
TER-SB-51 0-3 FT	0-3	7/9/08	30	4.8	NA	<0.038	29	1800	NA	170	1800	0.12	220	62	4.3	<15 O	4800
TER-SB-51 3-6 FT	3-6	7/9/08	1.5	1.3	NA	0.27	2.2	88	NA	22	160	0.019 J	15	1.3	0.21	<1.5 O	400
TER-SB 51 3-6 FT (DUP)	3-6	7/9/08	10	1.1	NA	<0.038	7.4	440	NA	41	410	0.014 J	38	2.2	1	<6 O	1200
TER-SB-51-A 0-3 FT	0-3	8/15/08	10	34	130	0.49	54	720	NA	280	2200	0.092	200	<1.6	3	<3.0	7500
TER-SB-51-A 3-6 FT	3-6	8/15/08	2.5	1.0 J	78	0.64	0.71	11	NA	7	22	0.005	5.7	0.50 J	<0.16	<0.30	73
TER-SB-51-B 0-3 FT	0-3	8/15/08	24	23	240	0.76	42	1800	NA	200	1700	0.031	160	<1.6	3.2	<15	4800
TER-SB-51-B 3-6 FT	3-6	8/15/08	2.3	0.42 J	91	0.25	0.61	32	NA	6.5	30	0.017	5.5	2.7	<0.16	<0.30	78
TER-SB-51-C 0-3 FT	0-3	8/15/08	14	12	210	0.62	31	1000	NA	120	990	0.019	95	2.3	2.5	<15	3200
TER-SB-51-C 3-6 FT	3-6	8/15/08	2.5	0.37 J	68	0.35	0.53	24	NA	4.5	21	0.018 J	4.2	1.3	<0.16	<0.30	51
TER-SB-51-D 0-3FT	0-3	8/15/08	17	15	84	0.27	28	1200	NA	150	1200	0.086	640	<1.6	1.1	<15	3200
TER-SB-51-D 3-6 FT	3-6	8/15/08	2.5	0.80 J	44	0.51	0.65	23	NA	4.3	24	<0.0015	14	0.48 J	<0.16	<0.30	60
TER-SB-51-E 0-3 FT	0-3	8/15/08	2.6	4.2	78	0.58	5.2	180	NA	26	430	0.02	17	<0.33	2.5	<0.30	960
TER-SB-51-F 0-3 FT	0-3	8/15/08	17	14	160	0.29	34	1300	NA	170	1300	0.049	100	<1.6	<0.81	<3.0	3000
TER-SB-51-F 0-3FT (DUP)	0-3	8/15/08	<0.52	2.3	92	0.4	0.66	15	NA	10	36	0.078	7	<0.33	<0.16	<0.30	79
TER-SB-51-F 3-6 FT	3-6	8/15/08	2.3	0.58 J	58	0.31	0.72	21	NA	7.5	32	0.02	4.4	1.2	<0.16	<0.030	68
TER-SB-51-G 0-3 FT	0-3	8/15/08	<0.52	3.7	79	0.44	2.2	41	NA	12	110	0.022	11	<0.33	<0.16	<0.30	260
TER-SB-51-H 0-3 FT	0-3	8/15/08	6.9	3.9	140	0.35	1	460	NA	20	80	0.024	44	<0.33	0.29	<3.0	200
TER-SB-53 2-4 FT	2-4	6/24/08	<0.52	1.4	37	0.26	0.27 J	10	NA	3	7.5	0.035	1.5	1.2	<0.16	<0.3	8.6
TER-SB-54 2-4 FT	2-4	6/24/08	<0.52	1.2 J	130	0.75	0.33	14	NA	4.3	14	0.022	4.4	1.3	<0.16	<0.3	14
TER-SB-55 0-2 FT	0-2	6/24/08	<0.52	0.92 J	110	0.6	0.26 J	7.9	NA	2.1	7.1	0.0021 J	3.2	<0.33	<0.16	<0.3	8.6
TER-SB-56 2-4 FT	2-4	6/24/08	<0.52	1.3	19	0.22	0.29 J	9.2	NA	2.4	6	0.011 J	1.7	0.93 J	<0.16	<0.3	10
TER-TMW-19 0-3FT	0-3	7/9/08	0.82 J	0.94 J	NA	0.49	0.4	37	NA	6	11	0.0042 J	9.5	0.53 J	<0.16	<0.30	16
TER-TMW-19 3-6FT	3-6	7/9/08	<0.52	1.3	NA	0.75	0.43	12	NA	5	11	<0.0015	12	<0.33	<0.16	<0.30	17
TER-TMW-20 0-3 FT	0-3	7/10/08	1.5	5.2	41	0.15	10	55	NA	32	360	0.011 J	12	4.6	0.36 J	<0.3	2100
TER-MW-2 4-5FT	4-5	7/25/08	13	8.4	120	0.23	38	860	NA	200	2000	0.025	160	28	1.8	<1.5	5000
TER-MW-2 4-5FT (DUP)	4-5	7/25/08	17	5.4	160	0.37	35	1100	NA	270	1700	0.027	180	34	1.5	<1.5	4400
TER-MW-2 15 FT	15	7/25/08	<0.52	6.2	65	0.26	14	51	NA	31	490	0.034	10	3.4	0.74	<0.30	980
TER- MW-2-A 3-6 FT	3-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	44	NA	NA	NA	NA	NA	NA
TER-MW-2-B 3-6 FT	3-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	57	NA	NA	NA	NA	NA	NA
TER-MW-2-C 3-6 FT	3-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	27	NA	NA	NA	NA	NA	NA
TER-MW-2-E 3-6 FT	3-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	19	NA	NA	NA	NA	NA	NA
TER-MW-2-F 5-6 FT	5-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	6.8	NA	NA	NA	NA	NA	NA
TER-MW- 2-H 3-6 FT	3-6	8/21/08	NA	NA	NA	NA	NA	NA	NA	NA	29	NA	NA	NA	NA	NA	NA
TER-MW-5 0-3 FT	0-3	8/18/08	0.59 J	2.2	84	0.46	0.42	29	NA	5.7	30	0.026	6	0.37 J	<0.16	<0.30	65
TER-MW-5 3-6 FT	3-6	8/18/08	<0.52	1.4	83	0.58	<0.037	7.3	NA	2.4	8	0.0089	3.7	<0.33	<0.16	<0.30	10
TER-MW-5 6-9 FT	6-9	8/18/08	0.61 J	2.5	230	0.54	1.3	24	NA	8.1	41	0.0092 J	6.9	<0.33	<0.16	<0.30	110
Building 12 and Associated Areas																	
LTE-SB-28	2-4	6/27/08	<1.2	3.7	NA	0.72	0.15	13	NA	3.6	11	0.0028	14	<5.8	<0.58	<1.2	20
LTE-SB-29	4-6	7/12/08	0.76	<6.6	NA	1.4	0.93	34	NA	18	12	<0.026	22	6	<0.66	<1.3	49
LTE-SB-30	2-4	6/25/08	<1.2	6.0	NA	1.2	<0.30	12	NA	4.7	16	0.0097	11	<1.2	<0.59	<1.2	18
LTE-SB-31	2-4	8/14/08	2	4.5	NA	0.84	1.5	14	NA	5.6	20	0.015	9.2	2.5	<0.63	<1.3	16
LTE-SB-31	10-12	8/14/08	3.4	5.7	NA	1.6	1.8	11	NA	4.8	7.2	0.0059	14	<5.7	<0.57	1.5	9.6
LTE-SB-31 (Dup)	10-12	8/14/08	1.7	15	NA	3	2.3	14	NA	18	44	0.0061	36	2.8	<2.9	14	16
LTE-SB-50	2-4	6/30/08	0.88	1.6	NA	0.96	0.5	13	NA	8.3	8.4	0.01	14	<1.2	<0.59	<1.2	16
LTE-SB-69	4-6	7/12/08	<1.1	<1.1	NA	0.45	0.36	8.8	NA	4	55	0.0071	3.3	1.1	<0.57	<1.1	18
LTE-SB-69	22-24	7/12/08	<1.2	8.3	NA	0.57	0.47	13	NA	6	19	0.0026	6.5	3.4	<0.60	<1.2	22
LTE-TMW-27	0-2	6/27/08	<1.2	1.9	NA	0.64	0.26	12	NA	5.3	14	0.0019	10	<1.2	0.75	1.2	29
LTE-TMW-27	26-28	6/27/08	<1.2	9.0	NA	0.56	0.1	6.4	NA	1.7	9	<0.024	11	<1.2	0.44	1.7	5.2
LTE-TMW-48	2-4	7/1/08	<1.2	1.2	NA	1	0.64	16	NA	9.8	58	0.011	10	<1.2	0.38	<1.2	36
LTE-TMW-48	24-26	7/1/08	<1.2	0.5	NA	0.23	0.26	4	NA	2.4	3.1	<0.024	5.8	<1.2	0.37	<1.2	7.6
LTE-TMW-68	2-4	7/12/08	0.86	2	NA	1.5	0.83	34	NA	15	12	<0.025	25	<2.5	<0.63	<1.2	54
LTE-TMW-68	20-22	7/12/08	<1.2	<5.8	NA	0.43	0.37	6.6	NA	5	4.5	<0.023	7.3	12	<0.58	<1.2	15
LTE-TMW-70	2-4	7/12/08	<1.2	<1.2	NA	0.51	0.34	10	NA	3.9	25	0.0068	3.8	1.2	<0.58	<1.2	17
LTE-TMW-70	22-24	7/12/08	<1.2	<1.2	NA	0.29	0.31	6.7	NA	2.4	7.2	0.0032	5	2.8	<0.60	<1.2	11
LTE-TMW-71	2-4	7/12/08	<1.2	0.88	NA	0.074	0.17	5.6	NA	9.2	39	0.032	2.9	<1.2	<0.61	<1.2	140
LTE-TMW-71	22-24	7/12/08	<1.2	1.7	NA	0.19	<0.30	5.7	NA	4.4	7.8	0.0065	5.5	<1.2	<0.60	<1.2	19
LTE-TMW-71	22-24	7/12/08	<1.2	3.9	NA	0.6	0.08	11	NA	8.2	9.4	0.005	12	<1.2	<0.61	<1.2	21
LTE-TMW-73	5-6	7/12/08	<1.2	2.5	NA	0.48	0.2	9.9	NA	9	33	0.012	8.6	<1.2	<0.62	<1.2	67
LTE-TMW-73	8-10	7/12/08	<1.1	0.44	NA	0.5	0.39	11	NA	4.7	6.5	<0.023	5.7	<1.1	<0.57	<1.1	16
Building 02 and Associated Areas																	
LTE-SB-37	2-4	6/30/08	<1.2	3.1	NA	1.1	3.2	17	NA	6.8	12	0.002	20	15	<0.62	<6.2	33
LTE-TMW-35	2-4	6/30/08	1.4	6.0	NA	1	2.8	16	NA	9.4	10	<0.024	17	13	<0.60	7.4	47
LTE-TMW-35	22-24	6/30/08	0.99	2.7	NA	0.11	0.41	2.6	NA	1.1	1	0.0018	1.4	16	<0.59	1.3	7.9
LTE-TMW-38	2-4	6/30/08	<1.2	1.7	NA	0.73	2	12	NA	4	18	0.0076	5.4	5.7	<0.61	<1.2	18
LTE-TMW-38	18-20	6/30/08	<1.3	5.3	NA	0.64	1.8	12	NA	24	130	0.066	7.2	19	<0.63	1.5	160
LTE-TMW-39	0-2	6/30/08	1	1.2	NA	0.9	2.3	14	NA	3.6	11	0.0084	4.4	4.6	<0.60	<1.2	13
LTE-TMW-39	18-20	6/30/08	<1.2	4.5	NA	0.39	0.7	4.8	NA	1.6	1.8	<0.024	5.5	18	<0.59	1.4	14
LTE-TMW-40	2-4	7/11/08	<1.3	1.2	NA	0.78	0.34	12	NA	11	43	0.025	13	<1.3	0.44	<1.3	51
LTE-TMW-40	28-30	7/11/08	<1.3	0.6	NA	0.8	0.16	12	NA	3.5	37	0.02	8.6	<1.3	0.24	2.2	39
LTE-TMW-41	2-4	7/11/08	0.71	2.7	NA	1.2	0.47	20	NA	11	30	0.033	16	<1.3	0.74	9	58
LTE-TMW-41	38-40	7/11/08	<1.3	<1.3	NA	0.87	0.29	18	NA	9.1	26	0.012	14	<1.3	0.39	3.1	35
Building 05 and Associated Areas																	
LTE-SB-33	2-4	7/1/08	2.2	2	NA	0.64	1.5	15	NA	6	16	0.008	16	<6.1	0.48	<61	20
LTE-TMW-32	4-6	6/30/08	<1.2	<1.2	NA	1.2	2.3	13	NA	3.2	13	0.0021	5.7	0.9	<0.58	<1.2	8.7
LTE-TMW-32	18-20	6/30/08	<1.2	2.4	NA	0.33	0.8	7.8	NA	4.4	13	0.0032	2.7	5.2	<0.59	0.57	12
LTE-TMW-34	2-4	7/10/08	<1.2	0.98	NA	1.2	3.7	21	NA	6.4	16	0.007	12	0.59	<0.62	<1.2	17
LTE-TMW-34	20-22	7/10/08	<1.3	1.3	NA	0.15	1.2	6.8	NA	5	5.6	<0.026	7.4	<6.4	<0.64	<1.3	9.8
Building 19 and Associated Areas																	
TER-SB-90 2-4 FT	2-4	6/27/08	<0.52	2.7	38	0.35	0.7	4.1	NA	1.5	11	0.0088 J	3.6	6.7	<0.16	<0.44	11
TER-SB-92 2-4 FT	2-4	6/27/08	1.2	7.8	210	0.49	3.7	16	NA	200	240	0.4	10	18	<0.16	<1.5 O	420
TER-MW-1 0-3FT	0-3	7/25/08	<0.52	2.2	59	0.81	0.24	19	NA	6.8	12	0.013	5	7.1	<0.16	<0.30	20
TER-MW-1 0-3FT (DUP)	0-3	7/25/08	5.9	2.6	110	0.74	0.26	16	NA	6	9.9	0.0057	4.3	6.8	<0.16	<0.30	20
Building 22 and Ingram's Gully																	
TER-SB-10 0-3 FT	0-3	7/17/08	0.7	1	160	0.25	1	28	NA	11	45	0.029	7.5	<0.33	<0.16	<0.30	71
TER-SB-10 0-3 FT (DUP)	0-3	7/17/08	1.8	3.2	150	<0.038	2	58	NA	32	170	0.036	10	2.1	<0.16	<1.5	240
TER-SB-58 0-2 FT	0-2	6/30/08	<0.52	2.8	120	0.44	1.4	18	NA	15	62	0.057	7.7	15	<0.16	0.87 J	91
TER-SB-60 0-2 FT	0-2	6/30/08	<0.52	3.2	130	0.47	1.7	23	NA	20	74	0.059	9.7	13	<0.16	0.65	120

TABLE 1A
SOIL DATA SUMMARY
METALS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Metals[1]														
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Chromium (Hexavalent)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TER-SB-61 0-3 FT	0-3	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	8.2	NA	NA	NA	NA	NA	NA
TER-SB-62 0-3 FT	0-3	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	**16**	NA	NA	NA	NA	NA	NA
TER-SB-63 0-3 FT	0-3	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	11	NA	NA	NA	NA	NA	NA
TER-SB-64 0-3 FT	0-3	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	**17**	NA	NA	NA	NA	NA	NA
TER-SB-65 2-4 FT	2-4	6/25/08	<0.52	4	190	**1.6**	<0.34	19	NA	8.2	**27**	0.015 J	9.3	<0.33	<0.16	<0.3	45
TER-SB-66 4-6 FT	4-6	6/25/08	<0.52	3.1	160	**1.6**	<0.037	19	NA	8.3	**16**	0.0088 J	8.8	<0.33	<0.16	<0.3	29
TER-SB-67 2-4 FT	2-4	6/27/08	<0.52	NA	NA	NA	NA	NA	NA	NA	**30**	NA	NA	**14**	NA	NA	NA
TER-SB-68 0-2 FT	0-2	6/25/08	<0.52	3.1	140	1.1	<0.037	13	NA	7.5	**19**	0.011 J	7.7	<0.33	<0.16	<0.3	26
TER-SB-68 14-16 FT	14-16	6/25/08	<0.52	2.2	120	0.78	<0.037	12	NA	17	**44**	**0.12**	4.2	<0.33	<0.16	<0.3	54
TER-SB-69 12-14 FT	12-14	7/3/08	<0.52	0.66 J	120	0.36	0.5	19	NA	69	**69**	**0.083**	11	<0.33	**2.7**	<0.3	140
TER-SB-69 26-28 FT	26-28	7/3/08	<0.52	5.0	150	0.47	**1.4**	14	NA	11	**21**	0.015 J	16	**<1.6 O**	<0.16	**<1.5 O**	32
TER-SB-70 9-12 FT	9-12	7/3/08	2.3	3.1	180	0.32	**3**	22	NA	110	**210**	**0.11**	29	<0.33	**4.6**	**<1.5 O**	480
TER-SB-72 9-12 FT	9-12	7/3/08	0.64 J	1.3	140	0.63	**0.93**	35	NA	99	**79**	**0.06**	26	<0.33	<0.16	<0.6 O	80
TER-SB-73 9-12 FT	9-12	7/3/08	0.73 J	3.2	65	<0.038	0.65	7.1	NA	6.9	**26**	0.016 J	4.1	**<1.6 O**	<0.16	<0.3	40
TER SB 77 2-4 FT	2-4	6/23/08	<0.52	0.38 J	94	0.48	0.048 J	7.5	NA	1.4	6.2	<0.0015	6.1	<0.33	0.21 J	**1.5**	7.3
TER-SB-78 2-4 FT	2-4	6/23/08	<0.52	<0.27	100	0.42	0.46	75	NA	7.1	**35**	<0.0015	16	<0.33	**0.78**	**<6.0 O**	63
TER-SB-79 4-6 FT	4-6	6/23/08	<0.52	<0.27	89	0.37	0.062 J	11	NA	3.3	9.6	0.0046 J	7.2	0.71 J	0.19 J	0.54 J	15
TER-SB-80 2-4 FT	2-4	6/23/08	<0.52	2.3	130	0.64	0.16 J	9.5	NA	2.9	12	<0.0015	9	<0.33	**0.25 J**	**2.8**	8.9
TER-SB-81 2-4 FT	2-4	6/23/08	<0.52	<2.7 O	38	<0.038	0.32	17	NA	5.9	**36**	0.02 J	3.3	<0.33	**0.29 J**	**<6.0 O**	190
TER-SB-82 2-4 FT	2-4	6/27/08	<0.52	**6**	34	0.12	**0.9**	5.8	NA	4.5	13	0.021 J	<2.5	**16**	<0.16	**7.8**	33
TER-SB-83 2-4 FT	2-4	6/23/08	<0.52	<2.7 O	120 O	0.55	0.3	13	NA	10	**32**	0.02 J	9.2	<0.33	**0.69**	**<3.0 O**	42
TER-SB-84 2-4 FT	2-4	6/24/08	<0.52	2.4	110	0.88	0.46	17	NA	5.5	12	0.01 J	6	**2**	<0.16	<0.3	16
TER-SB-85 2-4 FT	2-4	6/24/08	1.7	**20**	73	0.14	0.38	4.9	NA	56	**66**	0.038	3.7	**1.9**	<0.16	<0.3	43
TER-SB-86 2-4 FT	2-4	6/24/08	<0.52	2	26	0.21	0.27 J	8.5	NA	2.2	5.4	0.0024	1.6	**1.5**	<0.16	<0.3	7.6
TER-SB-87 4-6 FT	4-6	6/24/08	<0.52	<0.27	32	0.52	0.24 J	14	NA	2.4	6.4	<0.0015	3	**1.1 J**	<0.16	<0.3	8.8
TER-SB-88 4-6 FT	4-6	6/24/08	<0.52	0.44 J	15	0.17	0.2 J	4.9	NA	1.4	4.4	<0.0015	1.3	0.43 J	<0.16	<0.3	5.1
TER-SB-89 4-6 FT	4-6	6/24/08	<0.52	0.42 J	17	0.16 J	0.15 J	3 J	NA	0.96 J	3.1	0.0035 J	0.78 J	<0.33	<0.16	<0.3	3.6
TER-TMW-22 0-3 FT	0-3	7/2/08	NA	NA	NA	NA	NA	NA	NA	NA	**43**	NA	NA	NA	NA	NA	NA
TER-TMW-23 2-4 FT	2-4	6/25/08	<0.52	2.2	170	1	<0.037	14	NA	5.7	**22**	0.027	7.1	<0.33	<0.16	<0.3	31
Former Substation																	
TER-SB-41 6-9 FT	6-9	7/8/08	NA	NA	NA	NA	0.27	NA	NA	NA	4.3	NA	NA	<0.33	NA	NA	NA
TER-SB-41 6-8 FT (DUP)	6-8	7/8/08	NA	NA	NA	NA	0.31	NA	NA	NA	9.5	NA	NA	0.4 J	NA	NA	NA
TER-SB-42 6-9 FT	6-9	7/8/08	NA	NA	NA	NA	0.32	NA	NA	NA	5.9	NA	NA	<0.33	NA	NA	NA
TER-SB-42 6-9 (DUP)	6-9	7/8/08	NA	NA	NA	NA	0.4	NA	NA	NA	14	NA	NA	<0.33	NA	NA	NA
TER-SB-44 6-9FT	6-9	7/8/08	NA	NA	NA	NA	<0.037	NA	NA	NA	2.4	NA	NA	<0.33	NA	NA	NA
TER-SB-44 6-9 FT (DUP)	6-9	7/8/08	NA	NA	NA	NA	0.27 J	NA	NA	NA	2.4	NA	NA	<0.33	NA	NA	NA
TER-SB-45 0-3 FT	0-3	7/8/08	<0.52	<0.27	120	0.33	0.71	22	NA	19	**78**	**0.067**	14	<0.33	**1.3**	<0.30	130
TER-SB-45 0-3 FT (DUP)	0-3	7/8/08	0.69 J	0.91 J	130	0.98	0.65	21	NA	6.4	**27**	**0.04**	7.5	0.83 J	<0.16	<0.3	50
TER-SB-46 0-3 FT	0-3	7/8/08	<0.52	0.62 J	130	0.34	**0.78**	20	NA	25	**74**	**0.073**	13	<0.33	**1.2**	**<6 O**	130
TER-SB-46 12-15 FT (DUP)	12-15	7/8/08	<0.52	<0.27	120	0.3	0.64	20	NA	24	**74**	**0.078**	11	<0.33	**1.1**	**<3 O**	120
TER-SB-47 0-3 FT	0-3	7/8/08	<0.52	1.1 J	46	0.52	0.16 J	27	NA	7	11	0.016 J	13	**3.1**	**0.82**	**13**	29
TER-SB-47 3-6 FT	3-6	7/8/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47 3-6 DUP	3-6	7/8/08	<0.52	<0.27	17	0.32	<0.037	10	NA	2.4	4.9	<0.0015	6.2	0.45 J	0.23 J	**4.2**	16
TER-SB-47-A 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-B 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-C 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**<15**	NA
TER-SB-47-D 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-E 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-F 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**<30**	NA
TER-SB-47-F 0-3 FT (DUP)	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**<15**	NA
TER-SB-47-G 0-3 FT	0-3	8/15/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-H 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-47-H 0-3FT (DUP)	0-3	8/14/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	NA
TER-SB-48 0-3 FT	0-3	7/8/08	<0.52	<0.27	54	0.82	0.083 J	18	NA	2.6	7.8	0.0021 J	10	<0.33	**0.48 J**	**6.2**	20
TER-SB-48 0-3 FT (DUP)	0-3	7/8/08	<0.52	0.32 J	49	0.9	0.14 J	15	NA	1.7	6.6	<0.0015	11	<0.33	**0.53 J**	**7.8**	22
TER-SB-59 0-2 FT	0-2	6/30/08	<0.52	4	100	0.49	**1.7**	16	NA	19	**74**	**0.075**	7.9	**14**	**0.26 J**	0.8 J	100
TER-TMW-17 6-9 FT	6-9	7/10/08	NA	NA	NA	NA	0.61	NA	NA	NA	5.9	NA	NA	2.2	NA	NA	NA
TER-TMW-18 0-3 FT	0-3	7/10/08	1.7	**5.9**	66	0.16	**2.2**	28	NA	85	**35**	0.0055 J	37	**12**	<0.16	**2.1**	51
TER-TMW-21 0-3 FT	0-3	7/10/08	1.6	2	90	0.32	**1.8**	63	NA	6.5	**49**	0.014 J	8.3	**11**	<0.16	**1.2**	89
TER-MW-3 5-6FT	5-6	7/25/08	<0.52	0.86	76	0.32	0.2	7	NA	5.8	9.6	0.0084	3.8	**4.3**	<0.16	<0.30	30
Ingestion PCL[2]			**2.7**	**5.9**	**300**	**1.50**	**0.75**	**1,200**	**14**	**520**	**15**	**0.04**	**160**	**1.1**	**0.24**	**0.9**	**1,200**
Non-Ingestion PCL[3]			**15**	**24**	**7,800**	**38**	**52**	**23,000**	**120**	**550**	**500**	**2.10**	**830**	**310**	**95**	**6.3**	**9,900**

