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PID 77332/85531

APPENDIX EC-11

ESA Phase II Reports – Commercial Road
(Contract Document)

State of Ohio
Department of Transportation
Jolene M. Molitoris, Director

Innerbelt Bridge
Construction Contract Group 1 (CCG1)

Revision Date: January 2010

2 - Addendum No. 2 - Updated Title - URS Report removed and provided in New Appendix EC-14

PHASE II ENVIRONMENTAL SITE ASSESSMENT

CUY-CLEVELAND INNERBELT COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510) CLEVELAND, CUYAHOGA COUNTY, OHIO

JANUARY 2010

Prepared for:

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H09004-14

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EXECUTIVE SUMMARY

HzW Environmental Consultants, LLC (HzW) was contracted by the Ohio Department of Transportation (ODOT) Office of Environmental Services (OES) to conduct a Phase II Environmental Site Assessment (ESA) of the CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area (PID 77510), Cleveland, Cuyahoga County, Ohio (herein referred to as the "Project Area"). This project was conducted in accordance with HzW's proposal dated November 3, 2009, which was authorized by ODOT OES on November 19, 2009. The purpose of the Phase II ESA investigation was to assess the unknown fill materials encountered during installation of geotechnical borings in July 2009 within the Project Area prior to property acquisition and/or the initiation of construction activities.

The CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area involves the realignment of Commercial Road between Canal Road and the proposed East Ninth Street Extension. In July 2009, geotechnical drilling crews installed a series of borings for the proposed realignment of Commercial Road. During installation of four (4) borings, drilling crews encountered unknown fill materials at depths of less than five (5) feet in three (3) borings and to a depth over 20 feet in one (1) boring. The unknown fill materials ranged in color from white to blue and odors were identified in several borings.

Phase II ESA activities were conducted in December 2009, and consisted of the installation of four (4) soil borings (designated HB-071, HB-072, HB-073 and HB-075) within the Project Area. The soil borings were installed adjacent to the geotechnical soil borings installed in July 2009. Subsurface materials encountered during boring installation consisted of non-native fill materials comprised of sandy clay, sand and sandy slag with varying amounts of gravel, slag, brick and wood fragments. Odors were identified at multiple depths in one (1) boring. No evidence of groundwater was encountered during boring installation.

Soil analytical results were compared against the Ohio Environmental Protection Agency's (EPA's) Voluntary Action Program (VAP) single-chemical Generic Direct Contact Soil Standards (GDCS) for commercial/industrial land use and construction/excavation activities and the State of Ohio's Bureau of Underground Storage Tank Regulations' (BUSTR) Petroleum-Contaminated Soil (PCS) Re-Use Levels. The regulatory standards referenced as part of this project are for comparative use only and may not be directly applicable to the Project Area.

Soil analytical results indicate that concentrations of several volatile organic compounds (VOCs), polynuclear aromatic hydrocarbon (PAH) compounds, one or more fractions of total petroleum hydrocarbons (TPH), total metals and/or total sulfide were detected in the soil samples collected within the Project Area. None of the concentrations of the constituents detected in soil samples exceeded the Ohio EPA's VAP GDCS for commercial/industrial land use or construction/excavation activities. However, concentrations of several constituents exceeded BUSTR's PCS Re-Use Levels, which consist of the following:

- Benzo(a)anthracene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene and naphthalene in HB-071 (8-10');
- Benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-071 (10-12');
- Indeno(1,2,3-cd)pyrene in HB-071 (16-18'), HB-072 (2-4') and HB-073 (0-2');
- Benzene, benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-072 (4-6'); and
- Benzo(a)anthracene, benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-075 (0-2') and HB-075 (2-4').

Therefore, based upon the above constituent concentrations exceeding BUSTR's PCS Re-Use Levels, a plan note should be included in construction documents for the proper handling, management and/or disposal of PCS in accordance with all applicable laws and regulations. The detected concentrations of total lead in HB-073 (0-2') and HB-075 (2-4') are 20 times the Toxicity Characteristic Leaching Procedure (TCLP) level for lead. In addition, although concentrations did not exceed VAP GDCS for commercial/industrial land use or construction/excavation activities, total cyanide was detected in six (6) soil samples and hexavalent chromium in one (1) soil sample. As a result, should construction plans/activities anticipate excavation and disposal of soils from these locations, properly characterize soils prior to disposal.

SIGNATURE PAGE

This Phase II Environmental Site Assessment report for the CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area (PID 77510) was prepared by HzW Environmental Consultants, LLC. Mr. Douglas M. Wetzel, Environmental Scientist, was the primary author of the report and Mr. John A. Zampino, Senior Geologist, reviewed the report. The signatures for Mr. Wetzel and Mr. Zampino are presented below.

Douglas M. Wetzel
Environmental Scientist

John A. Zampino
Senior Geologist, CPG

PHASE II ENVIRONMENTAL SITE ASSESSMENT
CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area (PID 77510)
Cleveland, Cuyahoga County, Ohio
(HzW Project No. H09004-14)

1.0 INTRODUCTION

The CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area (PID 77510) consists of realignment of Commercial Road between Canal Road and the proposed East Ninth Street Extension. A map showing the general location of the CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area is presented as **Figure 1**. The location of the proposed realignment of Commercial Road within the Project Area is presented in **Appendix A**.

In July 2009, geotechnical drilling crews installed a series of borings for the proposed realignment of Commercial Road. During installation of four (4) borings (designated B-071, B-072, B-073 and B-075, which are presented on the proposed realignment map of Commercial Road in Appendix A), drilling crews encountered materials described as:

- Having a "bad odor" or being an "unknown blue/white material" that "looked [corrosive]" to a depth of over 20 feet below ground surface in B-071;
- An "unknown blue material" at a depth of less than five (5) feet in B-072;
- An "unknown blue/green rock material" to a depth of less than five (5) feet in B-073; and
- A "nasty…blue/green material" from 1.5 to 4.5 feet in B-075, which "smells bad" and the drilling crew was "…not sure if [it was] safe to touch."

A review of historic Sanborn fire insurance maps provided to HzW by the Ohio Department of Transportation's (ODOT's) Office of Environmental Services (OES) indicated that the areas in question were historically occupied by railroad yards that were "full of tracks".