Notes:
(Dup) = Duplicate sample
All units in mg/kg = milligrams per kilogram
NA = Not analyzed
Bold indicates concentrations above the Ingestion PCL.
indicates concentrations above the Non-Ingestion PCL.

[1]Metals analyzed by EPA Method 6010.
[2]TCEQ TRRP Tier 1 Residential $^{GW}SOIL_{Ing}$ PCL for 30-acre source area (or Texas Specific Background, whichever is higher).
[3]TCEQ TRRP Tier 1 Residential $^{Tot}SOIL_{Comb}$ PCL for a 30-acre source area.

TABLE 1B
SOIL DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	PAHs[1]	Other SVOCs[2]					
			Benzo(a)pyrene	Benzidine	Bis(2-chloroethoxy)methane	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4-Dinitrophenol	Pentachlorophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Buildings 32D, 32E, and 32F									
ESE-TMW-04	30-31	6/17/2008	<0.041	NA	NA	NA	NA	NA	NA
Building 6B and 6E									
ESE-SB-50	7-8	7/2/2008	0.53	NA	NA	NA	NA	NA	NA
Buildings 06, 06A, 06C, and 06D									
ESE-SB-56	10-12	7/7/08	0.12J	**0.054J,J3**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
ESE-SB-75	3-5	7/10/08	0.45J	**<4.0**	**<4.0**	**<4.0**	**<4.0**	**<4.0**	**<4.0**
Building 04 and Associated Areas									
LTE-SB-51	2-4	7/10/08	0.065	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-SB-52	2-4	6/26/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-53	2-4	7/11/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-TMW-53	22-24	7/11/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-54	2-4	6/30/08	<0.37	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**
LTE-TMW-54	24-26	6/30/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-55	4-6	6/25/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-TMW-55	20-22	6/25/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
Building 04A and 10B									
LTE-TMW-02	2-4	6/27/08	0.075	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**
LTE-TMW-02	12-14	6/27/08	0.1	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**
LTE-TMW-02 (Dup)	2-4	6/27/08	<0.34	**<0.34**	**<0.34**	**<0.34**	**<0.34**	**<0.34**	**0.072**
LTE-TMW-03	2-4	6/24/08	<1.7	**<1.7**	**<1.7**	**<1.7**	**<1.7**	**<1.7**	**<1.7**
LTE-TMW-03	22-24	6/24/08	0.14	**<0.47**	**<0.47**	**<0.47**	**<0.47**	**<0.47**	**<0.47**
LTE-TMW-03	22-24	6/24/08	0.066	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-04	0-2	6/25/08	**<38**	**<38**	**<38**	**<38**	**<38**	**<38**	**<38**
LTE-TMW-04	20-22	6/25/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**0.11**	**<0.41**
LTE-TMW-56	4-6	6/25/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**0.11**	**<0.41**
LTE-TMW-56	16-18	6/25/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-58	4-6	6/25/08	**<7.7**	**<7.7**	**<7.7**	**<7.7**	**<7.7**	**<7.7**	**<7.7**
LTE-TMW-58	8-10	6/25/08	**<7.8**	**<7.8**	**<7.8**	**<7.8**	**<7.8**	**<7.8**	**<7.8**
LTE-MW-91	2-4	8/13/08	<0.040	NA	NA	NA	NA	NA	NA
LTE-MW-91	8-10	8/13/08	<0.038	NA	NA	NA	NA	NA	NA
Building 10 and 10A									
LTE-SB-59	0-2	6/26/08	0.094	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**	**<0.37**
LTE-SB-61	2-4	6/24/08	0.052	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-TMW-57	2-4	7/10/08	<0.42	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-TMW-57	18-20	7/10/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-60	2-4	6/26/08	0.16	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-60	14-16	6/26/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**

TABLE 1B
SOIL DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	PAHs[1]	Other SVOCs[2]					
			Benzo(a)pyrene	Benzidine	Bis(2-chloroethoxy)methane	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4-Dinitrophenol	Pentachlorophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 8, 14, 14A, 14B									
LTE-SB-12	2-4	6/24/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-SB-14	2-4	6/23/08	0.66	**<7.6**	**<7.6**	**<7.6**	**<7.6**	**<7.6**	**<7.6**
LTE-SB-14	22-24	6/23/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-SB-14 (Dup)	22-24	6/23/08	<0.42	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-SB-15	4-6	6/24/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-SB-16	2-4	6/24/08	<0.36	**<0.36**	**<0.36**	**<0.36**	**<0.36**	**<0.36**	**<0.36**
LTE-SB-66	2-4	7/8/08	0.05	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**0.12**
LTE-SB-75	2-4	8/12/08	0.12	NA	NA	NA	NA	NA	NA
LTE-SB-75	8-10	8/12/08	<0.40	NA	NA	NA	NA	NA	NA
LTE-SB-76	2-4	8/12/08	<0.40	NA	NA	NA	NA	NA	NA
LTE-SB-76	8-10	8/12/08	<0.38	NA	NA	NA	NA	NA	NA
LTE-SB-77	2-4	8/12/08	1.6	NA	NA	NA	NA	NA	NA
LTE-SB-77	8-10	8/12/08	<0.39	NA	NA	NA	NA	NA	NA
LTE-SB-78	2-4	8/12/08	<0.40	NA	NA	NA	NA	NA	NA
LTE-SB-78	8-10	8/12/08	<0.38	NA	NA	NA	NA	NA	NA
LTE-SB-81	2-4	8/12/08	<1.9	NA	NA	NA	NA	NA	NA
LTE-TMW-01	2-4	6/24/08	0.65	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-TMW-01	22-24	6/24/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-05	5-6	6/23/08	<7.0	**<7.0**	**<7.0**	**<7.0**	**<7.0**	**1.9**	**<7.0**
LTE-TMW-05	22-24	6/23/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-07	0-2	6/23/08	**<7.8**	**<7.8**	**<7.8**	**<7.8**	**<7.8**	**2.1**	**<7.8**
LTE-TMW-08	2-4	6/23/08	0.088	**<0.36**	**0.04**	**<0.36**	**<0.36**	**0.099**	**<0.36**
LTE-TMW-08	12-14	6/23/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-13	2-4	6/23/08	0.48	**<1.9**	**<1.9**	**<1.9**	**<1.9**	**<1.9**	**<1.9**
LTE-TMW-13	22-24	6/23/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
Building 18 and 18A									
TER-TMW-14 0-2 FT	0-2	7/1/08	<0.27	**<0.42**	**<0.32**	**<0.25**	**<0.23**	**<0.41**	**<0.31**

TABLE 1B
SOIL DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	PAHs[1]	Other SVOCs[2]					
			Benzo(a)pyrene	Benzidine	Bis(2-chloroethoxy)methane	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4-Dinitrophenol	Pentachlorophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Former Asphalt Plant									
TER-SB-03 0-3 FT	0-3	7/28/08	<0.0092	NA	NA	NA	NA	NA	NA
TER-SB-04 0-3 FT	0-3	7/29/08	0.11	NA	NA	NA	NA	NA	NA
TER-SB-11 0-3 FT	0-3	7/10/08	0.23	NA	NA	NA	NA	NA	NA
TER-SB-11 0-3 FT (DUP)	0-3	7/10/08	0.38	NA	NA	NA	NA	NA	NA
TER-SB-12 6-9 FT	6-9	7/11/08	1.4	NA	NA	NA	NA	NA	NA
TER-SB-12 6-9 FT (DUP)	6-9	7/11/08	0.38	NA	NA	NA	NA	NA	NA
TER-SB-13 0-3 FT	0-3	7/11/08	0.26	NA	NA	NA	NA	NA	NA
TER-SB-14 0-3 FT	0-3	7/11/08	0.14	NA	NA	NA	NA	NA	NA
TER-SB-14 0-3 FT (DUP)	0-3	7/11/08	<0.092	NA	NA	NA	NA	NA	NA
TER-SB-15 0-3 FT	0-3	7/29/08	0.28	NA	NA	NA	NA	NA	NA
TER-SB-16 0-3 FT	0-3	7/29/08	0.21	NA	NA	NA	NA	NA	NA
TER-SB-16 0-3 FT (DUP)	0-3	7/29/08	0.74	NA	NA	NA	NA	NA	NA
TER-SB-17 0-3 FT	0-3	7/11/08	<0.18	NA	NA	NA	NA	NA	NA
TER-SB-19 0-3 FT	0-3	7/11/08	0.7	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-22 0-3 FT	0-3	7/14/08	<0.13	**<0.21**	**<0.16**	**<0.12**	**<0.11**	**<0.20**	**<0.16**
TER-SB-22 3-6 FT	3-6	7/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-22 3-6 FT (DUP)	3-6	7/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-23 0-3 FT	0-3	7/14/08	<0.13	**<0.21**	**<0.16**	**<0.12**	**<0.11**	**<0.20**	**<0.16**
TER-SB-23 30-32 FT	30-32	7/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-23 3-6 FT	3-6	7/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-24 0-3 FT	0-3	7/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-24 3-6 FT	3-6	7/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<3.1**
TER-SB-24 3-6 FT (DUP)	3-6	7/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26 6-9FT	6-9	7/15/08	<1.3	**<2.1**	**<1.6**	**<1.2**	**<1.1**	**<2.0**	**<1.6**
TER-SB-26-A 0-3 FT	0-3	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-A 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-A 6-9 FT	6-9	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-B 0-3 FT	0-3	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-B 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-B 6-9 FT	6-9	8/14/08	<0.13	**0.24**	**<0.16**	**<0.12**	**0.17**	**0.56**	**<0.16**
TER-SB-26-C 0-3 FT	0-3	8/14/08	0.03	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-C 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**2.6**	**<0.62**
TER-SB-26-C 6-9 FT	6-9	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-D 0-3 FT	0-3	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-D 3-6 FT	3-6	8/14/08	0.24	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-D 6-9 FT	6-9	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-E 0-3 FT	0-3	8/14/08	<0.13	**<0.21**	**<0.16**	**<0.12**	**<0.11**	**<0.20**	**<0.16**
TER-SB-26-E 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-E 6-9 FT	6-9	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-F 0-3 FT	0-3	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**0.64**	**<0.82**	**<0.62**
TER-SB-26-F 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-F 6-9 FT	6-9	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-G 0-3 (DUP)	0-3	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-G 0-3FT	0-3	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**0.16**
TER-SB-26-G 3-6 FT	3-6	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-26-G 6-9 FT	6-9	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-H 0-3 FT	0-3	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-H 3-6 FT	3-6	8/14/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-26-H 6-9 FT	6-9	8/14/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-98 0-3FT	0-3	7/15/08	<0.46	NA	NA	NA	NA	NA	NA
TER-SB-100 9-12FT	9-12	7/15/08	<0.46	NA	NA	NA	NA	NA	NA
TER-TMW-01 9-12 FT	9-12	7/28/08	<0.0092	NA	NA	NA	NA	NA	NA
TER-TMW-02 0-3 FT	0-3	7/28/08	1.4	NA	NA	NA	NA	NA	NA
TER-TMW-02 9-12 FT	9-12	7/28/08	0.029	NA	NA	NA	NA	NA	NA
TER-TMW-07 0-3 FT	0-3	7/29/08	0.14	NA	NA	NA	NA	NA	NA
TER-TMW-07 12-15 FT	12-15	7/29/08	<0.46	NA	NA	NA	NA	NA	NA
TER-TMW-07 12-15 FT (DUP)	12-15	7/29/08	<0.46	NA	NA	NA	NA	NA	NA
TER-TMW-09 0-3 FT	03-	7/11/08	0.52	NA	NA	NA	NA	NA	NA
TER-TMW-10 0-3 FT	0-3	7/29/08	0.22	NA	NA	NA	NA	NA	NA
TER-TMW-11 0-3FT	0-3	7/15/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-TMW-11 3-6FT	3-6	7/15/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-MW-4 0-3 FT	0-3	8/18/08	<0.13	**<0.21**	**<0.16**	**0.14**	**<0.11**	**<0.20**	**<0.16**
TER-MW-4 3-6 FT	3-6	8/18/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-MW-4 3-6 FT (DUP)	3-6	8/18/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**

TABLE 1B
SOIL DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	PAHs[1]	Other SVOCs[2]					
			Benzo(a)pyrene	Benzidine	Bis(2-chloroethoxy)methane	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4-Dinitrophenol	Pentachlorophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 01 and Associated Areas									
LTE-SB-45	4-6	7/10/08	<0.43	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**
LTE-SB-47	UNK	7/1/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-42	2-4	7/11/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-42	18-20	7/11/08	<0.45	**<0.45**	**<0.45**	**<0.45**	**<0.45**	**<0.45**	**<0.45**
LTE-TMW-42 (Dup)	18-20	7/11/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-43	2-4	7/11/08	<0.42	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-TMW-43	18-20	7/11/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-44	2-4	7/11/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-44	22-24	7/11/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
Building 03and Associated Areas									
LTE-SB-24E	6-8	7/7/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-SB-24W	2-4	7/7/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-SB-24W (Dup)	2-4	7/7/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-SB-25	4-6	7/10/08	<0.45	**<0.45**	**<0.45**	**<0.45**	**<0.45**	**<0.45**	**<0.45**
LTE-SB-25 (Dup)	4-6	7/10/08	<0.44	**<0.44**	**<0.44**	**<0.44**	**<0.44**	**<0.44**	**<0.44**
LTE-SB-26	2-4	6/27/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-SB-49	4-6	7/11/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
Building 13A and 13B									
LTE-SB-65	4-6	7/14/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-SB-65	18-20	7/14/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-17	2-4	7/7/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-17	12-14	7/7/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-18	2-4	6/24/08	<1.8	**<1.8**	**<1.8**	**<1.8**	**<1.8**	**<1.8**	**<1.8**
LTE-TMW-18	18-20	6/24/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-67	2-4	7/7/08	<0.42	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-TMW-67	18-20	7/7/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
Building 13 Slab									
TER-SB-55 0-2 FT	0-2	6/24/08	<0.54	**<0.83**	**<0.032**	**<0.025**	**<0.023**	**<0.041**	**<0.62**
TER-SB-55 8-9 FT	8-9	6/24/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	**<0.041**	**<0.031**
Building 12 and Associated Areas									
LTE-SB-28	2-4	6/27/08	0.11	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-SB-30	2-4	6/25/08	0.07	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**0.11**	**<0.39**
LTE-SB-31	2-4	8/14/08	0.05	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-SB-31	10-12	8/14/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-SB-31 (Dup)	10-12	8/14/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-SB-50	2-4	6/30/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-27	0-2	6/27/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-27	26-28	6/27/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-48	2-4	7/1/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-48	24-26	7/1/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-71	2-4	7/12/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-71	22-24	7/12/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-71 (Dup)	22-24	7/12/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-73	5-6	7/12/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-MW-92	19-20	8/13/08	<0.042	**NA**	NA	NA	NA	NA	NA

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4100 CLINTON DRIVE
HOUSTON, TEXAS

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			Benzo(a)pyrene	Benzidine	Bis(2-chloroethoxy)methane	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4-Dinitrophenol	Pentachlorophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 02 and Associated Areas									
LTE-SB-37	2-4	6/30/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-35	2-4	6/30/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-35	22-24	6/30/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-38	2-4	6/30/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-38	18-20	6/30/08	2.5	**<8.3**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<8.3**
LTE-TMW-39	0-2	6/30/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-39	18-20	6/30/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-40	2-4	7/11/08	0.18	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**
LTE-TMW-40	28-30	7/11/08	<0.43	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**
LTE-TMW-41	2-4	7/11/08	0.082	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
LTE-TMW-41	38-40	7/11/08	<0.43	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**	**<0.43**
Building 05 and Associated Areas									
LTE-SB-33	2-4	7/1/08	<0.40	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**	**<0.40**
LTE-TMW-32	4-6	6/30/08	<0.38	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**	**<0.38**
LTE-TMW-32	18-20	6/30/08	<0.39	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**	**<0.39**
LTE-TMW-34	2-4	7/10/08	<0.41	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**	**<0.41**
LTE-TMW-34	20-22	7/10/08	<0.42	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**	**<0.42**
Building 19 and Associated Areas									
TER-SB-96 2-4 FT	2-4	6/25/08	0.71	NA	NA	NA	NA	NA	NA
Building 22 Ingram's Gully									
TER-SB-57 8-10 FT	8-10	6/20/08	<0.027	**<0.042**	**0.066**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-61 0-3 FT	0-3	7/2/08	<0.027	**<0.83**	NA	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-64 0-3 FT	0-3	7/2/08	0.039	**<0.042**	NA	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-SB-65 2-4 FT	2-4	6/25/08	<0.54	**<0.83**	**<0.64**	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-SB-72 9-12 FT	9-12	7/3/08	0.27	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-TMW-22 0-3 FT	0-3	7/2/08	<0.027	**<0.042**	**<0.032**	**<0.025**	**<0.023**	<0.041	**<0.031**
TER-TMW-22 0-3 FT	0-3	7/2/08	<0.027	**<0.83**	NA	**<0.49**	**<0.46**	**<0.82**	**<0.62**
TER-TMW-22 0-3 FT	0-3	7/2/08	<0.027	**<0.042**	NA	**<0.025**	**<0.023**	<0.041	**<0.031**
Former Substation									
TER-SB-46 12-15 FT	12-15	7/8/08	<0.13	**<0.21**	**<0.16**	**<0.12**	**<0.11**	**<0.20**	**<0.16**
Ingestion PCL[3]			**7.6**	**0.000011**	**0.012**	**0.0053**	**0.0048**	**0.094**	**0.018**
Non-Ingestion PCL[4]			**0.56**	**0.015**	**3.1**	**6.9**	**6.9**	**130**	**2.4**

Notes:
(Dup) = Duplicate sample
All units in mg/kg = milligrams per kilogram
NA = Not analyzed
Only Chemicals of Concern with concentrations detected above the Ingestion PCL are shown.
Bold indicates concentrations above the Ingestion PCL.
indicates concentrations above the Non-Ingestion PCL.
[1]Poly-cyclic Aromatic Hydrocarbons (PAHs) analyzed by EPA Method 8270.
[2]Semi-volatile organic compounds (SVOCs) analyzed by EPA Method 8270.
[3]TCEQ TRRP Tier 1 Residential $^{GW}SOIL_{ing}$ PCL for a 0.5-acre source area.
[4]TCEQ TRRP Tier 1 Residential $^{Tot}SOIL_{Comb}$ PCL.