The purpose of the Phase II Environmental Site Assessment (ESA) investigation was to assess whether adverse subsurface impacts have occurred prior to property acquisition and/or the initiation of construction activities within the Project Area. Phase II ESA activities were conducted in accordance with the ODOT's April 2009 Environmental Site Assessment Guidelines for Phase II Environmental Site Assessments. Details regarding the sampling efforts and evaluation methods along with the corresponding findings of this study are presented in separate subsections of this report.

2.0 BACKGROUND INFORMATION

The background geologic information pertaining to the Project Area is presented below.

2.1 Physiography

According to the *Physiographic Regions of Ohio* map, published by the Ohio Department of Natural Resources (ODNR), the Project Area is located within the Erie Lake Plain of the Huron-Erie Lake Plains Section. The Erie Lake Plain is an Ice-Age lake basin separated from modern Lake Erie by shoreline cliffs and has major streams in deep gorges. Elevations of the Erie Lake Plain are generally of low relief between 570 and 800 feet. A copy of the Physiographic Map of Ohio is included as **Appendix B**.

2.2 Topography

According to the 1994 Cleveland South, Ohio quadrangle 7.5-minute USGS topographic map, the topography of the Project Area varies from an elevation of approximately 630 feet above National Geodetic Vertical Datum (NGVD) in the southern portion to an elevation of 670 feet above NGVD in the northern portion. The locations in which soil borings were installed in the Project Area are nearly level. A copy of the 1994 Cleveland South, Ohio quadrangle USGS topographic map is included as **Appendix C**.

2.3 Bedrock Geology

According to the *Geologic Map of Ohio*, published by the ODNR, bedrock beneath the Property consists of the Upper Devonian shales of the Cleveland, Chagrin and Huron groups. Bedrock is not exposed at the ground surface within the Project Area. A copy of the *Geologic Map of Ohio* is included as **Appendix D**.

2.4 Bedrock Topography

According to the Revised 1996 Bedrock Topography Map of the USGS 7.5-minute Cleveland South, Ohio quadrangle published by the ODNR, bedrock beneath the Project Area is at an elevation of approximately 450 feet above NGVD. Bedrock within the vicinity of the Project Area slopes east/southeast. A copy of the Bedrock Topography Map is included as **Appendix E**.

2.5 Glacial Geology

According to the *Glacial and Surficial Geology Map of Cuyahoga County*, published by the ODNR, the subsurface beneath the Project Area consists of Made Land. The areas of Made Land consist of reclaimed land, cut and fill, dumps, and continuous urban cover where 90 percent or more of the surface is covered with concrete, asphalt, building complexes, structures, or other manmade surfaces. A copy of the *Glacial and Surficial Geology Map of Cuyahoga County* is included as **Appendix F**.

2.6 Hydrology

According to the *Principal Streams and Their Drainage Area Map*, published by the ODNR, the Project Area is located within the 809 square mile drainage basin of the Cuyahoga River. A copy of the *Principal Streams and Their Drainage Areas Map* is included as **Appendix G**.

2.7 Hydrogeology

Based on local topographic conditions, local groundwater flow beneath the Project Area is anticipated to flow to the south/southwest towards the Cuyahoga River. However, actual groundwater flow direction is often influenced by factors such as underground structures, seasonal fluctuations, soil and bedrock geology, production wells and other factors beyond the scope of this study. According to the *Ground Water Resources Map of Cuyahoga County, Ohio*, published by the ODNR, two (2) hydrogeologic units underlie the Project Area. The majority of the Project Area is underlain by buried valleys that contain 200 to 300 feet of fine sand, silt and clay. Wells drilled within the buried valleys yield meager supplies (generally 3 to 10 gallons of groundwater per minute) unless thin, isolated sand and gravel lenses are encountered. The remaining portion of the Project Area is underlain by permeable sand and gravel deposits interbedded with silt and clay in a buried valley. Drilled wells within the permeable sand and gravel unit yield 100 to 300 gallons of groundwater per minute with yields as much as 250 gallons of groundwater per minute in locations where sufficient coarse material is present. A copy of the *Ground Water Resources Map of Cuyahoga County* is included in **Appendix H**.

2.8 Soils

According to the *Soil Survey of Cuyahoga County, Ohio*, published by the United States Department of Agriculture, the Project Area is underlain by one (1) soil type, Urban land (Ub). The Urban land soil type consists of areas in where more than 80 percent of the surface is covered by asphalt, concrete, buildings or other manmade surfaces. A copy of the *Soil Survey* is included as **Appendix I**.

2.9 Oil and Gas Wells

According to the Oil and Gas Well Map for the Cleveland South, Ohio 7.5-minute quadrangle published by the ODNR, no oil or gas wells are located within the Project Area. A copy of the Oil and Gas Well Map is included as **Appendix J**.

3.0 FIELD ACTIVITIES AND SAMPLING PROCEDURES

3.1 Sampling Methods

Phase II ESA activities were conducted on December 17, 2009, and consisted of the installation of four (4) soil borings (designated "HB-071," "HB-072," "HB-073" and "HB-075"). The soil borings were installed adjacent to the geotechnical soil borings installed in July 2009 and the designation of each soil boring was kept consistent with the geotechnical soil borings (e.g., HzW soil boring HB-071 was installed adjacent to geotechnical soil boring B-071). Visual evidence of two (2) geotechnical soil borings (HB-071 and HB-072) remained, which consisted of wooden stakes with the respective boring numbers and the auger hole. However, no visual evidence of the remaining two (2) geotechnical boring locations (HB-073 and HB-075) was identified. Therefore, in order to locate HB-073 and HB-075 and to verify the locations of HB-071 and HB-072, HzW utilized a Trimble® GeoXH™ Global Positioning System unit to locate the state plane coordinates for each boring, which were included on the geotechnical soil borings logs provided by ODOT OES. The locations of the soil borings on the Property are depicted on **Figure 2**.

All personnel on-site, or otherwise associated with the sample collection, were trained in accordance with Occupation Safety and Health Administration (OSHA) requirements, as stipulated under 29 CFR 1910.120. A copy of the site-specific Health and Safety Plan (HASP) prepared for use by all on-site personnel is included as **Appendix K**.

3.2 Soil Boring Installation and Sample Collection

Soil samples were collected from ground surface to terminal depths. The soil borings were installed using hydraulic Geoprobe® direct push subsurface sampling techniques. Hydraulic Geoprobe® marco core direct push subsurface sampling techniques utilize a series of 5-foot long steel rods driven into the subsurface. Soil samples were collected using a five-foot long sample tube attached to five-foot long steel rods. The sample tube consists of a clean, disposable acetate (plastic) liner that is driven into the subsurface to obtain a core sample of the subsurface material.

Upon extraction from the soil, the plastic liner, with core intact, was removed from the sample tube. Each sample liner was initially split into two-foot intervals following sample collection and examined separately. Each two-foot soil sample was transferred to a clean, labeled sample container (provided by the laboratory) and placed in an ice cooler for preservation in the field. The sample intervals were characterized by a qualified environmental technician. Observations noted by the technician included the sample location/number, sample depth, sediment description, color, moisture content, odor, and presence or absence of contamination based on visual/olfactory observation. The observations were recorded on a boring log completed for each soil boring.

Following completion of soil sampling activities, all borings installed within the Project Area were filled with granular bentonite and hydrated. All equipment used during Phase II ESA sampling activities was decontaminated with a Liqui-Nox® and distilled water solution and triple-rinsed with distilled water after each use to limit the potential for cross contamination.

3.3 Sample Selection Methods

Soil samples were selected for laboratory analysis based upon visual and olfactory observations in the field and depths at which unknown materials were encountered by the geotechnical drilling crews as recorded in the geotechnical soil boring logs. The samples were shipped in a sample cooler, chilled to 4°C, under chain-of-custody documentation.

3.4 Analytical Methods

The soil samples from each boring were submitted to TestAmerica Laboratories, Inc. (TestAmerica) of North Canton, Ohio, for analysis of volatile organic compounds (VOCs) by EPA Method 8260, polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270, total petroleum hydrocarbons (TPH) gasoline and diesel range organics by modified EPA Method 8015, total concentrations of arsenic, cadmium, chromium and lead by EPA Method 6010, total concentrations of cyanide by EPA Method 335.2, hexavalent chromium by EPA Method 7196, total sulfide by EPA Methods 9030/9034 and corrosivity (pH) by EPA Method 9045.

3.5 Quality Assurance/Quality Control

HzW developed Quality Assurance/Quality Control (QA/QC) measures to ensure the Phase II ESA was conducted in accordance with consistent professional standards and specific ODOT requirements. The main elements of the QA/QC program include the following:

- Peer review of all project correspondence, notes, chain-of-titles, etc;
- Multi-layered report examination by the QA/QC team;
- Daily involvement by HzW's project manager in all aspects of the project; and
- Regular discussion with technical personnel to review elements to be included in the reports; report format changes, and internal routing/review procedures.

Specific QA/QC procedures for this project included the following elements:

1. Review of the project Scope-of-Services between the HzW Project Manager and the field representatives;
2. Continual reference to the Phase II proposal by the field representatives during project implementation;
3. During field work, completion of thorough and accurate field notes (such as site drawings, information obtained from the property representative, and observations made during the site assessment);
4. During data evaluation, identifying appropriate and applicable reference standards with which to compare results, comparing results to field observations to identify any discrepancies; and
5. During report preparation:
    - completion of report in a format required by ODOT,
    - review of report by the author,
    - editing report, as needed,
    - review and editing of report by the Technical Editor, as needed,
    - review of report by the Project Manager, and
    - finalization of the report.

4.0 PHASE II FINDINGS, DATA EVALUATION & REGULATORY INTERPRETATION

The findings of this Phase II ESA investigation are presented below. A discussion of the geology and hydrology of the Project Area based on soil boring logs, and the soil sample analytical results, are presented in separate subsections below.

4.1 Boring Log Descriptions

Soil borings within the Project Area were installed to terminal depths of six (6) or 20 feet below ground surface (bgs). Subsurface materials encountered during boring installation consisted of non-native fill materials including brown, black and dark gray sandy clay, dark gray, black and brown sand, and dark brown, black and dark gray sandy slag with varying amounts of gravel, slag, brick and wood fragments. Slight to strong sulfur odors were identified in HB-071 (6-14' and 16-18'). No odors were identified in the remaining soil borings. Although damp soils were encountered in HB-073 and HB-075 (both of which terminated at six [6] feet bgs), no evidence of groundwater was encountered during boring installation. Copies of the boring logs for the borings installed within the Project Area are included as **Appendix L**.

4.2 Soil Analytical Results

The analytical results of the soil samples collected from soil borings installed within the Project Area (HB-071, HB-072, HB-073 and HB-075) are presented in **Table 1**. The complete laboratory analytical report from TestAmerica, including the laboratory's internal QA/QC sample results, is included in **Appendix M**. The laboratory QA/QC reporting was determined to be acceptable with the exception of the following:

- The matrix spike/matrix spike duplicate (MS/MSD) for a batch of samples for VOC analysis had relative percent differences (RPDs) and recoveries outside acceptance limits. However, since the associated method blank and laboratory control sample was in control, no corrective action was necessary.
- The internal standard areas for VOC analysis were outside acceptance limits for samples HB-071 (10-12'), HB-071 (16-18') and HB-072 (2-4') due to matrix effects.
- Sample HB-071 (8-10') had elevated reporting limits due to tentatively identified compounds in the VOC analysis.
- Samples HB-071 (10-12'), HB-071 (16-18') and HB-072 (2-4') were reanalyzed at a dilution due to internal standard recoveries outside of acceptance limits, per Ohio VAP standards. Only compounds associated with internal standards that met criteria are reported from each analysis.
- Sample HB-075 (0-2') had elevated reporting limits in SVOC analysis due to matrix interferences.
- The batch QC for SVOC analysis batch 9353017 was unable to be reported due to re-preparation of the parent sample and the original sample was not reported.
- The MS/MSD for a batch of samples for TPH analysis had recoveries outside acceptance limits. However, since the associated method blank and laboratory control sample was in control, no corrective action was necessary.
- The reported concentration of a TPH fraction in HB-075 (0-2') is flagged with a "J" as the results were between the method detection limit and the reporting limit. The possibility of false positive or mis-identification at these quantification levels exist. In analytical methods requiring confirmation of the anlayte reported, confirmation was

performed only down to the standard reporting limit. The acceptance criteria for QC samples may not be met at these quantification levels.