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 32																	
ESE-TMW-14	3-5	6/24/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060J4	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018J4
ESE-FD-3	13-15	6/24/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060J4	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018J4
ESE-MW-21	3-5	9/30/08	NA	NA	NA	NA	<0.0068	<0.0068	<0.0068	**<0.0068**	<0.0068	**<0.034**	<0.0068	<0.034	<0.0068	**<0.0068**	<0.020
ESE-FD-31	3-5	9/30/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-MW-21	11-13	9/30/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-MW-22	12-14	9/30/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.031**	<0.0063	<0.031	<0.0063	**<0.0063**	<0.019
Buildings 32D, 32E, and 32F																	
ESE-SB-04	1-3	6/16/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-SB-06	3-5	6/16/08	NA	NA	NA	NA	<0.0066	<0.0066	<0.0066	**<0.0066**	<0.0066	**<0.033**	<0.0066	<0.033	<0.0066	**<0.0066**	<0.020
ESE-SB-10	3-5	6/19/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-10	13-15	6/19/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-11	1-3	6/19/08	NA	NA	NA	NA	<0.0073	<0.0073	<0.0073	**<0.0073**	<0.0073	**<0.036**	<0.0073	<0.036	<0.0073	**<0.0073**	<0.022
ESE-SB-12	3-5	6/19/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-SB-13	3-5	6/19/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	**<0.0069**	<0.0069	**<0.035**	<0.0069	<0.035	<0.0069	**<0.0069**	<0.021
ESE-SB-14	3-5	6/19/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.032**	<0.0065	<0.032	<0.0065	**<0.0065**	<0.019
ESE-SB-15	3-5	6/19/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-16	3-5	6/19/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	**<0.0069**	<0.0069	**<0.034**	<0.0069	<0.034	<0.0069	**<0.0069**	<0.021
ESE-SB-29	13-15	6/27/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	0.0036J
ESE-TMW-04	3-5	6/17/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-TMW-04	13-15	6/17/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-04	30-31	6/17/08	NA	NA	NA	NA	**<0.062**	<0.062	<0.062	**<0.062**	0.22	**<0.31**	**<0.062**	<0.31	**<0.062**	**<0.062**	1.1
ESE-TMW-05	3-5	6/17/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-FD-2	3-5	6/17/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-TMW-05	13-15	6/17/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-TMW-06	3-5	6/18/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	0.0033J
ESE-TMW-06	13-15	6/18/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	0.003J
ESE-TMW-06	32-35	6/18/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.031**	<0.0063	<0.031	<0.0063	**<0.0063**	<0.019
ESE-TMW-08	3-5	6/18/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.031**	<0.0063	<0.031	<0.0063	**<0.0063**	<0.019
ESE-TMW-09	3-5	6/23/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-TMW-09	13-15	6/23/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-TMW-10	3-5	6/23/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-TMW-10	13-15	6/23/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-TMW-12	3-5	6/23/08	NA	NA	NA	NA	<0.0068	<0.0068	<0.0068	**<0.0068**	<0.0068	**<0.034**	<0.0068	<0.034	<0.0068	**<0.0068**	<0.020
ESE-TMW-12	13-15	6/23/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-TMW-13	3-5	6/23/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-TMW-48	3-5	11/3/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
Building 15, 21, and Lots along Clinton Drive																	
ESE-SB-17	3-5	6/19/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
ESE-SB-18	3-5	6/19/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-20	3-5	6/26/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-21	3-5	6/26/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-FD-5	3-5	6/26/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	0.0028J
ESE-SB-22	3-5	6/26/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-SB-23	3-5	6/26/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-SB-24	3-5	6/26/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-25	3-5	6/26/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-SB-26	3-5	6/26/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-30	3-5	6/30/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062J4,J3**	<0.019
ESE-TMW-15	3-5	6/24/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059J4	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018J4
ESE-TMW-16	3-5	6/24/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061J4	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018J4
ESE-TMW-21	3-5	6/25/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-TMW-21	13-15	6/25/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-TMW-22	3-5	6/25/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
Building 32C and Associated Areas																	
ESE-SB-07	3-5	6/16/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	**<0.0069**	<0.0069	**<0.035**	<0.0069	<0.035	<0.0069	**<0.0069**	<0.021
ESE-SB-08	3-5	6/16/08	NA	NA	NA	NA	<0.0066	<0.0066	<0.0066	**<0.0066**	<0.0066	**<0.033**	<0.0066	<0.033	<0.0066	**<0.0066**	<0.020
ESE-SB-09	3-5	6/16/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-SB-19	3-5	6/23/08	NA	NA	NA	NA	<0.0067	<0.0067	<0.0067	**<0.0067**	<0.0067	**<0.034**	<0.0067	<0.034	<0.0067	**<0.0067**	<0.020
ESE-SB-19	13-15	6/23/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-34	3-5	6/30/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-17	3-5	6/24/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061J4	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018J4
ESE-TMW-18	3-5	6/24/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	**<0.0069**	<0.0069J4	**<0.035**	<0.0069	<0.035	<0.0069	**<0.0069**	<0.021J4
ESE-TMW-19	3-5	6/24/08	NA	NA	NA	NA	<0.0067	<0.0067	<0.0067	**<0.0067**	<0.0067J4	**<0.034**	<0.0067	<0.034	<0.0067	**<0.0067**	<0.020J4
ESE-TMW-23	3-5	6/25/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-FD-4	3-5	6/25/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.029**	<0.0057	<0.029	<0.0057	**<0.0057**	<0.017
Building 16B and Associated Areas																	
ESE-SB-27	3-5	6/27/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-28	3-5	6/27/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	0.0032J
ESE-SB-28	3-5	6/27/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-31	3-5	6/30/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-FD-6	3-5	6/30/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.032**	<0.0065	<0.032	<0.0065	**<0.0065**	<0.020
ESE-SB-32	3-5	6/30/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-33	3-5	6/30/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-SB-35	3-5	6/30/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-TMW-20	3-5	6/24/08	NA	NA	NA	NA	<0.0067	<0.0067	<0.0067	**<0.0067**	<0.0067J4	**<0.033**	<0.0067	<0.033	<0.0067	**<0.0067**	<0.020J4
ESE-TMW-24	3-5	6/25/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-25	3-5	6/25/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-TMW-26	3-5	6/25/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-TMW-27	3-5	6/25/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-TMW-28	3-5	6/30/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	0.0016J	<0.031	<0.0062	**<0.0062**	<0.018

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 9 and Open Parking Lots along Clinton Drive																	
ESE-TMW-43	3-5	7/21/08	NA	NA	NA	NA	<0.0068	<0.0068	<0.0068	**<0.0068**	<0.0068	**<0.034**	<0.0068	<0.034	<0.0068	**<0.0068**	<0.020
ESE-FD-17	3-5	7/21/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-44	3-5	7/21/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-45	3-5	7/21/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.032**	<0.0065	<0.032	<0.0065	**<0.0065**	<0.019
ESE-TMW-46	3-5	7/21/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
ESE-TMW-47	3-5	7/21/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
Building 6B and 6E																	
ESE-SBA-1	UNK	7/2/2008	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-SB-45	4-6	7/2/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-45	13-15	7/2/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-FD-8	13-15	7/2/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-48	8-10	7/2/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-SB-50	7-8	7/2/08	NA	NA	NA	NA	**<0.29**	<0.29	<0.29	**<0.29**	<0.29	**<1.4**	**<0.29**	<1.4	**<0.29**	**<0.29**	<0.87
ESE-SB-52	3-5	7/3/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-FD-9	3-5	7/3/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-53	3-5	7/3/08	NA	NA	NA	NA	<0.0054	<0.0054	<0.0054	<0.0054	<0.0054	**<0.027**	<0.0054	<0.027	<0.0054	**<0.0054**	<0.016
ESE-TMW-29	3-5	7/9/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-FD-12	3-5	7/9/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-TMW-29	13-15	7/9/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-TMW-30	3-5	7/9/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-TMW-30	13-15	7/9/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-TMW-31	3-5	7/9/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-TMW-31	13-15	7/9/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-TMW-32	3-5	7/9/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	0.0015J	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	0.012J
ESE-TMW-32	13-15	7/9/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.029**	<0.0057	<0.029	<0.0057	**<0.0057**	<0.017
Building 06, 06A, 06C, 06D, and 06F																	
ESE-SB-40	1-3	7/1/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-FD-7	1-3	7/1/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-SB-40	10-12	7/1/08	NA	NA	NA	NA	<0.0068	<0.0068	0.048	<0.0068	<0.0068	**<0.034**	0.005J	<0.034	<0.0068	**<0.0068**	0.0035J
ESE-SB-40	13-15	7/1/08	NA	NA	NA	NA	<0.0057	<0.0057	0.074	<0.0057	<0.0057	**<0.029**	**14E**	<0.029	**0.42**	**<0.0057**	<0.017
ESE-SB-44	3-5	7/1/08	NA	NA	NA	NA	<0.0057	<0.0057	0.074	<0.0057	<0.0057	**<0.029**	**14E**	<0.029	**0.42**	**<0.0057**	<0.017
ESE-SB-44	10-12	7/1/08	NA	NA	NA	NA	<0.0068	<0.0068	0.048	<0.0068	<0.0068	**<0.034**	0.005J	<0.034	<0.0068	**<0.0068**	0.0035J
ESE-SB-54	3-5	7/3/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-55	3-5	7/3/08	NA	NA	NA	NA	0.0048J	<0.0059	<0.0059	<0.0059	0.0028J	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	0.014J
ESE-SB-55	8-10	7/3/08	NA	NA	NA	NA	0.016	<0.0063	<0.0063	<0.0063	0.012	**<0.031**	<0.0063	<0.031	<0.0063	**<0.0063**	0.058
ESE-SB-55	13-15	7/3/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-SB-56	3-5	7/7/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	0.002J	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	0.011J
ESE-FD-10	3-5	7/7/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-SB-56	10-12	7/7/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	0.0074	<0.029	0.0029J	**<0.0058**	<0.017
ESE-SB-57	3-5	7/7/08	NA	NA	NA	NA	0.0028J	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-SB-57	10-12	7/7/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	0.0042J
ESE-SB-58	3-5	7/7/08	NA	NA	NA	NA	0.003J	<0.0065	<0.0065	<0.0065	0.0017J	**<0.033**	<0.0065	<0.033	<0.0065	**0.007**	0.0073J
ESE-SB-59	3-5	7/7/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-SB-60	3-5	7/7/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-SB-60	13-15	7/7/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-SB-61	3-5	7/7/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-61	13-15	7/7/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	0.0016J	<0.029	<0.0059	**<0.0059**	<0.018
ESE-SB-62	3-5	7/7/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-SB-62	10-12	7/7/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
ESE-SB-62	13-15	7/7/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-SB-63	3-5	7/7/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
ESE-SB-63	13-15	7/7/08	NA	NA	NA	NA	0.0041J	<0.010	<0.010	**<0.010**	<0.010	**<0.051**	<0.010	<0.051	<0.010	**<0.010**	<0.031
ESE-SB-64	2-4	7/7/08	NA	NA	NA	NA	0.0032J	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	0.0031J
ESE-SB-65	3-5	7/7/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.031**	<0.0063	<0.031	<0.0063	**<0.0063**	<0.019
ESE-SB-67	3-5	7/8/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-SB-67	13-15	7/8/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-SB-68	3-5	7/8/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-69	3-5	7/8/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-70	3-5	7/8/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-SB-71	3-5	7/8/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
ESE-SB-72	3-5	7/8/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-SB-73	3-5	7/10/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-SB-74	3-5	7/10/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-SB-75	3-5	7/10/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-SB-76	3-5	7/10/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	0.0015J	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	0.012J
ESE-FD13	3-5	7/10/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	0.0052J
ESE-SB-76	10-12	7/10/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	0.0035J
ESE-SB-77	3-5	7/12/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	0.034	<0.032	0.0083	**<0.0063**	<0.019
ESE-SB-81	3-5	7/12/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-SB-82	3-5	7/12/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-SB-83	3-5	7/12/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-SB-84	3-5	7/12/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-FD-16	3-5	7/12/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061J4	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-SB-102	15-16	8/12/08	NA	NA	NA	NA	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	**<0.048**	<0.0095	<0.048	<0.0095	**<0.0095**	0.0049J
ESE-SB-113	3-5	10/1/08	NA	NA	NA	NA	<0.0073	<0.0073	<0.0073	**<0.0073**	<0.0073	**<0.036**	<0.0073	<0.036	<0.0073	**<0.0073**	<0.022
ESE-SB-115	3-5	10/3/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
ESE-FD-33	3-5	10/3/08	NA	NA	NA	NA	<0.0066	<0.0066	<0.0066	**<0.0066**	<0.0066	**<0.033**	<0.0066	<0.033	<0.0066	**<0.0066**	<0.020
ESE-SB-115	7-9	10/3/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
ESE-SB-115	9-11	10/3/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-SB-115	11-13	10/3/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-TMW-33	2-4	7/14/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	**<0.0069**	<0.0069	**<0.034**	<0.0069	<0.034	<0.0069	**<0.0069**	<0.021
ESE-TMW-33	13-15	7/14/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-TMW-34	3-5	7/14/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-FD-15	3-5	7/14/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
ESE-TMW-34	13-15	7/14/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
ESE-TMW-35	3-5	7/14/08	NA	NA	NA	NA	<0.0061	0.0063	<0.0061	<0.0061	0.0022J	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	0.0097J
ESE-TMW-38	3-5	7/16/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
ESE-MW-15	3-5	8/15/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	0.0016J	0.076	**<0.030**	<0.0061	<0.030	<0.0061	**1.9**	0.19J4

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 11, NEC of Building 06 and Associated Area																	
ESE-SB-78	3-5	7/12/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062J4	<0.0062	<0.0062	**<0.031**	<0.0062J3	<0.031	<0.0062J3	**<0.0062**	<0.019
ESE-SB-79	3-5	7/12/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	0.0016J	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-FD-14	3-5	7/12/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
ESE-SB-79	6-8	7/12/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
ESE-SB-86	3-5	7/21/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-SB-87	3-5	7/21/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
ESE-TMW-36	3-5	7/14/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	0.0042J	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	0.059
ESE-TMW-36	13-15	7/14/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
ESE-TMW-37	3-5	7/14/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
ESE-TMW-37	6-8	7/14/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
ESE-TMW-37	13-15	7/14/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
ESE-TMW-37	16-18	7/14/08	NA	NA	NA	NA	**<0.32**	<0.32	<0.32	**<0.32**	1.6	**<1.6**	**<0.32**	<1.6	**<0.32**	**<0.32**	3.2
ESE-TMW-39	3-5	7/16/08	NA	NA	NA	NA	<0.0063	NA	NA	NA	<0.0063	NA	NA	<0.032	NA	NA	<0.019
ESE-TMW-40	3-5	7/17/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0061	NA	NA	<0.030	NA	NA	<0.018
ESE-TMW-40	13-15	7/17/08	NA	NA	NA	NA	<0.0060	NA	NA	NA	<0.0060	NA	NA	<0.030	NA	NA	<0.018
ESE-TMW-40	20-22	7/17/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0067	NA	NA	<0.030	NA	NA	0.0055J
ESE-TMW-41	3-5	7/17/08	NA	NA	NA	NA	<0.0060	NA	NA	NA	<0.0017J	NA	NA	<0.030	NA	NA	0.007J
ESE-TMW-41	13-15	7/17/08	NA	NA	NA	NA	**1.1J**	NA	NA	NA	4.4	NA	NA	**8.3**	NA	NA	15
ESE-TMW-41	16-18	7/17/08	NA	NA	NA	NA	**6.5**	NA	NA	NA	**79**	NA	NA	**270**	NA	NA	**360**
ESE-MW-12	32-34	8/14/08	NA	NA	NA	NA	<0.0035	NA	NA	NA	<0.0035	NA	NA	<0.035	NA	NA	<0.011
ESE-MW-13	27-29	8/14/08	NA	NA	NA	NA	0.0011J	NA	NA	NA	0.0068	NA	NA	0.012J	NA	NA	0.047
ESE-MW-14	27-29	8/15/08	NA	NA	NA	NA	<0.0029	NA	NA	NA	<0.0029	NA	NA	<0.029	NA	NA	0.0037J
ESE-FD-25	27-29	27-29	NA	NA	NA	NA	<0.0030	NA	NA	NA	<0.0030	NA	NA	<0.030	NA	NA	<0.0089
ESE-MW-18	26-28	26-28	NA	NA	NA	NA	<0.0030	NA	NA	NA	<0.0030	NA	NA	<0.030	NA	NA	<0.0091
ESE-FD-27	26-28	26-28	NA	NA	NA	NA	<0.0031	NA	NA	NA	<0.0031	NA	NA	<0.031	NA	NA	<0.0094
Building 4 and Associated Areas																	
LTE-SB-51	2-4	7/10/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-SB-52	2-4	6/26/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
LTE-TMW-53	2-4	7/11/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
LTE-TMW-53	22-24	7/11/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
LTE-TMW-54	2-4	6/30/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	<0.017
LTE-TMW-54	24-26	6/30/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-TMW-55	4-6	6/25/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-55	20-22	6/25/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
Building 04A and 10B																	
LTE-TMW-02	2-4	6/17/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**0.71**	<0.0056	<0.028	<0.0056	**<0.0056**	0.0032
LTE-TMW-02	12-14	6/27/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	0.0031
LTE-TMW-02 (Dup)	2-4	6/27/08	NA	NA	NA	NA	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	**<0.026**	<0.0051	<0.026	<0.0051	**<0.0051**	<0.015
LTE-TMW-03	2-4	6/24/08	NA	NA	NA	NA	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	**<0.026**	<0.0052	<0.026	<0.0052	**<0.0052**	<0.016
LTE-TMW-03	22-24	6/24/08	NA	NA	NA	NA	0.0023	<0.0072	<0.0072	**<0.0072**	0.022	**<0.036**	<0.0072	<0.036	<0.0072	**<0.0072**	0.06
LTE-TMW-03 (Dup)	22-24	6/24/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
LTE-TMW-04	0-2	6/25/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.029**	<0.0057	<0.029	<0.0057	**<0.0057**	<0.017
LTE-TMW-04	20-22	6/25/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
LTE-TMW-56	4-6	6/25/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
LTE-TMW-56	16-18	6/25/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-TMW-58	4-6	6/25/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-58	8-10	6/25/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-MW-91	2-4	8/13/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-91	8-10	8/13/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 10 and 10A and Associated Areas																	
LTE-SB-59	0-2	6/26/08	NA	NA	NA	NA	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	**<0.028**	<0.0056	<0.028	<0.0056	**<0.0056**	0.0039
LTE-SB-61	2-4	6/24/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
LTE-TMW-57	2-4	7/10/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
LTE-TMW-57	18-20	7/10/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-60	2-4	6/26/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-60	14-16	6/26/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
Building 8, 14, 14A, and 14B																	
LTE-SB-12	2-4	6/24/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
LTE-SB-14	2-4	6/23/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.029**	<0.0057	<0.029	<0.0057	**<0.0057**	<0.017
LTE-SB-14	22-24	6/23/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-SB-14 (Dup)	22-24	6/23/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
LTE-SB-15	4-6	6/24/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.019
LTE-SB-16	2-4	6/24/08	NA	NA	NA	NA	<0.0054	<0.0054	<0.0054	<0.0054	<0.0054	**<0.027**	<0.0054	<0.027	<0.0054	**<0.0054**	<0.016
LTE-SB-66	2-4	7/8/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-01	2-4	6/24/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-01	22-24	6/24/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-05	5-6	6/23/08	NA	NA	NA	NA	<0.0053	<0.0053	<0.0053	<0.0053	<0.0053	**<0.027**	<0.0053	<0.027	<0.0053	**<0.0053**	<0.016
LTE-TMW-05	22-24	6/23/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-06	2-4	6/23/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	<0.0057	NA	NA	<0.028	NA	NA	<0.017
LTE-TMW-06	22-24	6/23/08	NA	NA	NA	NA	<0.0059	NA	NA	NA	<0.0059	NA	NA	<0.029	NA	NA	<0.018
LTE-TMW-07	0-2	6/23/08	NA	NA	NA	NA	<0.12	<0.12	<0.12	**<0.12**	<0.12	**<0.59**	**<0.12**	<0.59	**<0.12**	<0.12	<0.35
LTE-TMW-07	12-14	6/23/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	<0.0057	NA	NA	<0.028	NA	NA	<0.017
LTE-TMW-08	2-4	6/23/08	NA	NA	NA	NA	**0.035**	<0.055	<0.055	**<0.055**	1.3	**<0.28**	**<0.055**	<0.28	**<0.055**	**<0.055**	0.43
LTE-TMW-08	12-14	6/23/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
LTE-TMW-09	2-24	6/23/08	NA	NA	NA	NA	0.0042	NA	NA	NA	0.0032	NA	NA	<0.029	NA	NA	0.0072
LTE-TMW-09	20-22	6/23/08	NA	NA	NA	NA	<0.0060	NA	NA	NA	<0.0060	NA	NA	<0.030	NA	NA	<0.018
LTE-TMW-11	2-4	6/23/08	NA	NA	NA	NA	<0.0053	NA	NA	NA	<0.0053	NA	NA	<0.027	NA	NA	<0.016
LTE-TMW-11	16-18	6/23/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	<0.0057	NA	NA	<0.029	NA	NA	<0.017
LTE-TMW-13	2-4	6/24/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-13	22-24	6/24/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
Building 18 and 18A																	
TER-SB-33 2-4 FT	2-4	7/1/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-34 2-4 FT	2-4	7/1/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-35 2-4 FT	2-4	7/1/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-36 2-4 FT	2-4	7/1/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-14 0-2 FT	0-2	7/1/08	<0.00082	<0.0082	0.0067	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Former Asphalt Plant																	
TER-SB-08 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	0.0015	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-22 0-3 FT	0-3	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-22 3-6 FT	3-6	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0027	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0031
TER-SB-22 3-6 FT (DUP)	3-6	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0014	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-23 0-3 FT	0-3	7/14/08	NA	NA	NA	NA	0.0031	0.011	<0.0018	<0.0018	0.0062	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0046
TER-SB-23 30-32 FT	30-32	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0027
TER-SB-23 3-6 FT	3-6	7/14/08	NA	NA	NA	NA	0.021	0.11	<0.0018	<0.0018	0.017	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0049
TER-SB-24 0-3 FT	0-3	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-24 3-6 FT	3-6	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.012	<0.012	0.0017	<0.012	<0.0026	**<0.0026**	0.077
TER-SB-24 3-6 FT (DUP)	3-6	7/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0078	<0.012	0.0015	<0.012	<0.0026	**<0.0026**	0.027
TER-SB-26 6-9 FT	6-9	7/15/08	NA	NA	NA	NA	<0.016	<0.012	<0.018	<0.018	0.081	**<0.12**	<0.012	<0.12	<0.026	**<0.026**	0.037
TER-SB-26 G 0-3 FT (DUP)	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0021	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0051
TER-SB-26-A 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0026	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.011
TER-SB-26-A 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	0.011	<0.0012	<0.0018	<0.0018	0.033	<0.012	<0.0012	0.017	<0.0026	**<0.0026**	0.2
TER-SB-26-A 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-B 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	0.02	<0.0026	**<0.0026**	0.0032
TER-SB-26-B 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.016	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0052
TER-SB-26-B 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0087	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0088
TER-SB-26-C 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-C 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	<0.016	<0.012	<0.018	<0.018	0.081	**<0.12**	<0.012	<0.12	<0.026	**<0.026**	0.06
TER-SB-26-C 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.016	<0.012	<0.018	<0.018	<0.011	**<0.12**	<0.012	<0.12	<0.026	**<0.026**	0.037
TER-SB-26-D 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-D 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0075	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.048
TER-SB-26-D 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-E 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-E 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	0.0039	<0.0012	<0.0018	<0.0018	0.04	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.14
TER-SB-26-E 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-F 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.01	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-F 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0014	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0025
TER-SB-26-F 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-G 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-G 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0069	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0057
TER-SB-26-G 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	0.0046	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0079
TER-SB-26-H 0-3 FT	0-3	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-26-H 3-6 FT	3-6	8/14/08	NA	NA	NA	NA	0.0026	0.0064	<0.0018	<0.0018	0.0034	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.01
TER-SB-26-H 6-9 FT	6-9	8/14/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-98 0-3 FT	0-3	7/15/08	0.02	<0.082	0.092	0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-99 0-3 FT	0-3	7/15/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-100 0-3 FT	0-3	7/15/08	<0.00082	<0.0082	0.0011	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-100 9-12 FT	9-12	7/15/08	<0.00082	<0.0082	0.0012	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-101 3-6 FT	3-6	7/15/08	<0.00082	0.028	0.0014	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-110 0-3 FT	0-3	7/22/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-TMW-01 9-12 FT	9-12	7/28/08	<0.00082	<0.0082	<0.00082	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-02 0-3 FT	0-3	7/28/08	<0.00082	<0.0082	0.0032	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-02 9-12 FT	9-12	7/28/08	<0.00082	<0.0082	0.0021	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-11 0-3 FT	0-3	7/15/08	NA	NA	NA	NA	<0.0016	0.0029	<0.0018	<0.0018	0.007	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	0.0082
TER-TMW-11 3-6 FT	3-6	7/15/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-TMW-15 0-3 FT	0-3	7/16/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-TMW-16 0-3 FT	0-3	7/16/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TMW-16 0-3 FT (DUP)	0-3	7/16/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0018	<0.0018	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-TMW-27 0-3 FT	0-3	7/15/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-27 0-3 FT (DUP)	0-3	7/15/08	<0.00082	<0.0082	0.0013	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-4 0-3 FT	0-3	8/18/08	NA	NA	NA	NA	0.0029 J	0.016	<0.0018	<0.0018	0.013	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-MW-4 3-6 FT	3-6	8/18/08	NA	NA	NA	NA	<0.016	0.033	<0.018	<0.018	0.038	**<0.12**	<0.012	<0.12	<0.026	**<0.026**	0.053
TER-MW-4 3-6 FT (DUP)	3-6	8/18/08	NA	NA	NA	NA	<0.016	<0.012	<0.0.18	<0.0.18	0.041	**<0.12**	<0.012	<0.12	<0.026	**<0.026**	0.066
Building 1 and Associated Areas																	
LTE-SB-45	4-6	7/10/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
LTE-SB-47	UNK	7/1/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
LTE-TMW-42	2-4	7/11/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-42	18-20	7/11/08	NA	NA	NA	NA	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	**<0.034**	<0.0069	<0.034	<0.0069	**<0.0069**	<0.021
LTE-TMW-42 (Dup)	18-20	7/11/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-43	2-4	7/11/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
LTE-TMW-43	18-20	7/11/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**<0.028**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
LTE-TMW-44	2-4	7/11/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
LTE-TMW-44	22-24	7/11/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
Building 3 and Associated Areas																	
LTE-SB-25	4-6	7/10/08	NA	NA	NA	NA	<0.0068	<0.0068	<0.0068	<0.0068	<0.0068	**<0.034**	<0.0068	<0.034	<0.0068	**<0.0068**	0.0042
LTE-SB-25 (Dup)	4-6	7/10/08	NA	NA	NA	NA	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	**<0.034**	<0.0067	<0.034	<0.0067	**<0.0067**	0.013
LTE-SB-26	2-4	6/27/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	0.0035
LTE-SB-49	4-6	7/11/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
Parking Areas South of Buildings 03 and 12																	
LTE-TMW-19	5-6	7/7/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	<0.0057	NA	NA	<0.028	NA	NA	<0.017
LTE-TMW-19	22-24	7/7/08	NA	NA	NA	NA	<0.0059	NA	NA	NA	<0.0059	NA	NA	<0.030	NA	NA	<0.018
LTE-TMW-20	4-6	7/2/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0061	NA	NA	<0.030	NA	NA	<0.018
LTE-TMW-20	18-20	7/2/08	NA	NA	NA	NA	<0.0058	NA	NA	NA	<0.0058	NA	NA	<0.029	NA	NA	<0.018
LTE-TMW-21	2-4	6/26/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0061	NA	NA	<0.031	NA	NA	<0.018
LTE-TMW-21	16-18	6/27/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0061	NA	NA	<0.030	NA	NA	<0.018
LTE-TMW-22	4-6	7/2/08	NA	NA	NA	NA	<0.0063	NA	NA	NA	<0.0063	NA	NA	<0.031	NA	NA	<0.019
LTE-TMW-22	12-14	7/2/08	NA	NA	NA	NA	<0.0061	NA	NA	NA	<0.0061	NA	NA	<0.030	NA	NA	<0.018
LTE-TMW-23	4-6	7/2/08	NA	NA	NA	NA	<0.0062	NA	NA	NA	<0.0062	NA	NA	<0.031	NA	NA	<0.019
LTE-TMW-23	22-24	7/2/08	NA	NA	NA	NA	<0.0062	NA	NA	NA	<0.0062	NA	NA	<0.031	NA	NA	<0.018

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 13A and 13B and Associated Areas																	
LTE-SB-65	4-6	7/14/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-SB-65	18-20	7/14/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
TER-SB-09 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	0.0013	0.022	<0.0026	**<0.0026**	<0.0023
TER-SB-108 0-3 FT	0-3	7/22/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-109 0-3 FT	0-3	7/22/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
TER-SB-110 0-3 FT	0-3	7/22/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0026	**<0.0026**	<0.0023
LTE-TMW-17	2-4	7/7/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
LTE-TMW-17	12-14	7/7/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	0.0065
LTE-TMW-18	2-4	6/24/08	NA	NA	NA	NA	<0.0054	<0.0054	<0.0054	<0.0054	<0.0054	**<0.027**	<0.0054	<0.027	<0.0054	**<0.0054**	<0.016
LTE-TMW-18	18-20	6/24/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-67	2-4	7/7/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
LTE-TMW-67	18-20	7/7/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
TER-TMW-08 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	0.0028	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-29 9-12 FT	9-12	7/22/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	0.0057	<0.012	<0.0012	<0.0012	0.0036
Building 13 Slab																	
TER-SB-50 3-6 FT	3-6	7/9/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-51 12-15 FT	12-15	7/9/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-53 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-54 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-55 0-2 FT	0-2	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-56 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-19 6-9 FT	6-9	7/9/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-20 6-9 FT	6-9	7/10/08	NA	NA	NA	NA	<0.016	<0.012	<0.011	<0.011	<0.011	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	<0.023
TER-MW-2 4-5 FT	4-5	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0096
TER-MW-2 4-5 FT (DUP)	4-5	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0087
Building 12 and Associated Areas																	
LTE-SB-28	2-4	6/27/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.018
LTE-SB-29	4-6	7/12/08	NA	NA	NA	NA	<0.0066	NA	NA	NA	<0.0066	NA	NA	<0.033	NA	NA	<0.020
LTE-SB-30	2-4	6/25/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-SB-31	2-4	8/14/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**0.044**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
LTE-SB-31	10-12	8/14/08	NA	NA	NA	NA	<0.0057	<0.0057	<0.0057	<0.0057	<0.0057	**0.034**	<0.0057	<0.028	<0.0057	**<0.0057**	<0.017
LTE-SB-31 (Dup)	10-12	8/14/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**0.033**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-SB-50	2-4	6/30/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-SB-69	4-6	7/12/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	0.0016	NA	NA	<0.029	NA	NA	0.0033
LTE-SB-69	22-24	7/12/08	NA	NA	NA	NA	**0.1**	NA	NA	NA	**16**	NA	NA	<1.5	NA	NA	28
LTE-TMW-27	0-2	6/27/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-27	26-28	6/27/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-TMW-48	2-4	7/1/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-48	24-26	7/1/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-68	2-4	7/12/08	NA	NA	NA	NA	<0.0063	NA	NA	NA	<0.0063	NA	NA	<0.031	NA	NA	<0.019
LTE-TMW-68	22-24	7/12/08	NA	NA	NA	NA	<0.0058	NA	NA	NA	0.0082	NA	NA	0.01	NA	NA	0.012
LTE-TMW-72	2-4	7/12/08	NA	NA	NA	NA	<0.0058	NA	NA	NA	<0.0058	NA	NA	<0.029	NA	NA	<0.017
LTE-TMW-72	22-24	7/12/08	NA	NA	NA	NA	0.014	NA	NA	NA	0.38	NA	NA	0.036	NA	NA	0.56
LTE-TMW-71	2-4	7/12/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
LTE-TMW-71	22-24	7/12/08	NA	NA	NA	NA	<0.060	<0.060	<0.060	<0.060	<0.060	**<0.30**	**<0.060**	<0.30	**<0.060**	**<0.060**	<0.18
LTE-TMW-71 (Dup)	22-24	7/12/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
LTE-TMW-73	5-6	7/12/08	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	0.027	**<0.31**	**<0.062**	<0.31	**<0.062**	**<0.062**	0.032
LTE-TMW-73	8-10	7/12/08	NA	NA	NA	NA	<0.0057	NA	NA	NA	0.0013	NA	NA	<0.029	NA	NA	<0.017
LTE-MW-83	23-24	10/2/08	<0.0030	<0.030	0.0012	<0.0089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-84	22-23	10/2/08	0.012	0.036	0.020	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-85	24-25	10/2/08	<0.0030	<0.030	0.0011	0.0032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-86	22-23	10/2/08	**1.1**	1.7	2.7	4.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-92	19-20	8/13/08	<0.0063	<0.031	<0.0063	<0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 2 and Associated Areas																	
LTE-SB-37	2-4	6/30/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-35	2-4	6/30/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-35	22-24	6/30/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
LTE-TMW-38	2-4	6/30/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.030**	<0.0061	<0.030	<0.0061	**<0.0061**	<0.018
LTE-TMW-38	18-20	6/30/08	NA	NA	NA	NA	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	**<0.032**	<0.0063	<0.032	<0.0063	**<0.0063**	<0.019
LTE-TMW-39	0-2	6/30/08	NA	NA	NA	NA	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	**<0.030**	<0.0060	<0.030	<0.0060	**<0.0060**	<0.018
LTE-TMW-39	18-20	6/30/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.029**	<0.0059	<0.029	<0.0059	**<0.0059**	<0.018
LTE-TMW-40	2-4	7/11/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.032**	<0.0065	<0.032	<0.0065	**<0.0065**	<0.020
LTE-TMW-40	28-30	7/11/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.033**	<0.0065	<0.033	<0.0065	**<0.0065**	<0.020
LTE-TMW-41	2-4	7/11/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
LTE-TMW-41	38-40	7/11/08	NA	NA	NA	NA	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	**<0.032**	<0.0065	<0.032	<0.0065	**<0.0065**	<0.020
Building 5 and Associated Areas																	
LTE-SB-33	2-4	7/1/08	NA	NA	NA	NA	<0.0061	<0.0061	<0.0061	<0.0061	<0.0061	**<0.031**	<0.0061	<0.031	<0.0061	**<0.0061**	<0.018
LTE-TMW-32	4-6	6/30/08	NA	NA	NA	NA	<0.0058	<0.0058	<0.0058	<0.0058	<0.0058	**<0.029**	<0.0058	<0.029	<0.0058	**<0.0058**	<0.017
LTE-TMW-32	18-20	6/30/08	NA	NA	NA	NA	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	**<0.030**	<0.0059	<0.030	<0.0059	**<0.0059**	<0.018
LTE-TMW-34	2-4	7/10/08	NA	NA	NA	NA	<0.0062	<0.0062	<0.0062	<0.0062	<0.0062	**<0.031**	<0.0062	<0.031	<0.0062	**<0.0062**	<0.018
LTE-TMW-34	20-22	7/10/08	NA	NA	NA	NA	<0.0064	<0.0064	<0.0064	<0.0064	<0.0064	**<0.032**	<0.0064	<0.032	<0.0064	**<0.0064**	<0.019
Building 19 and Associated Areas																	
TER-SB-90 2-4 FT	2-4	6/27/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-92 2-4 FT	2-4	6/27/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-93 2-4 FT	2-4	6/25/08	<0.00082	<0.0082	0.0011	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-94 8-10 FT	8-10	7/2/08	NA	NA	NA	NA	<0.0016	NA	NA	NA	<0.0011	NA	NA	<0.0061	NA	NA	NA
TER-SB-95 2-4 FT	2-4	6/25/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-96 2-4 FT	2-4	6/25/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-97 12-14 FT	12-14	6/27/08	<0.00082	<0.0082	<0.00082	<0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-06 8-10 FT	8-10	7/2/08	NA	NA	NA	NA	<0.0016	NA	NA	NA	<0.0011	NA	NA	<0.0061	NA	NA	NA
TER-MW-1 0-3 FT (DUP)	0-3	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-MW-1 0-3FT	0-3	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023

TABLE 1C
SOIL DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	BTEX[1]				VOCs[2]										
			Benzene	Toluene	Ethylbenzene	Xylenes	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Ethylbenzene	Methylene Chloride	Tetrachloroethene	Toluene	Trichloroethene	1,2,3-Trichloropropane	Xylenes (Total)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 22 and Ingram's Gully																	
TER-SB-10 0-3 FT	0-3	7/17/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	0.0062	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-10 0-3 FT (DUP)	0-3	7/17/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	0.0016	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-57-8-10 FT	8-10	6/30/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	0.0015	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0034
TER-SB-58-4-6 FT	4-6	6/30/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-60-10-12 FT	10-12	6/30/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.005
TER-SB-65 2-4 FT	2-4	6/25/08	NA	NA	NA	NA	<0.016	0.016	<0.011	<0.011	<0.011	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	0.036
TER-SB-66 4-6 FT	4-6	6/25/08	NA	NA	NA	NA	<0.016	<0.012	<0.011	<0.011	<0.011	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	0.031
TER-SB-67 2-4 FT	2-4	6/27/08	NA	NA	NA	NA	<0.0016	0.0073	0.0041	0.0041	0.007	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.011
TER-SB-68 0-2 FT	0-2	6/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	**0.04**	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-68 14-16 FT	14-16	6/25/08	NA	NA	NA	NA	<0.016	<0.012	<0.011	<0.011	<0.011	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	<0.023
TER-SB-69 12-14 FT	12-14	7/3/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-69 26-28 FT	26-28	7/3/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-70 9-12 FT	9-12	7/3/08	NA	NA	NA	NA	0.0022	0.027	0.0015	0.0015	0.0015	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0055
TER-SB-71 12-15 FT	12-15	7/7/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	0.002	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0098
TER-SB-71 9-12 FT	9-12	7/7/08	NA	NA	NA	NA	0.0065	0.014	0.0022	0.0022	0.0022	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0043
TER-SB-71 9-12 FT (DUP)	9-12	7/7/08	NA	NA	NA	NA	<0.0016	0.002	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-72 9-12 FT	9-12	7/3/08	NA	NA	NA	NA	<0.016	<0.012	<0.011	<0.011	0.021	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	<0.023
TER-SB-73 9-12 FT	9-12	7/3/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	0.0013	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0041
TER-SB-75 9-12 FT	9-12	7/7/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-75 9-12 FT (DUP)	9-12	7/7/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-76 9-12 FT	9-12	7/7/08	NA	NA	NA	NA	**0.34**	**22**	**0.28**	**0.28**	0.024	**<0.12**	<0.012	<0.12	**0.034**	**0.034**	0.032
TER-SB-77 2-4 FT	2-4	6/23/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	0.0015	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-78 2-4 FT	2-4	6/23/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-79 4-6 FT	4-6	6/23/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-80 2-4 FT	2-4	6/23/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-81 2-4 FT	2-4	6/23/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-82 2-4 FT	2-4	6/27/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-83 14-16 FT	14-16	6/23/08	NA	NA	NA	NA	<0.081	<0.062	<0.054	<0.054	<0.056	**<0.62**	<0.058	<0.62	**<0.062**	**<0.062**	<0.12
TER-SB-84 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-85 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-86 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-87 4-6 FT	4-6	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-88 4-6 FT	4-6	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-SB-89 4-6 FT	4-6	6/24/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-23 2-4 FT	2-4	6/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	**0.085**	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-24 18-20 FT	18-20	7/7/08	NA	NA	NA	NA	<0.016	0.015	<0.011	<0.011	<0.011	**<0.12**	<0.012	<0.12	<0.012	**<0.012**	<0.023
TER-TMW-24 9-12 FT	9-12	7/7/08	NA	NA	NA	NA	0.0059	0.031	<0.0011	<0.0011	0.0034	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0037
TER-TMW-25 9-12 FT	9-12	7/7/08	NA	NA	NA	NA	<0.0016	0.0016	0.0016	0.0016	<0.0011	<0.012	<0.0012	<0.012	<0.0012	<0.0012	<0.0023
TER-TMW-26 8-10 FT	8-1	7/7/08	NA	NA	NA	NA	0.0073	0.035	0.0026	0.0026	0.0014	<0.012	<0.0012	<0.012	<0.0012	<0.0012	0.0031
Former Substation																	
TER-SB-46 12-15 FT	12-15	7/8/08	NA	NA	NA	NA	**0.058**	0.23	<0.0011	<0.0011	0.0042	<0.012	<0.0012	<0.012	<0.012	**<0.012**	0.013
TER-SB-46 9-12 FT	9-12	7/8/08	NA	NA	NA	NA	**0.04**	0.1	<0.0011	<0.0011	0.0045	<0.012	<0.0012	<0.012	<0.012	**<0.012**	0.0062
TER-SB-59-8-10 FT	8-10	6/30/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.012	**<0.012**	<0.0023
TER-SB-104-6-8 FT	6-8	6/30/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.012	**<0.012**	<0.0023
TER-TMW-21 0-3 FT	0-3	7/10/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.012	**<0.012**	<0.0023
TER-MW-3 5-6FT	5-6	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.012	**<0.012**	<0.0023
TER-MW-3 6-9FT	6-9	7/25/08	NA	NA	NA	NA	<0.0016	<0.0012	<0.0011	<0.0011	<0.0011	<0.012	<0.0012	<0.012	<0.012	**<0.012**	<0.0023
Ingestion PCL[3]			**0.026**	**8.2**	**7.6**	**120**	**0.026**	**1.1**	**0.25**	**0.0066**	**7.6**	**0.013**	**0.05**	**8.2**	**0.034**	**0.0023**	**120**
Non-Ingestion PCL[4]			**66**	**5,900**	**5,300**	**6,000**	**66**	**520**	**770**	**7.6**	**5,300**	**390**	**100**	**5,900**	**120**	**0.87**	**6,000**

Notes:

(Dup) = Duplicate sample

All units in mg/kg = milligrams per kilogram

NA = Not analyzed

Only Chemicals of Concern with concentrations detected above the Ingestion PCL are shown.