- The generic batch MS/MSDs for a TPH analysis batch was extracted and analyzed, but unable to be reported due to the laboratory system limitations.
- Sample HB-072 (4-6') for hexavalent chromium is suspect to have a reducing agent based on the results obtained from method of standard addition.
- The MS/MSD data for certain batches are not included in this report. The batch QC samples, which document the effect of a specific sample matrix on method performance, were not associated with a sample reported in this lot. The data, therefore, has no bearing on samples reported herein. In order to document compliance with the QC requirement for an MS/MSD per 20 environmental samples, a summary of sample/QC associations has been provided.

4.3 Data Evaluation Criteria/Regulatory Discussion

Soil analytical results were compared against the Ohio Environmental Protection Agency's Voluntary Action Program (VAP) single-chemical Generic Direct Contact Soil Standards (GDCS) for commercial/industrial land use and construction/excavation activities and the State of Ohio's Bureau of Underground Storage Tank Regulations' (BUSTR) Petroleum-Contaminated Soil (PCS) Re-Use Levels. The GDCS values were developed to be protective of the environment and human health based on predictive models regarding potential exposures to adults from dermal contact with soil, inhalation of vapors and particles from soil, and ingestion of soil. The VAP and BUSTR comparative standards are included with the soil analytical results in **Table 1**.

The regulatory standards referenced as part of this project are for comparative use only and may not be directly applicable to the Project Area. The Ohio VAP and BUSTR standards referenced in this report apply only to sites that are participants in Ohio's Voluntary Action Program or sites regulated by BUSTR. However, because the Ohio Environmental Protection Agency and BUSTR recognize these standards as being protective of human health and the environment, they provide a useful tool for assessing environmental conditions within the Project Area.

According to soil analytical results, low concentrations of several VOCs consisting of acetone, benzene, carbon disulfide, ethylbenzene, methylene chloride, toluene and/or total xylenes were detected in soil samples HB-71 (10-12'), HB-71 (16-18'), HB-072 (2-4'), HB-072 (4-6'), HB-073 (0-2') and HB-075 (0-2'). None of the detected concentrations of VOCs exceeded VAP GDCS for commercial/industrial land use or construction/excavation activities. However, the detected concentration of benzene in HB-072 (4-6'), 0.027 milligrams per kilogram (mg/kg), exceeded the BUSTR PCS Re-Use Level of 0.015 mg/kg.

Concentrations of PAH compounds consisting of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, phenanthrene and/or pyrene were detected in soil samples from all soil borings. Although none of the detected concentrations of PAH compounds exceeded VAP GDCS for commercial/industrial land use or construction/excavation activities, concentrations of several PAH compounds exceeded BUSTR PCS Re-Use Levels. The compounds exceeding Re-Use Levels consists of benzo(a)anthracene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pryene and naphthalene in HB-071 (8-10'); benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-071 (10-12'); indeno(1,2,3-cd)pryene in HB-071 (16-18'), HB-072 (2-4') and HB-073 (0-2'); benzo(a)pyrene, chrysene and

indeno(1,2,3-cd)pyrene in HB-072 (4-6'); and benzo(a)anthracene, benzo(a)pryene, chrysene and indeno(1,2,3-cd)pyrene in HB-075 (0-2') and HB-075 (2-4').

Soil analytical results indicate that concentrations of one or more fractions of TPH were detected in the soil samples from all soil borings. None of the detected concentrations of TPH fractions exceeded VAP GDCS for commercial/industrial land use or construction/excavation activities or BUSTR PCS Re-Use Levels.

Concentrations of total arsenic, cadmium, chromium and/or lead were detected in soil samples from all soil borings. None of the detected concentrations of total metals exceeded VAP GDCS for commercial/industrial land use or construction/excavation activities. However, the detected concentrations of lead in HB-073 (0-2') and HB-075 (2-4'), 115 mg/kg and 107 mg/kg, respectively, are 20 times the Toxicity Characteristic Leaching Procedure (TCLP) level for lead (5.0 mg/kg).

According to soil analytical results, concentrations of total cyanide were detected in HB-071 (8-10'), HB-071 (10-12'), HB-071 (16-18'), HB-072 (2-4'), HB-072 (4-6') and HB-073 (0-2') and hexavalent chromium detected in HB-072 (4-6'). The detected concentrations of total cyanide or hexavalent chromium did not exceed VAP GDCS for commercial/industrial land use or construction/excavation activities.

No comparative standards currently exist for total sulfide or corrosivity (pH). Total sulfide concentrations in soil samples ranged from below detection limits in HB-075 (2-4') to 302 mg/kg in HB-073 (0-2'). Concentrations of pH ranged from 8.7 in HB-075 (2-4') to 11.5 in HB-075 (0-2').

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of Phase II ESA activities conducted within the CUY-Cleveland Innerbelt, Commercial Road Alignment Project Area (PID 77510) indicate that concentrations of several VOCs, PAH compounds, one or more fractions of TPH, several total metals and total sulfide were detected in soil samples collected within the Project Area. None of the concentrations of the constituents detected in soil samples within the Project Area exceeded VAP GDCS for commercial/industrial land use or construction/excavation activities. However, concentrations of several constituents exceeded BUSTR's PCS Re-Use Levels, which consist of the following:

- Benzo(a)anthracene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene and naphthalene in HB-071 (8-10');
- Benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-071 (10-12');
- Indeno(1,2,3-cd)pyrene in HB-071 (16-18'), HB-072 (2-4') and HB-073 (0-2');
- Benzene, benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-072 (4-6'); and
- Benzo(a)anthracene, benzo(a)pyrene, chrysene and indeno(1,2,3-cd)pyrene in HB-075 (0-2') and HB-075 (2-4').

Based upon the above constituent concentrations exceeding BUSTR's PCS Re-Use Levels, a plan note should be included in construction documents for the proper handling, management and/or disposal of PCS in accordance with all applicable laws and regulations.