Bold indicates concentrations above the Ingestion PCL.

indicates concentrations above the Non-Ingestion PCL.

[1]BTEX analyzed by EPA Method 8021.

[2]VOCs analyzed by EPA Method 8260B.

[3]TCEQ TRRP Tier 1 Residential $^{Gw}SOIL_{Ing}$ PCL.

[4]TCEQ TRRP Tier 1 Residential $^{Tot}SOIL_{Comb}$ PCL.

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 32																			
ESE-TMW-14	3-5	6/24/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-3	3-5	6/24/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 32D, 32E, 32F, and Associated Area																			
ESE-SB-06	3-5	6/16/08	**<66**	**<66**	<66	<66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-11	1-3	6/19/08	**<73**	**<73**	<73	<73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-12	3-5	6/19/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-13	3-5	6/19/08	**<69**	<69	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-14	3-5	6/19/08	**<65**	<65	<65	<65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-15	3-5	6/19/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-16	3-5	6/19/08	**<69**	**<69**	<69	<69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-29	13-15	6/27/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-04	3-5	6/17/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-04	13-15	6/18/08	**<64**	<64	<64	<64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-04	30-31	6/17/08	**<62**	**260**	56J	**310**	79	92	<12.	<12.	54	80	100	<12.	<12.	<12.	<12.	21	76
ESE-TMW-05	3-5	6/17/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-2	3-5	6/17/08	**<61**	<61J6	<61	<61J3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-05	13-15	6/17/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-06	3-5	6/18/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-06	13-15	6/18/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-06	32-35	6/18/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-08	3-5	6/18/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-09	3-5	6/23/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-09	13-15	6/23/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-10	3-5	6/23/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-10	13-15	6/23/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-11	3-5	6/23/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-11	13-15	6/23/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-12	3-5	6/23/08	**<68.**	<68.	<68.	<68.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-12	13-15	6/23/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-13	3-5	6/23/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-48	3-5	7/21/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 15, 21, and Lot along Clinton Drive																			
ESE-SB-17	3-5	6/19/2008	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-18	3-5	6/19/2008	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-20	3-5	6/26/08	**<58.**	33J	96	**130**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-21	3-5	6/26/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-5	3-5	6/26/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-22	3-5	6/26/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-23	3-5	6/26/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-24	3-5	6/26/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-25	3-5	6/26/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-26	3-5	6/26/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-30	3-5	6/30/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-15	**3-5**	6/24/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-16	**3-5**	6/24/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-21	3-5	6/25/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-21	13-15	6/25/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-22	3-5	6/25/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 32C																			
ESE-SB-07	3-5	6/16/08	**<69**	<69	<69	<69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-08	3-5	6/16/08	**<66**	<66	<66	<66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-09	3-5	6/16/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-19	3-5	6/23/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-19	13-15	6/23/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-34	3-5	6/30/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-17	3-5	6/24/08	**<61**	37J	<61	37J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-18	3-5	6/24/08	**<69**	<69	<69	<69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-19	3-5	6/24/08	**<67**	<67	<67	<67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-23	3-5	6/25/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-4	3-5	6/25/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 16B and Associated Areas																			
ESE-SB-27	3-5	6/27/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-28	0-2	6/27/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-28	3-5	6/27/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-31	3-5	6/30/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-6	3-5	6/30/08	**<65.**	<65.	<65.	<65.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-32	3-5	6/30/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-33	3-5	6/30/08	**<65.**	<65.	<65.	<65.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-35	3-5	6/30/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-20	3-5	6/24/08	**<67**	<67	<67	<67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-24	3-5	6/25/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-25	3-5	6/25/08	**<56.**	<56.	<56.	<56.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-26	3-5	6/25/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-27	3-5	6/25/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-28	3-5	6/30/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 9 and Open Parking Lots along Clinton Drive																			
ESE-TMW-43	3-5	7/21/08	**<68B3**	**<68.**	<68.	<68B3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-17	3-5	7/21/08	**<64B4**	<64.	<64.	<64B4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-44	3-5	7/21/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-45	3-5	7/21/08	**<65B3**	**<65.**	<65.	<65B3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-46	3-5	7/21/08	**<59B3**	<59.	<59.	<59B3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-47	3-5	7/21/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 06B and 06E																			
ESE-SB-38	1-3	7/1/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-39	1-3	7/1/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-41	1-3	7/1/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-42	3-5	7/1/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-43	3-5	7/1/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-45	4-6	7/2/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-45	13-15	7/2/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-8	13-15	7/2/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-46	3-5	7/2/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-48	8-10	7/2/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-50	7-8	7/2/08	**1100**	**820**	**680**	**2600**	<12.	<12.	110	530	15	<12.	740	<12.	<12.	<12.	<12.	<12.	100
ESE-SB-52	3-5	7/3/08	**<61.**	<61.	<61J6,J3	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-9	3-5	7/3/08	**<61.**	<61.	32J	32J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-53	3-5	7/3/08	**<54.**	**310**	**110**	**430**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-29	3-5	7/9/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-12	3-5	7/9/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-29	13-15	7/9/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-30	3-5	7/9/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-30	13-15	7/9/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-31	3-5	7/9/08	**<56**	<56	<56	<56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-31	13-15	7/9/08	**<56**	<56	<56J6	<56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-32	3-5	7/9/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-32	13-15	7/9/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 06, 06A, 06C, 06D, and 06F																			
ESE-SB-40	1-3	7/1/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-7	1-3	7/1/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-40	10-12	7/1/08	**<64.**	<64.	54J	54J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-40	13-15	7/1/08	**<95.**	88J	<95.	88J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-44	3-5	7/1/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-44	10-12	7/1/08	**<68.**	**3400**	**740**	**4100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-54	3-5	7/3/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-55	3-5	7/3/08	**39J**	**700**	**960**	**1600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-55	8-10	7/3/08	**65**	**1200**	**1500**	**2800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-55	13-15	7/3/08	**<56.**	<56.	<56.	<56.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-56	3-5	7/7/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-10	3-5	7/7/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-56	10-12	7/7/08	**600**	**6300E**	**3900E**	**11000**	<12.	<12.	34	290	660	390	5000	<12.	<12.	<12.	50	160	2000
ESE-SB-57	3-5	7/7/08	**<62.**	**120**	**100**	**220**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-57	10-12	7/7/08	**<61.**	44J	<61.	44J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-58	3-5	7/7/08	**<65.**	**<65.**	<65.	<65.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-59	3-5	7/7/08	**<57.**	95	87	**180**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-60	3-5	7/7/08	**<62.**	50J	54J	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-60	13-15	7/7/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-61	3-5	7/7/08	**<58.**	**210**	56J	**270**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-61	13-15	7/7/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-62	3-5	7/7/08	**<56.**	<56.	<56.	<56.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-62	10-12	7/7/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-62	13-15	7/7/08	**<60.**	49J	30J	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-63	3-5	7/7/08	**<62.**	40J	**44J**	84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-63	13-15	7/7/08	**<100**	**<100**	**<100J6**	**<100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-64	2-4	7/7/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-65	3-5	7/7/08	**<63.**	**160**	**140**	**310**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-67	3-5	7/8/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-67	13-15	7/8/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-68	3-5	7/8/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-69	3-5	7/8/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-70	3-5	7/8/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-71	3-5	7/8/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-72	3-5	7/8/08	31	**550**	**370**	**960**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-73	3-5	7/10/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-74	3-5	7/10/08	**<59.**	**450**	**300**	**760**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-75	3-5	7/10/08	**<61.**	**2200**	**1800**	**4000**	22B	<12.	<12.	<12.	<12.	390	4200	<12.	<12.	<12.	<12.	41	1000
ESE-SB-76	3-5	7/10/08	**<60.**	**320**	**130**	**450**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-13	3-5	7/10/08	**<60.**	**130**	**100**	**230**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-76	10-12	7/10/08	**<60.**	**99**	75	**170**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-77	3-5	7/12/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-81	3-5	7/12/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-82	3-5	7/12/08	**<57.**	28J	<57.	28J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-83	3-5	7/12/08	**<59.**	<59J5	<59J6	<59J5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-84	3-5	7/16/08	**<59.**	<59J5,J3	<59J6,J3	<59J5,J3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-16	3-5	7/16/08	**<61.**	**880**	**320**	**1200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-99	6-8	8/12/08	**<73.**	**<73.**	<73.	<73.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-102	10-12	8/12/08	**<120**	80J	80J	**160**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-102	15-16	8/12/08	**<95.**	74J	<95.	74J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-109	3-5	8/20/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-109	7-8	8/20/08	**<58J5**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-112	3-5	8/20/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-33	2-4	7/14/08	**<69.**	<69.	<69.	<69.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-33	13-15	7/14/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-34	3-5	7/14/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-15	3-5	7/14/08	**<57.**	<57.	<57.	<57.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-34	13-15	7/14/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-35	3-5	7/14/08	**<61.**	**390**	<61.	**390**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-38	3-5	7/16/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-15	3-5	8/15/08	**1600**	**8000**	**2200**	**12000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-15	42-44	8/15/08	**<67.**	<67.	<67.	<67.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-16	32-34	8/18/08	**<67.**	**110**	48J	**160**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-17	38-40	8/18/08	**<64**	<64	<64	<64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-26	38-40	8/18/08	**<69.**	<69.	<69.	<69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-19	30-32	8/21/08	**<68.**	<68.	<68.	<68.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 11 and NEC of Building 6 and Associated Areas																			
ESE-SB-78	3-5	7/12/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-79	3-5	7/12/08	**<58.**	**240**	<58.	**240**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-14	3-5	7/12/08	**<58.**	**100**	<58.	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-79	6-8	7/12/08	**<56.**	**900**	**100**	**1000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-86	3-5	7/17/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-SB-87	3-5	7/17/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-36	3-5	7/14/08	**<61.**	48J	<61.	48J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-36	13-15	7/14/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-37	3-5	7/14/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-37	6-8	7/14/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-37	13-15	7/14/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-37	16-18	7/14/08	**48J**	<64.	<64.	48J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-39	3-5	7/16/08	**<63.**	33J	<63.	33J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-40	3-5	7/17/08	**<61.**	**110**	94	**210**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-40	13-15	7/17/08	**53J**	<60.	<60.	53J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-40	20-22	7/17/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-41	3-5	7/17/08	**<60.**	**240**	**180**	**420**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-41	13-15	7/17/08	**290**	**190**	<58.	**480**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-41	16-18	7/17/08	**2800**	**410**	<60.	**3300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-12	32-34	8/14/08	**<71**	**<71**	<71	<71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-13	27-29	8/14/08	**<64**	<64	<64	<64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-14	27-29	8/15/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-25	27-29	8/15/08	**<59.**	<59.	<59.	<59.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-18	26-28	8/20/08	**<61.**	<61.	<61.	<61.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-27	26-28	8/20/08	**<63.**	<63.	<63.	<63.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 04 and Associated Areas																			
LTE-SB-51	2-4	7/10/08	**<60.**	<60.	<60.	<60.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-52	2-4	7/26/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-53	2-4	7/11/08	**48**	**81**	<62	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-53	22-24	7/11/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-54	2-4	6/30/08	**<56**	<56	<56	<56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-54	24-26	6/30/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-55	4-6	6/25/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-55	20-22	6/25/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 04A and 10B																			
LTE-TMW-02	2-4	6/27/08	**50**	<56	33	82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-02 (Dup)	2-4	6/27/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-02	12-14	6/27/08	**71**	**130**	<51	**200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-03	2-4	6/24/08	32	**87**	<52	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-03	22-24	6/24/08	**7300**	**190**	**140**	**7600**	<14	<14	<14	<14	<14	6.2	12	190	49	<14	<14	<14	<14
LTE-TMW-03 (Dup)	22-24	6/24/08	**590**	<61	<61	**590**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-04	0-2	6/25/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-04	20-22	6/25/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-56	4-6	6/25/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-56	16-18	6/25/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-58	4-6	6/25/08	**1600**	**910**	<58	**2400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-58	8-10	6/25/08	**2500**	**1400**	<59	**3900**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 10 and 10A																			
LTE-SB-59	0-2	6/26/08	**<56**	<56	<56	<56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-61	2-4	6/24/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-57	2-4	7/10/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-57	18-20	7/10/08	**<58.**	<58.	<58.	<58.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-60	2-4	6/26/08	**<60**	51	<60	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-60	14-16	6/26/08	**40**	<61	<61	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 8, 14, 14A, and 14B																			
LTE-SB-12	2-4	6/24/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-14	2-4	6/23/08	**72**	86	<57	**160**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-14	22-24	6/23/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-14	22-24	6/23/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-15	4-6	6/24/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-16	2-4	6/24/08	**<54**	<54	<54	<54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-66	2-4	7/8/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-01	2-4	6/24/08	**120**	49	<62	**170**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-01	22-24	6/24/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-05	5-6	6/23/08	**<53**	38	<53	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-05	22-24	6/23/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-06	2-4	6/23/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-06	22-24	6/23/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-07	0-2	6/23/08	**34**	**110**	48	**190**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-07	12-14	6/23/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-08	2-4	6/23/08	**<55**	<55	<55	<55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-08	12-14	6/23/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-09	2-4	2/23/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-09	20-22	2/23/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-11	2-4	2/23/08	**580**	**330**	<50	**920**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-11	16-18	2/23/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-13	2-4	6/24/08	**52**	50	<58	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-13	22-24	6/24/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-19	5-6	7/7/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-19	22-24	7/7/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-20	4-6	7/2/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-20	18-20	7/2/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-21	2-4	6/26/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-21	16-18	6/27/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-22	4-6	7/2/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-22	12-14	7/2/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-23	4-6	7/2/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-23	22-24	7/2/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Former Asphalt Plant, Building 18 and 18A																			
TER-SB-18 0-3 FT	0-3	7/11/08	**37**	**920**	**170**	**1000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-19 0-3 FT	0-3	7/11/08	**56**	**1400**	**150**	**1600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-19 0-3 FT	0-3	7/11/08	NA	NA	NA	NA	<3.3	<3.3	<3.3	<3.3	380	360	57	<3.3	<3.3	<3.3	9.3	94	76
TER-SB-19 6-9 FT	6-9	7/11/08	<25	**120**	<25	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-20 0-3 FT	0-3	7/11/08	<25	**180**	**250**	**430**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-21 0-3 FT	0-3	7/11/08	<25	**370**	**480**	**850**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-22 0-3 FT	0-3	7/14/08	<25	**350**	**140**	**510**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-22 3-6 FT	3-6	7/14/08	**65**	**2400**	**240**	**2700**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-22 3-6 FT (DUP)	3-6	7/14/08	29	**980**	80	**1000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-23 0-3 FT	0-3	7/14/08	<25	**660**	**330**	**990**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-23 30-32 FT	30-32	7/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-23 3-6 FT	3-6	7/14/08	**170**	**3100**	**900**	**4200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-24 0-3 FT	0-3	7/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-24 3-6 FT	3-6	7/14/08	**580**	**9400**	540	**10000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-24 3-6 FT	3-6	7/14/08	NA	NA	NA	NA	<3.3	<3.3	4.6	460	3800	2900	810	<3.3	<3.3	<3.3	590	710	480
TER-SB-24 3-6 FT (DUP)	3-6	7/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-25 0-3 FT	0-3	7/15/08	<25	**180**	**350**	**540**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-25 3-6 FT	3-6	7/15/08	<25	**320**	**530**	**850**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26 0-3 FT	0-3	7/15/08	**160**	**4600**	**410**	**5200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26 3-6 FT	3-6	7/15/08	**240**	**5000**	190	**5400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26 6-9 FT	6-9	7/15/08	**1600**	**32000**	**460**	**34000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26 6-9 FT	6-9	7/15/08	NA	NA	NA	NA	<3.3	<3.3	31	950	9400	7400	860	<3.3	<3.3	26	2200	2300	410
TER-SB-26-A 0-3 FT	0-3	8/14/08	<25	**180**	**140**	**320**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-A 3-6 FT	3-6	8/14/08	**750**	**12000**	**570**	**13000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-A 6-9 FT	6-9	8/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-B 0-3 FT	0-3	8/14/08	<25	**140**	89	**230**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-B 3-6 FT	3-6	8/14/08	**75**	**2500**	**380**	**3000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-B 6-9 FT	6-9	8/14/08	30	**910**	56	**1000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-C 0-3 FT	0-3	8/14/08	<25	**150**	**160**	**330**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-C 3-6 FT	3-6	8/14/08	**360**	**7100**	**720**	**8200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-C 6-9 FT	6-9	8/14/08	**680**	**15000**	**320**	**16000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-D 0-3 FT	0-3	8/14/08	<25	**300**	**230**	**520**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-D 3-6 FT	3-6	8/14/08	<25	28	<25	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-D 6-9 FT	6-9	8/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-E 0-3 FT	0-3	8/14/08	<25	41	65	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-E 3-6 FT	3-6	8/14/08	**280**	**4700**	**600**	**5600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-E 6-9 FT	6-9	8/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-F 0-3 FT	0-3	8/14/08	**210**	**7000**	**600**	**7800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-F 3-6 FT	3-6	8/14/08	<25	**190**	85	**280**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-F 6-9 FT	6-9	8/14/08	<25	**400**	**210**	**600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-G 0-3 FT (DUP	0-3	8/14/08	<25	**710**	**150**	**860**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-G 0-3 FT	0-3	8/14/08	<25	**560**	**220**	**780**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-G 3-6 FT	3-6	8/14/08	**140**	**3700**	**310**	**4200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-G 6-9 FT	6-9	8/14/08	**57**	**1200**	**1600**	**3000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-H 0-3 FT	0-3	8/14/08	<25	**290**	**320**	**600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-H 3-6 FT	3-6	8/14/08	**170**	**2000**	**1000**	**3300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-26-H 6-9 FT	6-9	8/14/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-27 0-3 FT (DUP)	0-3	7/15/08	<25	**160**	83	**240**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-27 0-3 FT	0-3	7/15/08	<25	76	**160**	**230**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-27 3-6 FT	3-6	7/15/08	<25	60	**100**	**160**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-28 0-3 FT	0-3	7/15/08	<25	43	34	77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-28 3-6 FT	3-6	7/15/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-29 0-3 FT	0-3	7/17/08	<25	**83**	**140**	**230**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-32 0-3 FT	0-3	7/17/08	<25	<25	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-32 0-3 (DUP)	0-3	7/17/08	<25	<25	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-33 2-4 FT	2-4	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-34 2-4 FT	2-4	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-35 2-4FT	2-4	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-36 2-4 FT	2-4	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-98 0-3 FT	0-3	7/15/08	**1500**	**7400**	**230**	**9100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-99 0-3 FT	0-3	7/15/08	**34**	**700**	**400**	**1100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-100 0-3 FT	0-3	7/15/08	<25	**170**	78	**260**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-100 9-12 FT	9-12	7/15/08	**270**	**1100**	**300**	**1600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-101 3-6 FT	3-6	7/15/08	<25	**350**	**200**	**550**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-03 0-3 FT	0-3	7/11/08	<25	**600**	**400**	**1000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-11 0-3 FT	0-3	7/15/08	**160**	**7700**	**460**	**8300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-11 0-3 FT	0-3	7/15/08	NA	NA	NA	NA	<3.3	U	U	120	2300	3500	1100	<3.3	<3.3	<3.3	370	1000	610
TER-TMW-11 3-6 FT	3-6	7/15/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-12 0-3 FT	0-3	7/14/08	<25	38	67	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-12 12-15 FT	12-15	7/14/08	<25	30	<25	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-12 3-6 FT	3-6	7/14/08	**74**	**360**	98	**550**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TMW-12 3-6 FT (DUP)	3-6	7/14/08	**150**	**820**	230	**1200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-13 0-3 FT	0-3	7/22/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-13 0-3FT (DUP)	0-3	7/22/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-14 0-2 FT	0-2	7/1/08	**67**	**1900**	**1300**	**3300**	<3.3	<3.3	<3.3	30	350	310	1700	<3.3	<3.3	<3.3	33	84	460
TER-TMW-15 0-3 FT	0-3	7/16/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-16 0-3 FT	0-3	7/16/08	<25	**270**	110	**380**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TMW-16 0-3 FT (DUP)	0-3	7/16/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-27 0-3 FT	0-3	7/15/08	**47**	**640**	**250**	**950**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-4 0-3 FT	0-3	8/18/08	**160**	**2100**	140	**2500**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-4 3-6 FT	3-6	8/18/08	**1200**	**19000**	**560**	**21000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-4 3-6 FT (DUP	3-6	8/18/08	**1400**	**23000**	**540**	**25000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 01 and Associated Areas																			
LTE-SB-45	4-6	7/10/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-47	0-0	7/1/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-42	2-4	7/11/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-42	18-20	7/11/08	**<69**	**<69**	<69	<69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-42 (Dup)	18-20	7/11/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-43	2-4	7/11/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-43	18-20	7/11/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-44	2-4	7/11/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-44	22-24	7/11/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 03 and Associated Areas																			
LTE-SB-25	4-6	7/10/08	**<68.**	**<68.**	<68.	<68.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-25 (Dup)	4-6	7/10/08	**<67.**	**<67.**	<67.	<67.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-26	2-4	6/27/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-49	24-26	7/11/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 13A and 13B																			
LTE-SB-65	4-6	7/14/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-65	18-20	7/14/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-06 0-3 FT	0-3	7/17/08	<25	37	52	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-07 6-9 FT	6-9	7/16/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-07 9-12 FT	9-12	7/16/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-08 0-3 FT	0-3	7/17/08	**43**	**180**	59	**280**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-09 0-3 FT	0-3	7/17/08	<25	**110**	**120**	**240**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-108 0-3FT	0-3	7/22/08	<25	<25	49	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-109 0-3 FT	0-3	7/22/08	<25	**320**	**150**	**470**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-110 0-3 FT	0-3	7/22/08	<25	57	46	**100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-17	2-4	7/7/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-17	12-14	7/7/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-18	2-4	6/24/08	**<54**	<54	<54	<54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-18	18-20	6/24/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-01 9-12 FT	9-12	7/28/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-02 0-3 FT	0-3	7/28/08	**160**	**1700**	<25	**1800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-02 9-12 FT	9-12	7/28/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-08 0-3 FT	0-3	7/17/08	<25	50	**110**	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-29 9-12 FT	9-12	7/22/08	<25	**620**	**140**	**760**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-67	2-4	7/7/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-67	18-20	7/7/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 13 Slab																			
TER-SB-50 3-6 FT	3-6	7/9/08	<25	**140**	62	**200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-51 12-15 FT	12-15	7/9/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-53 2-4 FT	2-4	6/24/08	NA	NA	NA	NA	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<6.6	<3.3	<3.3	<3.3	<3.3	<3.3	<6.6
TER-SB-53 2-4 FT	2-4	6/24/08	<25	54	**160**	**220**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-54 2-4 FT	2-4	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-55 0-2 FT	0-2	6/24/08	<25	**3800**	**1400**	**5300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-55 0-2 FT	0-2	6/24/08	NA	NA	NA	NA	<3.3	7.5	<3.3	<3.3	<3.3	510	4200	<3.3	<3.3	<3.3	<3.3	49	440
TER-SB-55 8-9 FT	8-9	6/24/08	<25	**650**	190	**840**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-56 2-4 FT	2-4	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-19 6-9 FT	6-9	7/9/08	<25	84	79	**160**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-20 6-9 FT	6-9	7/10/08	<25	**480**	**240**	**710**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-2 4-5 FT	4-5	7/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-2 4-5 FT (DUP	4-5	7/25/08	<25	<25	58	58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 12 and Associated Areas																			
LTE-SB-28	2-4	6/27/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-29	4-6	7/12/08	**<66**	<66	<66	<66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-30	2-4	6/25/08	**1500**	**850**	<59	**2400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-31	2-4	8/14/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-31	10-12	8/14/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-31 (Dup)	10-12	8/14/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-50	2-4	6/30/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-69	4-6	7/12/08	**45**	87	<57	**140**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-SB-69	22-24	7/12/08	**<60**	<60	**480**	**480**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-27	0-2	6/27/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-27	26-28	6/27/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-48	2-4	7/1/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-48	24-26	7/1/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-68	2-4	7/12/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-68	20-22	7/12/08	**<58**	<58	45	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-70	2-4	7/12/08	32	62	<58	96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-70	22-24	7/12/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-71	2-4	7/12/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-71	22-24	7/12/08	**<60**	<60	36	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-71	22-24	7/12/08	**<61**	<61	54	54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-73	5-6	7/12/08	**<62**	<62	**120**	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-73	8-10	7/12/08	**<57**	<57	<57	<57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-83	23-24	10/2/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-84	22-23	10/2/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-85	24-25	10/2/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-86	22-23	10/2/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 02 and Associated Areas																			
LTE-SB-37	2-4	6/30/08	**<62**	<62	<62	<62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-35	2-4	6/30/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-35	22-24	6/30/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-38	2-4	6/30/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-38	18-20	6/30/08	**<63**	<63	<63	<63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-39	0-2	6/30/08	**<60**	<60	<60	<60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-39	18-20	6/30/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-40	2-4	7/11/08	**<65**	<65	<65	<65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-40	28-30	7/11/08	**<65**	<65	<65	<65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-41	2-4	7/11/08	**<64**	<64	<64	<64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-41	38-40	7/11/08	**<65**	<65	<65	<65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 05 and Associated Areas																			
LTE-SB-33	2-4	7/1/08	**<61**	<61	<61	<61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-32	4-6	6/30/08	**<58**	<58	<58	<58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-32	18-20	6/30/08	**<59**	<59	<59	<59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-34	2-4	7/10/08	**<62.**	<62.	<62.	<62.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-34	20-22	7/10/08	**<64.**	<64.	<64.	<64.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 19 and Associated Areas																			
TER-SB-90 2-4 FT	2-4	6/27/08	<25	41	<25	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-92 2-4 FT	2-4	6/27/08	<25	<25	30	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-93 2-4 FT	2-4	6/25/08	<25	<25	34	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-94 8-10 FT	8-10	7/2/08	<25	**110**	82	**190**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-95 2-4 FT	2-4	6/25/08	<25	<25	44	44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-96 2-4 FT	2-4	6/25/08	<25	32	37	69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-97 12-14 FT	12-14	6/27/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-06 8-10 FT	8-10	7/2/08	<25	35	56	91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-1 0-3 FT	0-3	7/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-1 0-3 FT (DUP	0-3	7/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1D
SOIL DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	Total Petroleum Hydrocarbons																
			Texas Method 1005				Texas Method 1006												
			C6 - C12	C12 - C28	C28 - C35	C6 - C35	C6 Aliphatics	C6 - C8 Aliphatics	C8 - C10 Aliphatics	C10 - C12 Aliphatics	C12 - C16 Aliphatics	C16 - C21 Aliphatics	C21 - C35 Aliphatics	C7 - C8 Aromatics (Toluene Only)	C8 - C10 Aromatics	C10 - C12 Aromatics	C12 - C16 Aromatics	C16 - C21 Aromatics	C21 - C35 Aromatics
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 22 Ingram's Gully																			
TER-SB-10 0-3 FT	0-3	7/17/08	<25	**780**	**490**	**1200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-10 0-3 FT (DUP)	0-3	7/17/08	<25	**480**	**320**	**790**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-57 8-10 FT	8-10	6/30/08	**40**	**5800**	**2200**	**8040**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-57 8-10 FT	8-10	6/20/08	NA	NA	NA	NA	<3.3	4.5	4.4	10	58	160	2800	<3.3	<3.3	<3.3	4.9	60	580
TER-SB-58 4-6 FT	4-6	6/30/08	<25	**110**	77	**190**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-60 10-12 FT	10-12	6/30/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-61 0-3 FT	0-3	7/2/08	<25	**150**	**510**	**680**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-62 0-3 FT	0-3	7/2/08	<25	**100**	**290**	**400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-63 0-3 FT	0-3	7/2/08	<25	<25	54	54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-64 0-3 FT	0-3	7/2/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-65 2-4 FT	2-4	6/25/08	<25	**300**	<25	**300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-65 2-4 FT	2-4	6/25/08	NA	NA	NA	NA	<3.3	<3.3	<3.3	<3.3	98	80	<6.6	<3.3	<3.3	<3.3	<3.3	9.2	<6.6
TER-SB-66 4-6 FT	4-6	6/25/08	<25	**240**	<25	**240**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-68 0-2FT	0-2	6/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-68 14-16 FT	14-16	6/25/08	<25	90	52	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-69 12-14 FT	12-14	7/3/08	**61**	**380**	**160**	**600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-69 18-19 FT	18-19	7/3/08	**220**	**970**	**620**	**1700**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-69 26-28 FT	26-28	7/3/08	<25	72	**45**	**120**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-70 9-12 FT	9-12	7/3/08	**64**	**1400**	**1300**	**2600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-71 12-15 FT	12-15	7/7/08	<25	**260**	**140**	**410**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-71 8-12 FT (DUP)	8-12	7/7/08	<25	**780**	**360**	**1100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-71 9-12 FT	9-12	7/7/08	<25	**460**	**240**	**710**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-72 9-12 FT	9-12	7/3/08	**89**	**3600**	**2100**	**5800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-72 9-12 FT	9-12	7/3/08	NA	NA	NA	NA	<3.3	<3.3	<3.3	<3.3	51	480	3200	<3.3	<3.3	<3.3	<3.3	45	490
TER-SB-77 2-4 FT	2-4	6/23/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-78 2-4 FT	2-4	6/23/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-79 4-6 FT	4-6	6/23/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-80 2-4 FT	2-4	6/23/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-81 2-4 FT	2-4	6/23/08	<25	57	<25	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-82 2-4 FT	2-4	6/27/08	<25	62	**240**	**310**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-83 14-16 FT	14-16	6/23/08	**450**	**650**	**530**	**1600**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-84 2-4 FT	2-4	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-85 2-4 FT	2-4	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-86 2-4 FT	2-4	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-87 4-6 FT	4-6	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-88 4-6 FT	4-6	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-89 4-6 FT	4-6	6/24/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-22 0-3 FT	0-3	7/2/08	**40**	40	<25	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-23 2-4 FT	2-4	6/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-24 18-20 FT	18-20	7/7/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Former Substation																			
TER-SB-41 6-9FT	6-9	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-41 6-9 (DUP)	6-9	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-42 6-9FT	6-9	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-42 6-9 DUP	6-9	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-44 6-8 (DUP)	6-8	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-44 6-9 FT	6-9	7/8/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-46 12-15 FT	12-15	7/8/08	**51**	**1200**	**660**	**1900**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-46 12-15 FT	12-15	7/8/08	NA	NA	NA	NA	<3.3	<3.3	<3.3	<3.3	54	130	930	<3.3	<3.3	<3.3	<3.3	20	170
TER-SB-46 9-12 FT	9-12	7/8/08	**39**	**930**	**540**	**1500**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-59 8-10 FT	8-10	6/30/08	<25	94	73	**170**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-104 6-8 FT	6-8	6/30/08	<25	**3100**	<25	**3100**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-105 0-3 FT	0-3	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-105-A 0-3 FT	0-3	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-106 0-3 FT	0-3	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-107 0-3 FT	0-3	7/1/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-17 6-9 FT	6-9	7/10/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-21 0-3 FT	0-3	7/10/08	<25	76	57	**140**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-3 5-6 FT	5-6	7/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-3 6-9 FT	6-9	7/25/08	<25	<25	<25	<25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ingestion PCL[1]			**33**	**99**	**99**	**99**	**170**	**420**	**3,600**	**25,000**	**490,000**	**1,000,000**	**1,000,000**	**20**	**65**	**100**	**200**	**470**	**3,700**
Non-Ingestion PCL[2]			**1,100**	**2,000**	**2,000**	**2,000**	**1,900**	**1,900**	**2,200**	**2,100**	**2,800**	**130,000**	**110,000**	**4,800**	**1,600**	**1,900**	**2,300**	**1,900**	**1,900**

Notes:
(Dup) = Duplicate sample
All units in mg/kg = milligrams per kilogram
NA = Not analyzed
Bold indicates concentrations above the Ingestion PCL.
indicates concentrations above the Non-Ingestion PCL.
[1]TCEQ TRRP Tier 1 Residential$^{GW}SOIL_{Ing}$ PCL.
[2]TCEQ TRRP Tier 1 Residential$^{TOT}SOIL_{Comb}$ PCL.

TABLE 1E
SOIL DATA SUMMARY
POLYCHLORINATED BIPHENYLS

KBR CLINTON DRIVE FACILITY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Depth (Feet)	Date Collected	PCBs[1]						
			PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Building 10B and 14A									
LTE-TMW-56	4-6	6/25/08	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
LTE-TMW-56	16-18	6/25/08	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
LTE-TMW-58	4-6	6/25/08	<0.099	<0.099	<0.099	<0.099	<0.099	<0.099	0.22
LTE-TMW-58	8-10	6/25/08	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.17
Building 10 and 10A									
LTE-SB-59	0-2	6/26/08	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095
LTE-TMW-60	2-4	6/26/08	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10
LTE-TMW-60	14-16	6/26/08	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Building 22 Ingram's Gully									
TER-SB-57 8-10 FT	8-10	6/30/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	<0.014
Former Substation									
TER-SB-102 1-2 FT	1-2	6/30/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	0.12
TER-SB-103 1-2 FT	1-2	6/30/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	0.4
TER-SB-104 1-2 FT	1-2	6/30/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	<0.014
TER-SB-105 0-3 FT	0-3	7/1/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	<0.014
TER-SB-106 0-3 FT	0-3	7/1/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	<0.014
TER-SB-107 0-3 FT	0-3	7/1/08	<0.0099	<0.025	<0.036	<0.024	<0.014	<0.025	<0.014
Ingestion PCL[2]			**11**	**11**	**11**	**11**	**11**	**11**	**11**
Non-Ingestion PCL[3]			**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**

Notes:
(Dup) = Duplicate sample
All units in mg/kg = milligrams per kilogram
NA = Not analyzed
Bold indicates concentrations above the Ingestion PCL.
indicates concentrations above the Non-Ingestion PCL.
[1]Polychlorinated biphenyls (PCBs) analyzed by EPA Method 8082.
[2]TCEQ TRRP Tier 1 Residential $^{GW}SOIL_{ing}$ PCL.
[3]TCEQ TRRP Tier 1 Residential $^{Tot}SOIL_{Comb}$ PCL.

TABLE 2A
GROUNDWATER DATA SUMMARY
TOTAL METALS

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	pH	Total Metals[1]						
			Arsenic	Beryllium	Cadmium	Chromium	Lead	Mercury	Selenium
Units		--	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Building 32 and Associated Area									
ESE-TMW-14	6/25/08	--	0.0019	0.00022 J	<0.00020	<0.0020	0.0048 J	<0.020	<0.020
ESE-MW-01	8/8/08	--	0.00078 J	NA	**<0.0050**	<0.010	<0.0050	0.00005 J	<0.020
Buildings 32D, 32E, 32F and Associated Area									
ESE-TMW-02	6/17/08	--	0.14	<0.0020	0.00092 J	<0.010	<0.0050	<0.00020	0.013 J
ESE-TMW-03	6/18/08	--	**0.086**	<0.0020	0.0016 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-04	6/18/08	--	**0.068**	<0.0020	0.0012 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-05	6/20/08	--	0.0015	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.014 J
ESE-TMW-06	6/20/08	--	0.0017	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.014 J
ESE-TMW-07	6/20/08	--	0.0017	<0.0020	**<0.0050**	0.0036 J	0.0032 J	<0.00020	0.012 J
ESE-TMW-08	6/20/08	--	0.0066	0.00087 J	0.0017 J	0.014	0.0077	<0.00020	0.011 J
ESE-TMW-09	6/24/08	--	0.0029	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-10	6/24/08	--	0.0029	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.0082 J
ESE-TMW-11	6/24/08	--	0.0024	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-13	6/25/08	--	0.0029	<0.0010	<0.00020	<0.0020	0.0028 J	**<0.020**	<0.020
ESE-TMW-48	7/22/08	--	0.0012	<0.0020	**<0.0050**	<0.010	<0.0050	0.00009 J	0.023
ESE-TMW-49	7/22/08	--	**0.018**	NA	**<0.0050**	<0.010	<0.005	<0.0002	<0.02
ESE-MW-02	8/8/08	--	0.0004 J	NA	**<0.0050**	<0.010	<0.0050	0.00005 J	<0.020
ESE-MW-03	8/8/08	--	0.0026	NA	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-04	8/11/08	--	0.0049	NA	0.0012 J	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-05	8/11/08	--	0.0013	NA	0.001 J	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-08	8/11/08	--	0.0037	NA	0.0014 J	<0.010	<0.0050	<0.00020	<0.020
Buildings 15, 21 and Lot along Clinton Drive									
ESE-TMW-15	6/25/08	--	0.0021	0.00022 J	<0.00020	<0.0020	0.0091 J	**0.0065 J**	<0.020
ESE-TMW-16	6/25/08	--	0.0024 J,O	<0.0020	0.0012 J	<0.010	<0.0050	<0.00020	0.015 J
ESE-TMW-21	6/26/08	--	0.0046 J,O	0.00088 J	0.0034 J	0.011	0.01	<0.00020	0.016 J
ESE-TMW-22	6/26/08	--	0.0041 J,O	0.00081	0.0028	0.01	0.025	<0.00020	0.0098
ESE-MW-07	8/11/08	6.8 T8	0.0014	NA	0.0012 J	<0.010	<0.0050	0.00005 J	<0.020
Building 32C and Associated Area									
ESE-TMW-17	6/25/08	--	0.0026	<0.0010	<0.00020	<0.0020	0.0024 J	**<0.020**	<0.020
ESE-TMW-18	6/27/08	--	0.0068	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-19	6/27/08	--	0.0071	<0.0020	0.0011 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-23	6/27/08	--	0.001	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.019 J
Building 16B and Associated Area									
ESE-TMW-24	6/27/08	--	0.001	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.015 J
ESE-TMW-25	6/27/08	--	0.00075 J	<0.0020	0.00077 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-26	6/27/08	--	0.00049 J	<0.0020	0.0014 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-27	6/27/08	--	0.00058 J	<0.0020	0.00092 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-28	7/2/08	--	0.001	<0.0020	0.0011 J	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-06	10/14/08	7.1 T8	0.0049	<0.0020	**<0.0050**	0.0033 J	<0.0050	<0.00020 J6,J3	**0.059**
Building 09 and Open Parking Lots along Clinton Drive									
ESE-TMW-43	7/22/08	--	**0.011**	<0.0020	0.0031 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-44	7/22/08	--	0.002	<0.0020	0.0017 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-45	7/22/08	--	0.002	<0.0020	0.0028 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-46	7/22/08	--	0.003	<0.0020	0.0023 J	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-47	7/22/08	--	0.002	<0.0020	0.0038 J	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-10	8/26/08	7.3 T8	0.002	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-11	8/27/08	7.6 T8	**0.018**	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
Buildings 06B, 06E, 06F and Associated Area									
ESE-TMW-29	7/10/08	--	0.006	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-30	7/10/08	--	**0.017**	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-TMW-31	7/10/08	--	0.001	0.0016 J	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020