The detected concentrations of total lead in HB-073 (0-2') and HB-075 (2-4') are 20 times the TCLP level for lead. In addition, although concentrations did not exceed VAP GDCS for commercial/industrial land use or construction/excavation activities, total cyanide was detected in six (6) soil samples and hexavalent chromium in one (1) soil sample. As a result, should construction plans/activities anticipate excavation and disposal of soils from these locations, properly characterize soils prior to disposal.

TABLES

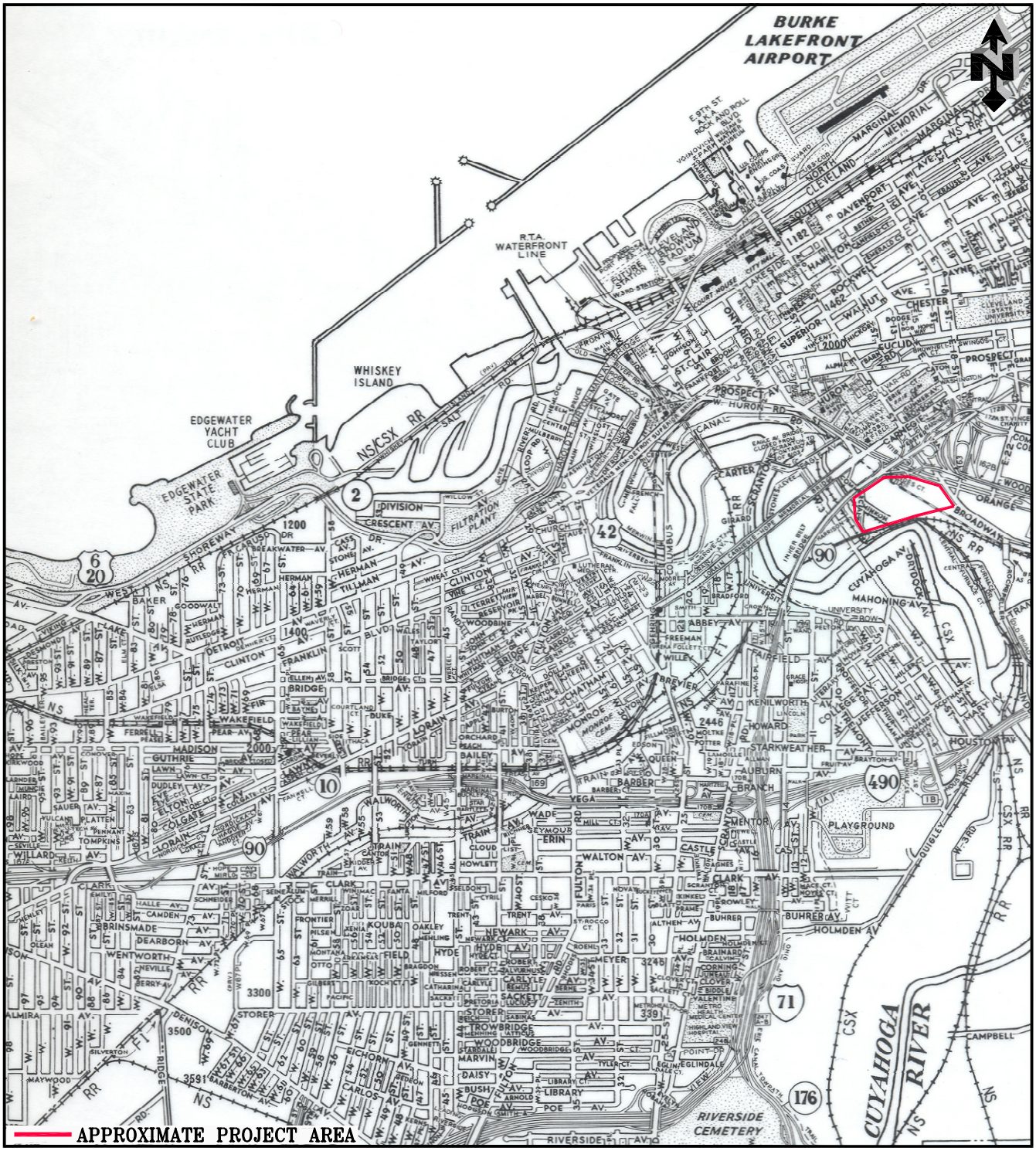
Table 1
Summary of Soil Analytical Results
Commercial Road Alignment Project Area (PID 77510)
Cleveland, Ohio
(All values presented in mg/kg, unless otherwise noted)