TABLE 2A
GROUNDWATER DATA SUMMARY
TOTAL METALS

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	pH	Total Metals[1]						
			Arsenic	Beryllium	Cadmium	Chromium	Lead	Mercury	Selenium
Units		--	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Buildings 06, 06A, 06C, 06D and Associated Area									
ESE-TMW-33	7/15/08	--	0.0095	<0.0020	**<0.0050**	<0.010	0.011	0.00006 J	**0.14**
ESE-TMW-34	7/15/08	--	0.0052	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	**0.15**
ESE-TMW-35	7/15/08	--	**0.042**	<0.0020	**<0.0050**	0.024	**0.099**	<0.00020	0.04
ESE-TMW-38	7/16/08	--	**0.032**	<0.0020 J	0.0015	<0.010	<0.0050	<0.0010 O	0.018 J
ESE-MW-09	8/26/08	7.2 T8	0.0079	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.012 J
ESE-MW-15	8/28/08	7 T8	0.003	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-16	8/28/08	7.5 T8	0.005	<0.0020	**<0.0050**	0.0031 J	<0.0050	<0.00020	0.01 J
ESE-MW-17	8/28/08	6.9 T8	0.004	<0.0020	**<0.0050**	0.0033 J	<0.0050	<0.00020	<0.020
ESE-MW-19	8/28/08	7.6 T8	0.0056	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-20	10/10/08	--	0.004	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
ESE-MW-23	10/10/08	7.7 T8	0.004	<0.0020	**<0.0050**	0.0036 J	<0.0050	<0.00020	0.041
ESE-MW-24	10/10/08	6.7 T8	0.003	<0.0020	**<0.0050**	0.0057 J	<0.0050	<0.00020	0.049
ESE-FD-36 (MW-24 dup)	10/10/08	6.8 T8	0.0026	0.0025	**<0.0050**	0.0044 J	<0.0050	<0.00020	**0.06**
ESE-E-MW-1	7/18/08	--	0.00031 J	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
Building 11 and Northeast Corner of Building 06 and Associated Area									
ESE-TMW-36	7/15/08	--	0.012	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	**0.068**
ESE-TMW-37	7/15/08	--	0.0042	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	**0.075**
ESE-TMW-41	7/18/08	--	NA	NA	NA	NA	<0.005	NA	NA
ESE-MW-12	8/27/08	7.4 T8	NA	NA	NA	NA	<0.0050	NA	NA
ESE-FD-29 (MW-12 dup)	8/27/08	--	NA	NA	NA	NA	<0.0050	NA	NA
ESE-MW-13	8/27/08	7.1 T8	NA	NA	NA	NA	<0.0050	NA	NA
ESE-MW-14	8/27/08	7.2 T8	NA	NA	NA	NA	<0.0050	NA	NA
ESE-MW-18	8/27/08	7.2 T8	NA	NA	NA	NA	<0.0050	NA	NA
Building 04 and Associated Area									
LTE-TMW-53	7/12/08	--	0.0034	**0.0048**	0.0046	0.066	**0.021**	<0.00020	<0.020
LTE-TMW-54	7/3/08	--	**0.013**	0.0025	**0.008**	0.033	**0.034**	<0.00020	<0.020
LTE-TMW-55	6/27/08	--	**0.028**	0.0024	**0.0059**	0.079	**0.019**	<0.00020	<0.020
LTE-MW-88	8/26/08	--	0.0018	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.022
LTE-MWEX-03	8/11/08	--	**0.032**	<0.0020	0.0014	<0.010	<0.0050	0.00009	<0.020
LTE-MWEX-04	8/22/08	--	0.0013	0.001	0.0012	<0.010	<0.0050	<0.00020	<0.020
Buildings 04A, 10B and Associated Area									
LTE-TMW-02	7/1/08	--	**0.012**	0.0016	0.0028	0.022	**0.022**	<0.00020	<0.020
LTE-TMW-03	6/25/08	--	**0.065**	<0.0020	**<0.0050**	0.0065	<0.0050	<0.00020	<0.020
LTE-TMW-04	6/27/08	--	0.0045	0.0032	**0.0092**	0.078	**0.038**	<0.00020	0.01
LTE-TMW-56	6/26/08	--	0.00047	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-56 (dup)	6/26/08	--	0.00049	<0.0020	0.0018	0.0032	<0.0050	<0.00020	0.014
LTE-TMW-58	6/26/08	--	0.0016	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
LTE-MW-91	8/27/08	--	0.0073	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
LTE-MWEX-01	8/11/08	--	**0.031**	<0.0020	0.0031	0.0036	<0.0050	0.00005	<0.020
LTE-MWEX-02	8/11/08	--	**0.021**	<0.0020	0.0022	<0.010	<0.0050	<0.00020	<0.020
Buildings 10, 10A and Associated Area									
LTE-TMW-57	7/11/08	--	**0.037**	<0.0020	0.0022	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-60	6/27/08	--	**0.021**	0.0034	**0.0089**	0.066	**0.071**	<0.00020	0.017
LTE-MBW-01	8/11/08	--	0.01	<0.0020	0.0012	0.0049	<0.0050	<0.00020	<0.020
LTE-MBW-01 (dup)	8/11/08	--	0.01	<0.0020	0.0012	0.0046	<0.0050	0.00005	<0.020
Buildings 08, 14, 14A, 14B and Associated Area									
LTE-TMW-05	6/24/08	--	**0.028**	<0.0020	0.0016	<0.010	0.0051	<0.00020	0.01
LTE-TMW-08	6/24/08	--	**0.012**	<0.0020	0.001	<0.010	<0.0050	<0.00020	0.0074
LTE-TMW-08 (dup)	6/24/08	--	**0.012**	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-13	6/25/08	--	**0.015**	<0.0020	**<0.0050**	0.0048	0.0028	<0.00020	<0.020
LTE-MBW-02	8/8/08	--	**0.03**	<0.0020	**<0.0050**	<0.010	<0.0050	0.00005	<0.020
LTE-MBW-03	8/11/08	--	**0.033**	<0.0020	0.0018	<0.010	<0.0050	<0.00020	<0.020
Former Asphalt Plant									
TER-TMW-09	7/11/2008	7.9	NA	NA	NA	NA	0.0054	NA	NA
TER-TMW-09 (dup)	7/11/2008	--	NA	NA	NA	NA	<0.0019	NA	NA
TER-TMW-10	7/29/2008	--	NA	NA	NA	NA	<0.0019	NA	NA
TER-TMW-10 (dup)	7/29/2008	--	NA	NA	NA	NA	<0.0019	NA	NA
TER-TMW-11	7/18/2008	--	NA	NA	NA	NA	<0.0019	NA	NA
TER-TMW-15	7/18/2008	--	0.00034 J	<0.00075	<0.00074	<0.0020	<0.0019	0.00005 J	<0.0065
TER-TMW-15 (dup)	7/18/2008	--	<0.00022	<0.00075	<0.00074	<0.0020	<0.0019	0.000060 J	<0.0065
TER-TMW-16	7/18/2008	--	**0.011**	<0.00075	<0.00074	0.0033 J	<0.0019	<0.000044	<0.0065

TABLE 2A
GROUNDWATER DATA SUMMARY
TOTAL METALS

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	pH	Total Metals[1]						
			Arsenic	Beryllium	Cadmium	Chromium	Lead	Mercury	Selenium
Units		--	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Building 01 and Associated Area									
LTE-TMW-42	7/12/08	--	0.003	0.0019	0.0028	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-43	7/12/08	--	0.015	0.0024	0.0046	0.039	0.0098	<0.00020	<0.020
LTE-TMW-44	7/12/08	--	0.0019	0.0021	0.0027	0.019	**0.015**	<0.00020	0.0078
LTE-TMW-44 (dup)	7/12/08	--	0.0031	<0.0020	0.0013	<0.010	<0.0050	<0.00020	<0.020
LTE-MW-89	8/26/08	--	0.0017	<0.0020	0.00076	<0.010	<0.0050	<0.00020	<0.020
LTE-MW-90	8/27/08	--	0.00072	0.00079	0.0012	<0.010	0.004	<0.00020	0.016
Parking Areas South of Buildings 03 and 12									
LTE-TMW-19	7/8/08	--	0.035	<0.0020	0.0011	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-22	7/3/08	--	0.0085	<0.0020	0.0024	0.0023	<0.0050	<0.00020	0.022
LTE-TMW-23	7/7/08	--	0.041	0.0011	0.0014	0.0093	0.0075	<0.00020	0.013
Buildings 13A, 13B and Associated Area									
LTE-TMW-17	7/8/08	--	0.038	<0.0020	0.0016	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-17 (dup)	7/8/08	--	0.037	<0.0020	0.0014	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-18	6/25/08	--	0.0089	<0.0020	**<0.0050**	0.016	0.0051	<0.00020	<0.020
LTE-TMW-67	7/8/08	--	0.093	<0.0020	0.002	<0.010	<0.0050	<0.00020	<0.020
TER-TMW-07	7/29/08	--	NA	NA	NA	NA	<0.0019	<0.000044	NA
TER-TMW-08	7/18/08	--	0.00049 J	<0.00075	<0.00074	<0.00074	<0.0019	0.000060 J	<0.0065
TER-TMW-29	7/22/08	--	0.004	<0.00075	0.0013 J	0.0024 J	<0.0019	<0.000044	0.017 J
TER-TMW-29 (dup)	7/22/08	--	0.003	<0.00075	0.0014 J	<0.0020	<0.0019	<0.000044	0.010 J
Building 13 Slab									
TER-MW-2	8/1/08	--	0.008	<0.00075	<0.00074	<0.0020	<0.0019	<0.000044	<0.0065
TER-MW-5	8/28/08	--	0.004	<0.00075	<0.00074	0.0031 J	<0.0019	<0.000044	<0.0065
Building 12 and Associated Area									
LTE-TMW-27	7/7/08	--	0.0029	0.00077	0.0009	0.0044	0.0033	<0.00020	0.0098
LTE-TMW-48	7/3/08	--	0.0023	<0.0020	0.0037	<0.010	<0.0050	<0.00020	<0.020
LTE-TMW-70	7/14/08	--	**0.1**	<0.0020	<0.0050	<0.010	**0.015**	<0.00020	0.11
LTE-MW-86	10/9/08	--	**0.028**	NA	**<0.0050**	<0.010	0.0024	NA	**0.061**
LTE-MW-92	8/22/08	--	0.0025	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	<0.020
Buildng 02 and Associated Area									
LTE-TMW-35	7/1/08	--	0.0019	<0.0020	0.0011	0.0055	0.0034	<0.00020	0.012
LTE-TMW-38	7/1/08	--	**0.018**	<0.0020	0.0012	<0.010	**0.041**	<0.0010	0.017
LTE-TMW-39	7/1/08	--	**0.02**	<0.0020	0.0014	0.0029	0.011	<0.00020	0.016
LTE-TMW-40	7/14/08	--	0.0087	<0.0020	**<0.0050**	<0.010	**0.051**	<0.00020	**0.14**
LTE-TMW-41	7/14/08	--	**0.012**	<0.0020	**<0.0050**	<0.010	0.0093	<0.00020	**0.13**
Building 05 and Associated Area									
LTE-TMW-32	7/1/08	--	0.002	<0.0020	0.0014	0.0031	0.0035	<0.00020	0.0085
LTE-TMW-32 (dup)	7/1/08	--	0.0014	<0.0020	**<0.0050**	<0.010	<0.0050	<0.00020	0.009
LTE-TMW-34	7/11/08	--	**0.011**	<0.0020	0.0024	0.003	0.0022	<0.0010	<0.020
Building 19 and Associated Area									
TER-TMW-04	6/26/08	--	0.0099 J	<0.00075	0.0010 J	<0.0020	0.0023 J	<0.000044	<0.0065
TER-TMW-05	6/27/08	--	0.00058 J	<0.00075	0.00091 J	<0.0020	<0.0019	<0.000044	<0.0065
TER-MW-1	8/1/08	--	0.010	<0.00075	<0.00074	<0.0020	<0.0019	<0.000044	<0.0065
TER-MW-1 (dup)	8/1/08	--	0.010	<0.00075	<0.00074	<0.0020	<0.0019	<0.000044	<0.0065
Building 22, Ingram's Gully and Associated Area									
TER-SB-70	7/8/08	--	**0.068**	<0.00075	0.0021 J	0.0029 J	0.0036 J	<0.000044	0.012 J
TER-SB-73	7/8/08	--	**0.026**	<0.00075	0.0025 J	<0.0020	<0.0019	<0.000044	0.0071 J
TER-TMW-22	7/3/08	7	**0.019**	<0.00075	0.0026 J	<0.0020	<0.0019	<0.000044	0.01 J
TER-TMW-23	6/26/08	7.2	0.028	<0.00075	0.0025 J	<0.0020	0.011	<0.000044	<0.0065
Former Substation									
TER-MW-3	8/1/08	--	0.003	<0.00075	<0.00074	<0.0020	<0.0019	<0.000044	0.0082 J
Ingestion PCL[2]			**0.01**	**0.004**	**0.005**	**0.1**	**0.015**	**0.002**	**0.05**
Non-Ingestion PCL[3]			--	--	--	--	--	**0.94**	--

Notes:
(Dup) = Duplicate sample
NA = Not analyzed
Bold indicates concentrations exceeding the Ingestion PCL.
indicates concentrations exceeding the non-ingestion PCL.
[1] Priority Pollutants Metals or Resource Conservation and Recovery Act (RCRA) 8 Metals analyzed by Environmental Protection Agency (EPA) Method 6010B or 6020.
[2] TCEQ TRRP Tier 1 Residential 0.5-acre source area ${}^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs).
[3] TCEQ TRRP Tier 1 Resdential 0.5-acre source area ${}^{Air}GW_{Inh\text{-}V}$ PCLs.

TABLE 2B
GROUNDWATER DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	SVOCs[1]
		1-Methylnapthalene
Units		mg/L
Building 09 and Associated Area		
ESE-TMW-43	7/22/08	0.0000068
Building 11, Northeast Corner of Building 06 and Associated Area		
ESE-TMW-37	7/15/08	0.0062
ESE-TMW-41	7/18/08	**0.035**
ESE-MW-09	8/27/08	0.013 J3
Building 04 and Associated Area		
LTE-TMW-53	7/12/08	NA
LTE-MWEX-03	8/11/08	NA
LTE-MWEX-04	8/22/08	NA
Buildings 04A, 10B and Associated Area		
LTE-TMW-02	7/3/08	NA
LTE-TMW-03	6/26/08	NA
LTE-TMW-04	7/3/08	NA
LTE-TMW-56	6/26/08	NA
LTE-TMW-56 (dup)	6/26/08	NA
LTE-TMW-58	6/26/08	NA
LTE-MWEX-01	8/11/08	NA
LTE-MWEX-02	8/11/08	NA
LTE-MW-91	8/27/08	0.0000022
Buildings 10, 10A and Associated Area		
LTE-TMW-57	7/11/08	NA
LTE-TMW-60	6/27/08	NA
LTE-MBW-01	8/11/08	NA
LTE-MBW-01 (dup)	8/11/08	NA
Buildings 8, 14, 14A, 14B and Associated Area		
LTE-TMW-05	6/24/08	NA
LTE-TMW-08	6/24/08	NA
LTE-TMW-08 (dup)	6/24/08	NA
LTE-TMW-13	6/25/08	NA
LTE-MBW-02	8/8/08	NA
LTE-MBW-03	8/11/08	NA

TABLE 2B
GROUNDWATER DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	SVOCs[1]
		1-Methylnapthalene
Units		mg/L
Former Asphalt Plant		
TER-MW-4	8/28/08	NA
Building 01 and Associated Area		
LTE-TMW-42	7/12/08	NA
LTE-TMW-43	7/12/08	NA
LTE-TMW-44	7/12/08	NA
LTE-TMW-44 (dup)	7/12/08	NA
Parking Areas South of Buildings 03 and 12		
LTE-TMW-23	7/7/07	NA
LTE-TMW-17	7/8/08	NA
LTE-TMW-17 (dup)	7/8/08	NA
LTE-TMW-18	6/25/08	NA
LTE-TMW-67	7/8/08	NA
Building 13 Slab		
TER-MW-2	8/1/08	NA
Building 12 and Associated Area		
LTE-TMW-27	7/7/08	NA
LTE-TMW-48	7/3/08	NA
LTE-MW-92	8/22/08	0.0000026
Building 02 and Associated Area		
LTE-TMW-35	7/1/08	NA
LTE-TMW-38	7/1/08	NA
LTE-TMW-39	7/1/08	NA
LTE-TMW-40	7/14/08	NA
LTE-TMW-41	7/14/08	NA

TABLE 2B
GROUNDWATER DATA SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	SVOCs[1]
		1-Methylnapthalene
Units		mg/L
Building 05 and Associated Area		
LTE-TMW-32	7/1/08	NA
LTE-TMW-32 (dup)	7/1/08	NA
LTE-TMW-34	7/11/08	NA
Building 19 and Associated Area		
TER-MW-1	8/1/08	NA
Building 22, Ingram's Gully and Associated Area		
TER-TMW-22	7/3/08	NA
Former Substation		
TER-MW-03	8/1/08	NA
Ingestion PCL[2]		**0.031**
Non-Ingestion PCL[3]		**--**

Notes:
(Dup) = Duplicate sample
NA = Not analyzed
-- indicates no established PCL exists
Bold indicates concentrations exceeding the Ingestion PCL.
indicates concentrations exceeding the non-ingestion PCL.
[1] Semi-Volatile Organic Compounds analyzed by Environmental Protection Agency (EPA) Method 8270C.
[2] TCEQ TRRP Tier 1 Residential 0.5-acre source area ${}^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs).
[3] TCEQ TRRP Tier 1 Resdential 0.5-acre source area ${}^{Air}GW_{Inh-V}$ PCLs.