Sample ID / Sample Date	HB-071 (8-10') 12/17/2009	HB-071 (10-12') 12/17/2009	HB-071 (16-18') 12/17/2009	HB-072 (2-4') 12/17/2009	HB-072 (4-6') 12/17/2009	HB-073 (0-2') 12/17/2009	HB-075 (0-2') 12/17/2009	HB-075 (2-4') 12/17/2009	CIGDCS[1]	CEGDCS[2]	BUSTR Re-Use[6]
VOCs - EPA Method 8260											
Acetone	<23.0	**0.036**	<0.023	<0.023	<0.023	<0.023	<0.023	<0.022	100,000	100,000	
Benzene	<5.7	<0.006	<0.006	<0.006	**0.027**	<0.006	<0.006	<0.006	140	150	0.015
Carbon disulfide	<5.7	**0.014**	**0.012**	**0.008**	**0.027**	<0.006	<0.006	<0.006	1,400	190	
Ethylbenzene	<5.7	<0.006	<0.028	<0.028	<0.006	**0.011**	<0.006	<0.006	230	230	4.55
Methylene chloride	<5.7	**0.012**	**0.007**	**0.011**	<0.006	<0.006	<0.006	<0.006	570	1,500	
Toluene	<5.7	**0.007**	<0.028	<0.028	**0.044**	**0.006**	<0.006	<0.006	520	520	4.91
Total Xylenes	<5.7	**0.011**	<0.028	<0.028	**0.02**	**0.047**	**0.026**	<0.006	370	370	15.7
PAHs - EPA Method 8270											
Acenaphthene	**7.0**	**1.3**	**0.9**	**0.11**	**0.14**	**0.082**	**0.19**	**0.57**	56,000	440,000	
Acenaphthylene	<0.38	**0.27**	**0.12**	**0.14**	**0.34**	**0.15**	**0.1**	**0.072**	170,000 [3]	51,000 [4]	
Anthracene	**2.4**	**0.94**	**0.49**	**0.36**	**0.41**	**0.24**	**0.86**	**1.3**	280,000	1,000,000	
Benzo(a)anthracene	**2.2**	**1.5**	**0.81**	**0.84**	**1.3**	**1.1**	**2.9**	**2.9**	76	680	2.2
Benzo(a)pyrene	**2.2**	**1.3**	**0.66**	**0.63**	**1.2**	**1.0**	**2.1**	**2.5**	7.7	69	1.1
Benzo(b)fluoranthene	**3.3**	**2.2**	**1.0**	**1.1**	**2.1**	**1.5**	**2.5**	**3.2**	77	690	5.53
Benzo(g,h,i)perylene	**0.83**	**0.96**	**0.45**	**0.5**	**0.85**	**0.82**	**1.2**	**1.6**	23,000 [3]	25,000 [4]	
Benzo(k)fluoranthene	**0.57**	**0.83**	**0.42**	**0.39**	**0.75**	**0.42**	**0.94**	**1.2**	770	6,900	1.97
Chrysene	**2.2**	**1.5**	**0.85**	**0.84**	**1.5**	**0.96**	**2.6**	**2.6**	7,600	69,000	1.27
Dibenz(a,h)anthracene	<0.38	**0.38**	**0.18**	**0.15**	**0.26**	**0.29**	**0.46**	**0.5**	7.7	69	0.94
Fluoranthene	**8.8**	**4.0**	**2.2**	**1.5**	**2.1**	**1.6**	**5.1**	**5.5**	37,000	290,000	
Fluorene	**5.3**	**1.3**	**0.87**	**0.14**	**0.18**	**0.087**	**0.21**	**0.57**	37,000	290,000	
Indeno(1,2,3-cd)pyrene	**1.4**	**0.94**	**0.44**	**0.46**	**0.76**	**0.6**	**1.1**	**1.5**	77	690	0.15
1-Methylnaphthalene	**4.1**	**2.0**	**0.96**	**0.52**	**0.86**	**1.0**	**0.15**	**0.61**	360	360	
2-Methylnaphthalene	**7.9**	**3.3**	**1.6**	**0.78**	**1.4**	**1.5**	**0.18**	**1.0**	94,000 [3]	62,000 [4]	
Naphthalene	**55.0**	**3.7**	**3.4**	**0.58**	**0.91**	**0.88**	**0.23**	**0.82**	150	84	3.98
Phenanthrene	**13.0**	**5.4**	**2.7**	**1.1**	**1.4**	**1.2**	**2.5**	**4.8**	870,000 [3]	260,000 [4]	
Pyrene	**5.6**	**3.1**	**1.8**	**1.4**	**2.1**	**1.5**	**6.1**	**5.4**	28,000	220,000	
TPH - Modified EPA Method 8015											
C6-C12	**2.7**	**0.17**	**0.15**	<0.11	**0.7**	**0.21**	**0.78**	<0.11	1,000 [5]	1,000 [5]	1,000
C10-C20	**260**	**170**	**72**	**44**	**82**	**120**	**100**	**48**	2,000 [5]	2,000 [5]	2,000
C20-C34	**250**	**220**	**150**	**140**	**220**	**130**	**610**	**110**	5,000 [5]	5,000 [5]	5,000
Total Metals - EPA Method 6010											
Arsenic	**10.0**	**11.3**	**9.7**	**8.6**	**9.3**	**9.3**	**4.7**	**10.4**	82	420	
Cadmium	<0.23	**0.31**	<0.23	<0.23	<0.23	**0.33**	**0.23**	<0.22	2,300	1,600	
Chromium	**11.2**	**14.4**	**22.9**	**10.6**	**19.7**	**10.6**	**18.6**	**8.9**	1,000,000	1,000,000	
Lead	**38.8**	**65.9**	**55.7**	**27.0**	**38.4**	**115**	**21.3**	**107**	1,800	750	
Total Cyanide - EPA Method 335.2	**0.8**	**2.1**	**0.73**	**2.9**	**2.1**	**4.6**	<0.57	<0.55	59,000	39,000	
Hexavalent Chromium - EPA Method 7196	<0.92	<0.92	<0.91	<0.9	**2.5**	<0.9	<0.91	<0.88	7,900	13,000	
Total Sulfide - EPA Methods 9030/9034	**48.5**	**90.2**	**148**	**287**	**289**	**302**	**61.6**	<33.1	NGS	NGS	
Corrosivity - EPA Method 9045 (unitless)	**9.5**	**10.1**	**10.4**	**10.2**	**10.2**	**11.0**	**11.5**	**8.7**	NGS	NGS	

Bolded values indicate laboratory detections
[1]VAP Generic Direct Contact Soil Standards for Commercial/Industrial Land Use per OAC 3745-300-08(C)(3)(c), Table II
[2]VAP Generic Direct Contact Soil Standards for Construction and Excavation Activities per OAC 3745-300-08(C)(3)(d), Table III
[3]VAP Supplemental Direct Contact Soil Values for Commercial/Industrial Land Use, January 25, 2006
[4]VAP Supplemental Direct Contact Soil Values for Construction and Excavation Activities, January 25, 2006
[5]Petroleum standards are BUSTR standards per VAP Technical Guidance Compendium VA30008.09.001
[6]BUSTR's Petroleum Contaminated Soil Re-Use Levels per OAC 1301:7-9-16(D)(1), Table 1
= Value exceeds BUSTR's PCS Re-Use Levels
= J-qualified analytical results