TABLE 2C
GROUNDWATER DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS (VOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	BTEX/MTBE [1]					VOCs[2]					
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Benzene	cis-1,2-Dichloroethene	Ethylbenzene	Toluene	1,2,4-Trimethylbenzene	Vinyl chloride
Units		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 32 and Associated Area												
ESE-TMW-14	6/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-01	8/8/08	NA	NA	NA	NA	NA	<0.0010	0.0012	<0.0010	<0.0050	<0.0010	<0.0010
	6/8/09	NA	NA	NA	NA	NA	<0.0010	0.00041	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-21	10/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-22	10/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-FD-35 (MW-22 dup)	10/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Buildings 32D, 32E, 32F and Associated Areas												
ESE-TMW-02	6/17/08	NA	NA	NA	NA	NA	**0.1**	<0.050	0.41	**1.2**	**0.61**	<0.050
ESE-TMW-03	6/18/08	NA	NA	NA	NA	NA	**0.0065**	<0.0010	0.0025	<0.0050	0.0013	<0.0010
ESE-TMW-04	6/18/08	NA	NA	NA	NA	NA	**0.29**	<0.010	**0.7**	0.82	**0.62**	<0.010
ESE-TMW-05	6/20/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-06	6/20/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-07	6/20/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-08	6/20/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-09	6/24/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-10	6/24/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-11	6/24/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-13	6/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-48	7/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-49	8/6/08	**0.93**	0.049 J	**1.4**	1.3	NA	NA	NA	NA	NA	NA	NA
ESE-MW-02	8/8/08	<0.00050	<0.0050	<0.00050	<0.0015	NA	NA	NA	NA	NA	NA	NA
ESE-MW-03	8/8/08	<0.00050	<0.0050	<0.00050	<0.0015	NA	NA	NA	NA	NA	NA	NA
ESE-MW-04	8/11/08	0.00021 J	<0.0050	0.00069	0.0024	NA	NA	NA	NA	NA	NA	NA
ESE-MW-05	8/11/08	<0.00050	<0.0050	0.00038 J	0.0014 J	NA	NA	NA	NA	NA	NA	NA
ESE-MW-08	8/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Building 15, 21 and Lot alomg Clinton Drive												
ESE-TMW-15	06/25/08	NA	NA	NA	NA	NA	0.0018	<0.0010	<0.0010	<0.0050	0.00096 J	<0.0010
ESE-TMW-16	06/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-21	06/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-22	06/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-07	08/26/08	NA	NA	NA	NA	NA	<0.0010	0.00047 J	<0.0010	<0.0050	<0.0010	<0.0010
Building 32C and Associated Area												
ESE-TMW-17	6/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-18	6/24/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-19	6/27/08	NA	NA	NA	NA	NA	0.00037 J	<0.0010	0.00047 J	<0.0050	<0.0010	<0.0010
ESE-TMW-23	6/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Building 16B and Associated Area												
ESE-TMW-24	6/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-25	6/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-26	6/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-27	6/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-28	7/2/08	NA	NA	NA	NA	NA	0.0046	**0.13**	0.0012	0.0095	0.00047 J	**0.0062**

TABLE 2C
GROUNDWATER DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS (VOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	BTEX/MTBE [1]					VOCs[2]					
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Benzene	cis-1,2-Dichloroethene	Ethylbenzene	Toluene	1,2,4-Trimethylbenzene	Vinyl chloride
Units		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 09 and Open Parking Lots along Clinton Drive												
ESE-TMW-43	7/22/08	NA	NA	NA	NA	NA	0.00075 J	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-44	7/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-45	7/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-46	7/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-47	7/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-10	8/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-11	8/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	0.00089 J	<0.0050	0.00079 J	<0.0010
Buildings 06B, 06E and Associated Area												
ESE-TMW-29	7/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-30	7/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-31	7/10/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Buildings 06, 06A, 06C, 06D and Associated Area												
ESE-TMW-33	7/15/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-34	7/15/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-35	7/15/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-TMW-38	7/16/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-09	8/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-15	8/28/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-16	8/28/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-17	8/28/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-MW-19	8/28/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
ESE-E-MW-1	7/18/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Building 11, Northeast Corner of Building 06 and Associated Area												
ESE-TMW-36	7/15/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	0.0012	<0.0010
ESE-TMW-37	7/15/08	NA	NA	NA	NA	NA	0.003	<0.0010	0.15 E	<0.0050	0.17 E	<0.0010
ESE-TMW-39	7/16/08	NA	NA	NA	NA	NA	0.0018	NA	0.058	0.0041 J	NA	NA
ESE-TMW-40	7/17/08	NA	NA	NA	NA	NA	0.00039 J,J5	NA	0.069 J5	0.00036 J	NA	NA
ESE-TMW-41	7/17/08	NA	NA	NA	NA	NA	**1.9**	NA	**1.1**	**9.4**	NA	NA
ESE-TMW-42	7/18/08	NA	NA	NA	NA	NA	**2.6**	NA	**1.4**	**2.1**	NA	NA
ESE-MW-12	8/27/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
ESE-FD-29 (MW-12 dup)	8/27/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
ESE-MW-13	8/27/08	NA	NA	NA	NA	NA	**3.2**	NA	**0.83**	**6.3**	NA	NA
ESE-MW-14	8/27/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	0.00071 J	NA	NA
ESE-MW-18	8/27/08	NA	NA	NA	NA	NA	**0.16**	NA	0.0049	0.0014 J	NA	NA
Building 04 and Associated Area												
LTE-TMW-53	07/12/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-55	06/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MWEX-03	08/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MWEX-04	08/22/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Buildings 04A, 10B and Associated Area												
LTE-TMW-02	06/30/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	0.0003	<0.0050	<0.0010	<0.0010
LTE-TMW-03	06/25/08	NA	NA	NA	NA	NA	0.00051	<0.0010	0.00038	<0.0050	<0.0010	<0.0010
LTE-TMW-04	06/27/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-04	07/02/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-56	06/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-56 (dup)	06/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-58	06/26/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MWEX-01	08/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MWEX-02	08/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010

TABLE 2C
GROUNDWATER DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS (VOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	BTEX/MTBE [1]					VOCs[2]					
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Benzene	cis-1,2-Dichloroethene	Ethylbenzene	Toluene	1,2,4-Trimethylbenzene	Vinyl chloride
Units		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Buildings 10, 10A and Associated Area												
LTE-TMW-57	07/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-60	06/27/08	NA	NA	NA	NA	NA	0.00058	<0.0010	0.00047	<0.0050	<0.0010	<0.0010
LTE-MBW-01	08/11/08	NA	NA	NA	NA	NA	<0.0010	0.0011	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MBW-01 (dup)	08/11/08	NA	NA	NA	NA	NA	<0.0010	0.00096	<0.0010	<0.0050	<0.0010	<0.0010
Buildings 08, 14, 14A, 14B and Associated Area												
LTE-TMW-05	06/24/08	NA	NA	NA	NA	NA	0.002	<0.0010	0.0015	<0.0050	0.0014	<0.0010
LTE-TMW-06	06/24/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-07	06/24/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-08	06/24/08	NA	NA	NA	NA	NA	0.0003	<0.0010	0.00067	<0.0050	<0.0010	<0.0010
LTE-TMW-08 (dup)	06/24/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-09	06/24/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-11	06/24/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-13	06/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-MBW-02	08/08/08	NA	NA	NA	NA	NA	0.00072	<0.0010	<0.0010	<0.0050	0.00048	<0.0010
LTE-MBW-03	08/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Former Asphalt Plant												
TER-TMW-01	7/29/2008	<0.00017	<0.0017	<0.00017	<0.00050	0.057	NA	NA	NA	NA	NA	NA
TER-TMW-11	7/18/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-15	7/18/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-15 (dup)	7/18/2008	NA	NA	NA	NA	NA	<0.0014	<0.0019	<0.0011	<0.0025	<0.00099	<0.0014
TER-TMW-16	7/18/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-MW-4	8/28/08	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
Building 01 and Associated Area												
LTE-TMW-42	07/12/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-43	07/12/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-44	07/12/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-44	07/12/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Parking Areas South of Buildings 03 and 12												
LTE-TMW-19	07/08/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-20	07/07/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-21	07/02/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	0.00041	NA	NA
LTE-TMW-22	07/03/08	NA	NA	NA	NA	NA	0.00046	NA	<0.0010	0.00048	NA	NA
LTE-TMW-23	07/07/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Buildings 13A, 13B and Associated Area												
LTE-TMW-17	07/08/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	0.00042	<0.0010
LTE-TMW-17 (dup)	07/08/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-18	06/25/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-67	07/08/08	NA	NA	NA	NA	NA	0.00044	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
TER-TMW-08	7/18/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-29	7/22/2008	NA	NA	NA	NA	NA	<0.00029	0.0021	<0.00022	<0.0025	<0.00020	**0.012**
Building 13 Slab												
TER-MW-2	8/1/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027

TABLE 2C
GROUNDWATER DATA SUMMARY
VOLATILE ORGANIC COMPOUNDS (VOCs)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Sample Location ID	Date Collected	BTEX/MTBE [1]					VOCs[2]					
		Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Benzene	cis-1,2-Dichloroethene	Ethylbenzene	Toluene	1,2,4-Trimethylbenzene	Vinyl chloride
Units		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 12 and Associated Area												
LTE-TMW-27	07/07/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-48	07/02/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-68	07/14/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-70	07/14/08	NA	NA	NA	NA	NA	**0.88**	NA	0.46	0.15	NA	NA
LTE-TMW-71	07/14/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-TMW-73	07/14/08	NA	NA	NA	NA	NA	<0.0010	NA	0.0005	0.00032	NA	NA
LTE-MW-83	10/09/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-MW-84	10/09/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
LTE-MW-85	10/09/08	NA	NA	NA	NA	NA	<0.0010	NA	0.00038	0.00032	NA	NA
LTE-MW-86	10/09/08	NA	NA	NA	NA	NA	**0.048**	NA	0.18	0.14	NA	NA
LTE-MW-87	08/27/08	NA	NA	NA	NA	NA	**0.0069**	NA	<0.0010	0.0016	NA	NA
LTE-MW-87	10/09/08	NA	NA	NA	NA	NA	**0.0062**	NA	<0.0010	0.0015	NA	NA
LTE-MW-87 (dup)	10/09/08	NA	NA	NA	NA	NA	**0.0058**	NA	<0.0010	0.0014	NA	NA
LTE-MW-92	08/22/08	NA	NA	NA	NA	NA	<0.0010	NA	<0.0010	<0.0050	NA	NA
Building 02 and Associated Area												
LTE-TMW-35	07/01/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-38	07/01/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-39	07/01/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-40	07/14/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-41	07/14/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Building 05 and Associated Area												
LTE-TMW-32	07/01/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-32 (dup)	07/01/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
LTE-TMW-34	07/11/08	NA	NA	NA	NA	NA	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Building 19 and Associated Area												
TER-TMW-04	6/26/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-05	6/27/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-06	7/3/2008	0.00048 J	<0.0016	0.0017	0.0014 J	NA	NA	NA	NA	NA	NA	NA
TER-TMW-28	6/27/2008	<0.00016	<0.0016	<0.00016	<0.00050	NA	NA	NA	NA	NA	NA	NA
TER-MW-1	8/1/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-MW-1 (dup)	8/1/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
Building 22, Ingram's Gully and Associated Area												
TER-SB-70	7/8/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-SB-73	7/8/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
TER-TMW-23	6/26/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	0.00032	<0.00027
Former Substation												
TER-MW-3	8/1/2008	NA	NA	NA	NA	NA	<0.00029	<0.00038	<0.00022	<0.0025	<0.00020	<0.00027
Ingestion PCL[3]		**0.005**	**1.0**	**0.70**	**10**	**0.24**	**0.005**	**0.070**	**0.70**	**1.0**	**0.24**	**0.002**
Non-Ingestion PCL[4]		**180**	**64,000**	**16,000**	**10,000**	**4,000**	**180**	**16,000**	**16,000**	**64,000**	**190**	**3.8**

Notes:
(Dup) = Duplicate sample
NA = Not analyzed
Bold indicates concentrations exceeding the Ingestion PCL.
indicates concentrations exceeding the non-ingestion PCL.

[1] Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) analyzed using Environmental Protection Agency (EPA) Method 8021.

[2] Volatile Organic Compounds (VOCs) analyzed by Environmental Protection Agency (EPA) Method 8260.

[3] TCEQ TRRP Tier 1 Residential 0.5-acre source area ${}^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs).

[4] TCEQ TRRP Tier 1 Resdential 0.5-acre source area ${}^{Air}GW_{Inh\text{-}V}$ PCLs.

TABLE 2D
GROUNDWATER DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Date Collected	TPH Texas 1005[1]			TPH Texas 1006[2]												
		C_6-C_{12}	C_{12}-C_{28}	C_{28}-C_{35}	C_6 Aliphatics	C_6-C_8 Aliphatics	C_8-C_{10} Aliphatics	C_{10}-C_{12} Aliphatics	C_{12}-C_{16} Aliphatics	C_{16}-C_{21} Aliphatics	C_{21}-C_{35} Alphatics	C_7-C_8 Aromatics (Toluene only)	C_8-C_{10} Aromatics	C_{10}-C_{12} Aromatics	C_{12}-C_{16} Aromatics	C_{16}-C_{21} Aromatics	C_{21}-C_{35} Aromatics
UNITS		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 32 and Associated Area																	
ESE-TMW-14	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-01	8/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 32D, 32E, 32F and Associated Area																	
ESE-TMW-02	6/17/08	**3.8 J**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-03	6/18/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-04	6/18/08	**6.5**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-05	6/20/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-06	6/20/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-08	6/20/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-09	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-10	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-11	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-13	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-48	7/22/08	**<5.0**	**1.5 J**	**1.2 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-49	8/6/08	**14**	**1 J**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-02	8/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-03	8/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-04	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-05	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-08	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 15, 21 and Lots along Clinton Drive																	
ESE-TMW-15	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-16	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-21	6/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-22	6/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-07	8/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 32C and Associated Area																	
ESE-TMW-17	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-18	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-19	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-23	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 16B and Associated Area																	
ESE-TMW-24	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-25	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-26	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-27	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-28	7/2/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2D
GROUNDWATER DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Date Collected	TPH Texas 1005[1]			TPH Texas 1006[2]												
		C_6-C_{12}	C_{12}-C_{28}	C_{28}-C_{35}	C_6 Aliphatics	C_6-C_8 Aliphatics	C_8-C_{10} Aliphatics	C_{10}-C_{12} Aliphatics	C_{12}-C_{16} Aliphatics	C_{16}-C_{21} Aliphatics	C_{21}-C_{35} Alphatics	C_7-C_8 Aromatics (Toluene only)	C_8-C_{10} Aromatics	C_{10}-C_{12} Aromatics	C_{12}-C_{16} Aromatics	C_{16}-C_{21} Aromatics	C_{21}-C_{35} Aromatics
UNITS		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 09 and Open Parking Lots along Clinton Drive																	
ESE-TMW-43	7/22/08	**<5.0**	**1.6 J**	**1.6 J**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
ESE-TMW-44	7/22/08	**<5.0**	**1.6 J**	**1.5 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-45	7/22/08	**<5.0**	**1.4 J**	**1.5 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-46	7/22/08	**<5.0**	**1.3 J**	**1.4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-47	7/22/08	**<5.0**	**1.3 J**	**1.4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-10	8/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-11	8/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 06B, 06E and Associated Area																	
ESE-TMW-29	7/10/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-30	7/10/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-31	7/10/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-32	7/10/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 06, 06A, 06D, 06E and Associated Area																	
ESE-TMW-33	7/15/08	**<5.0**	**<5.0**	**1.6 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-34	7/15/08	**<5.0**	**<5.0**	**1.8 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-35	7/15/08	**<5.0**	**1.3 J**	**1.8 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-38	7/16/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-09	8/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-15	8/28/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-16	8/28/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-17	8/28/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-19	8/28/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-1	7/18/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 11, Northeast Corner of Building 06 and Associated Area																	
ESE-TMW-36	7/15/08	**<5.0**	**<5.0**	**4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-37	7/15/08	**2.2 J**	**<5.0**	**2.6 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-39	7/16/08	**1.5 J**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-40	7/17/08	**1.2 J**	**2.1 J**	**1.8 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-41	7/17/08	**18**	**1.8 J**	**1.7 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-TMW-42	7/18/08	**14**	**1.8 J**	**1.6 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-12	8/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-FD-29 (MW-12 dup)	8/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-13	8/27/08	**17**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESE-MW-14	8/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 04 and Associated Area																	
LTE-TMW-53	7/12/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-55	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MWEX-03	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MWEX-04	8/22/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 04A, 10B and Associated Area																	
LTE-TMW-02	6/30/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-03	6/25/08	**3.8**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-04	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-04	7/2/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-56	6/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-56	6/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-58	6/26/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MWEX-01	8/11/08	**2.8**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MWEX-02	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2D
GROUNDWATER DATA SUMMARY
TOTAL PETROLEUM HYDROCARBONS (TPH)

KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Date Collected	TPH Texas 1005[1]			TPH Texas 1006[2]												
		C_6-C_{12}	C_{12}-C_{28}	C_{28}-C_{35}	C_6 Aliphatics	C_6-C_8 Aliphatics	C_8-C_{10} Aliphatics	C_{10}-C_{12} Aliphatics	C_{12}-C_{16} Aliphatics	C_{16}-C_{21} Aliphatics	C_{21}-C_{35} Alphatics	C_7-C_8 Aromatics (Toluene only)	C_8-C_{10} Aromatics	C_{10}-C_{12} Aromatics	C_{12}-C_{16} Aromatics	C_{16}-C_{21} Aromatics	C_{21}-C_{35} Aromatics
UNITS		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Buildings 10, 10A and Associated Area																	
LTE-TMW-57	7/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-60	6/27/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MBW-01	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MBW-01	8/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 08, 14, 14A, 14B and Associated Area																	
LTE-TMW-05	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-06	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-07	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-08	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-08	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-09	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-11	6/24/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-13	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MBW-02	8/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MBW-03	8/11/08	**<5.0**	**<5.0**	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Former Asphalt Plant																	
TER-TMW-01	7/29/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-03	7/11/2008	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-03 (dup)	7/11/2008	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-11	7/18/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-15	7/18/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-15 (dup)	7/18/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-16	7/18/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-4	8/28/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 01 and Associated Area																	
LTE-TMW-42	7/12/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-43	7/12/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-44	7/12/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-44	7/12/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Parking Areas South of Buildings 03 and 12																	
LTE-TMW-19	7/8/08	**1.4**	**1.2**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-21	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-22	7/3/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-23	7/7/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Buildings 13A, 13B and Associated Area																	
TER-TMW-08	7/18/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-17	7/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-17	7/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-18	6/25/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-29	7/22/08	<0.98	**1.3**	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-29 (dup)	7/22/08	<0.98	**1.3**	**1.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-67	7/8/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 13 Slab																	
TER-MW-2	8/1/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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KBR CLINTON DRIVE FACILTY
4100 CLINTON DRIVE
HOUSTON, TEXAS

Soil Boring ID	Date Collected	TPH Texas 1005[1]			TPH Texas 1006[2]												
		C_6-C_{12}	C_{12}-C_{28}	C_{28}-C_{35}	C_6 Aliphatics	C_6-C_8 Aliphatics	C_8-C_{10} Aliphatics	C_{10}-C_{12} Aliphatics	C_{12}-C_{16} Aliphatics	C_{16}-C_{21} Aliphatics	C_{21}-C_{35} Alphatics	C_7-C_8 Aromatics (Toluene only)	C_8-C_{10} Aromatics	C_{10}-C_{12} Aromatics	C_{12}-C_{16} Aromatics	C_{16}-C_{21} Aromatics	C_{21}-C_{35} Aromatics
UNITS		**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Building 12 and Associated Area																	
LTE-TMW-27	7/7/08	**<5.0**	**2.4**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-48	7/2/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-68	7/14/08	**<5.0**	**<5.0**	**2.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-70	7/14/08	**2.4**	**<5.0**	**42**	<1.0	**14**	**7.3**	**3**	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0
LTE-TMW-71	7/14/08	**<5.0**	**<5.0**	**1.1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-73	7/14/08	**<5.0**	**<5.0**	**1**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-83	10/9/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-84	10/9/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-85	10/9/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-86	10/9/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-MW-87	10/9/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 02 and Associated Area																	
LTE-TMW-35	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-38	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-39	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-40	7/14/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-41	7/14/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 05 and Associated Area																	
LTE-TMW-32	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-32	7/1/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LTE-TMW-34	7/11/08	**<5.0**	**<5.0**	**<5.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 19 and Associated Area																	
TER-TMW-04	6/26/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-05	6/27/08	**80**	**68**	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-06	7/3/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-28	6/27/08	**190**	**180**	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-1	8/1/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-MW-1 (dup)	8/1/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Building 22, Ingram's Gully and Associated Area																	
TER-SB-70	7/8/08	<0.98	**1.3**	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-SB-73	7/8/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-22	7/3/2008	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TER-TMW-23	6/26/2008	<0.98	0.99	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Former Substation																	
TER-MW-3	8/1/08	<0.98	<0.98	<0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ingestion PCL[3]		**0.98**	**0.98**	**0.98**	**1.5**	**1.5**	**2.4**	**2.4**	**2.4**	**49**	**--**	**2.4**	**0.98**	**0.98**	**0.98**	**0.73**	**0.73**
Non-Ingestion PCL[4]		**1,800**	**7,500**	**7,500**	**32**	**21**	**66**	**44**	**10**	**--**	**--**	**16,000**	**1,800**	**4,300**	**7,500**	**--**	**--**

Notes:
(Dup) = Duplicate sample
NA = Not analyzed
Bold indicates concentrations exceeding the Ingestion PCL.
indicates concentrations exceeding the non-ingestion PCL.
[1]Total Petroleum Hydrocarbons analyzed using Texas Method 1005.
[2]Total Petroleum Hydrocarbons analyzed using Texas Method 1006.
[3]TRRP Tier 1 Residential PCL for ${}^{GW}GW_{Ing}$ for a 0.5-acre source area.
[4]TRRP Tier 1 Residential PCL for ${}^{Air}GW_{Inh-V}$ for a 0.5-acre source area.

Appendix G

MUNICIPAL SETTING DESIGNATION APPLICATION
4100 CLINTON DRIVE
HOUSTON, TEXAS

STATEMENT REGARDING PLUME STABILITY

Based upon the investigations completed to date, the contaminant plumes present at the Site are stable. This statement is based upon the age of the plumes, the source masses, natural attenuation, and the low concentrations at the source. All of these factors limit the migration of the contaminant plume.

For VOC plumes, namely those from former leaking USTs, since the sources of impact are a decade old or older, natural degradation is underway and will continue to mitigate the impact. The source masses were all small to begin with, so without a large source mass, breakdown has exceeded expansion. Additionally, based on monitoring data available from previous investigations performed on the contaminant plumes west of Building 32 and northeast of Building 06, the concentrations in the groundwater have decreased over time since the tanks were removed. Figures and data tables from previous reports for these areas are included in **Appendix AA**.

For metals identified in the groundwater, no actual plume exists. The impacts are ubiquitous across the Site but in most cases are very low concentrations that are just above the ingestion PCL.

Vertical contaminant migration is limited due to a very dense clay aquitard encountered at approximately 46 feet bgs across the Site. Horizontal contaminant migration to the south is further limited by the manmade bulkhead which restricts shallow groundwater migration to the bayou.

Concentrations of the specified contaminants have not exceeded TRRP Tier 1 Residential Assessment Levels <u>with an MSD</u> (non-ingestion PCLs) in any of the monitoring wells located on the Designated Property.