FIGURES

I:\2009\H09004-14\CADDWGS\09004-14-SITE.dwg mtenbay Jan 21, 2010



SCALE

0 1 MILE

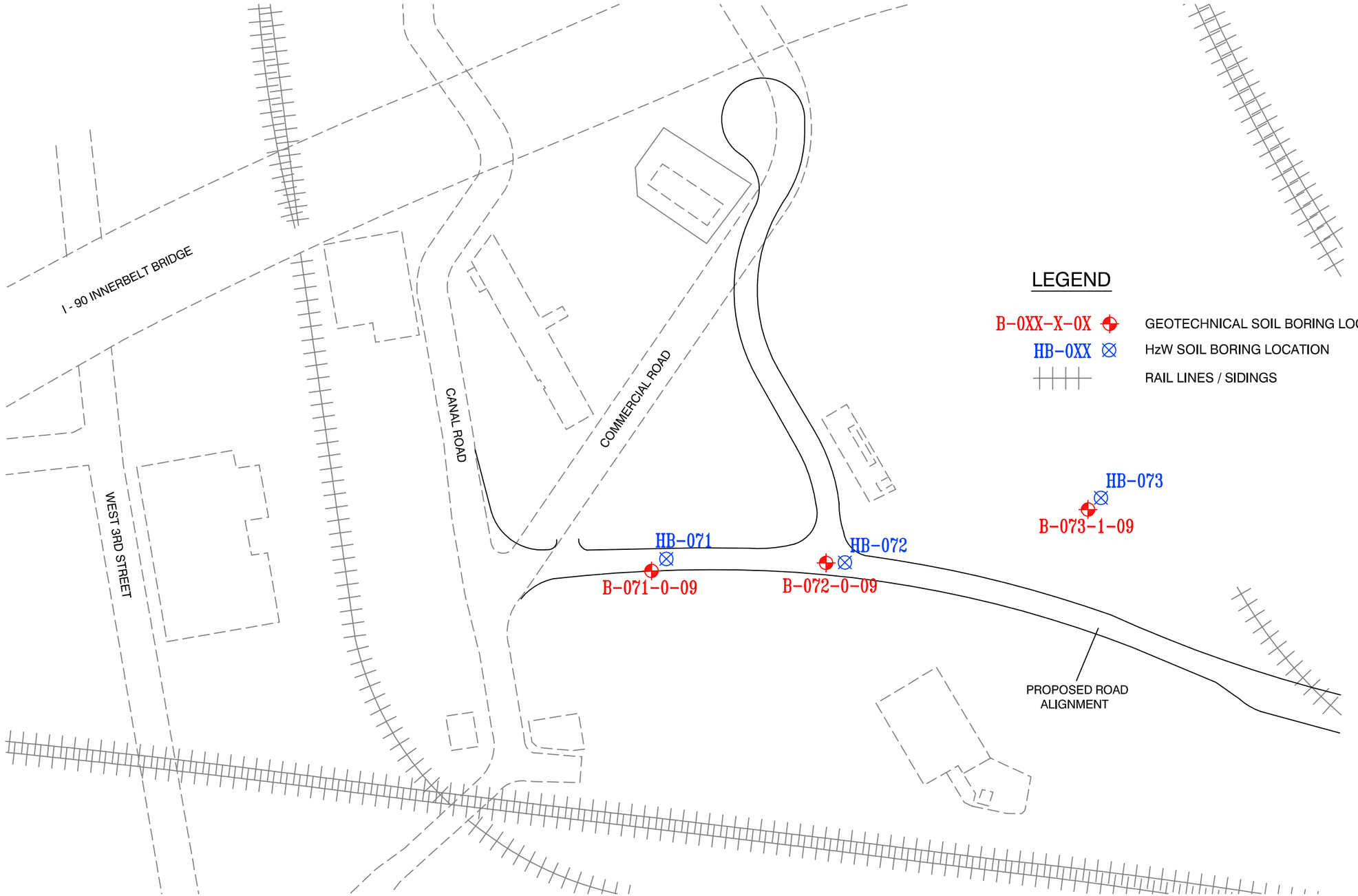
0 1000 2000 3000 4000 5000

HzW Environmental Consultants, LLC
6105 Heisley Rd. ▪ Mentor, OH 44060
440-357-1260 ▪ Fax 440-357-1510

FIGURE 1

SITE LOCATION MAP
CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

I:\HZW\2009\H0900414\CADDWGS\CUY90-COMM DR1.DWG (GMB) 1/11/09



0 120
(feet)
SCALE: 1"=120'

LEGEND

B-0XX-X-0X — GEOTECHNICAL SOIL BORING LOCATION

HB-0XX — HzW SOIL BORING LOCATION

RAIL LINES / SIDINGS

HzW ENVIRONMENTAL
CONSULTANTS, INC.
6105 Heisley Rd. ▪ Mentor, OH 44060
440-357-1260 ▪ Fax 440-357-1510

FIGURE 2A

SOIL BORING LOCATION MAP
CUY-CLEVELAND INNERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

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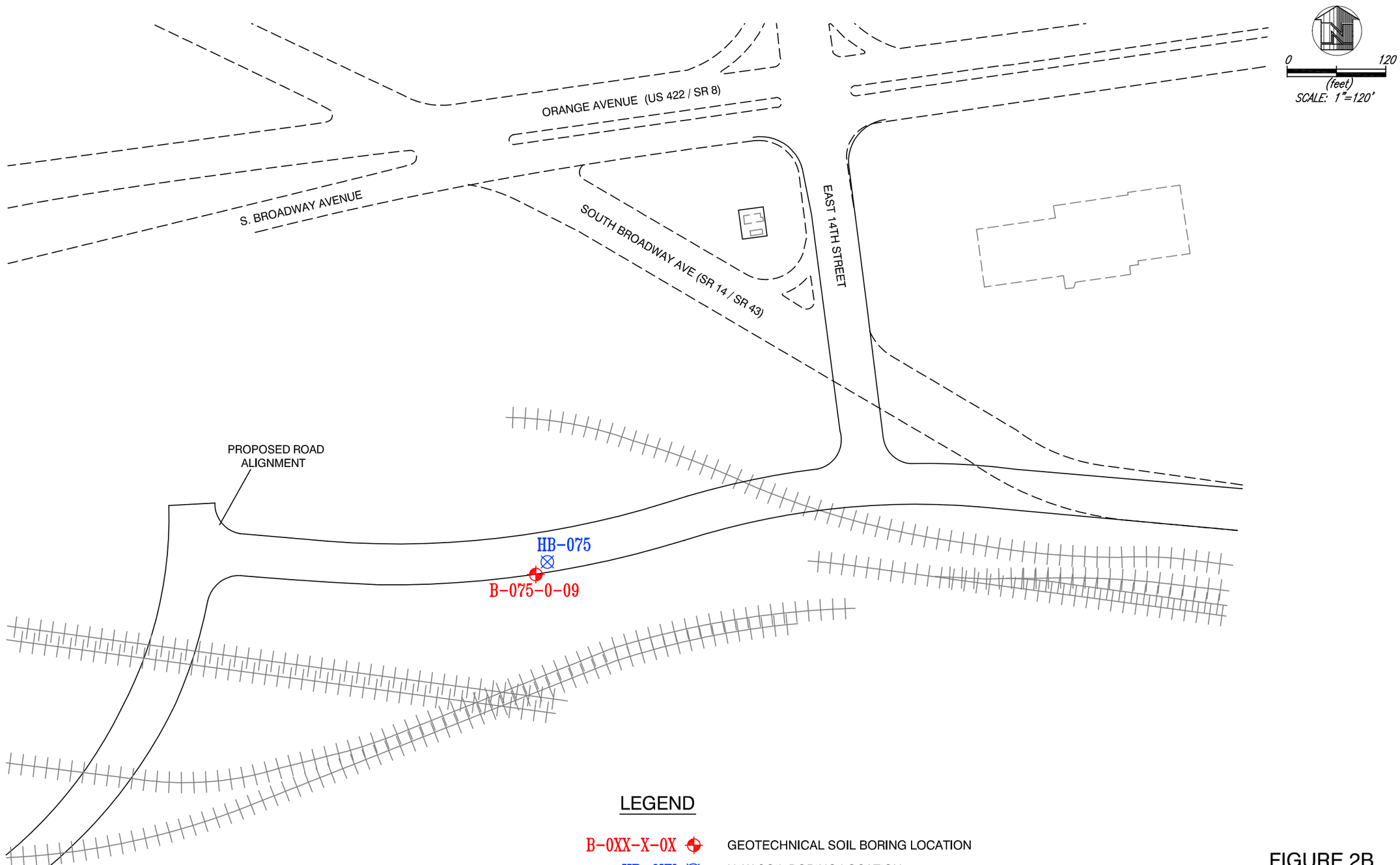


LEGEND

B-0XX-X-0X — GEOTECHNICAL SOIL BORING LOCATION

HB-0XX — HzW SOIL BORING LOCATION

RAIL LINES / SIDINGS

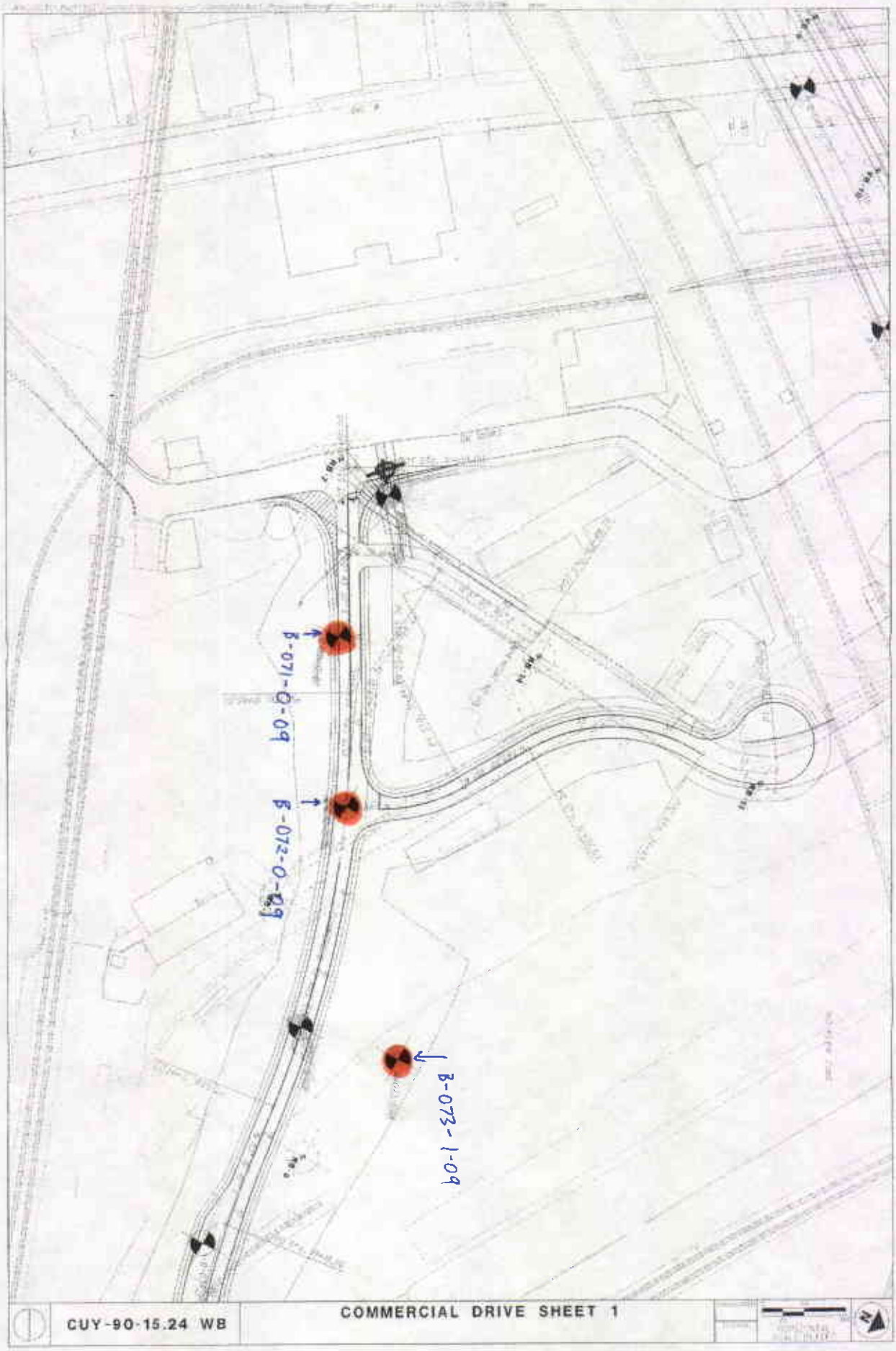
HzW ENVIRONMENTAL CONSULTANTS, INC.
6105 Heisley Rd. ▪ Mentor, OH 44060
440-357-1260 ▪ Fax 440-357-1510

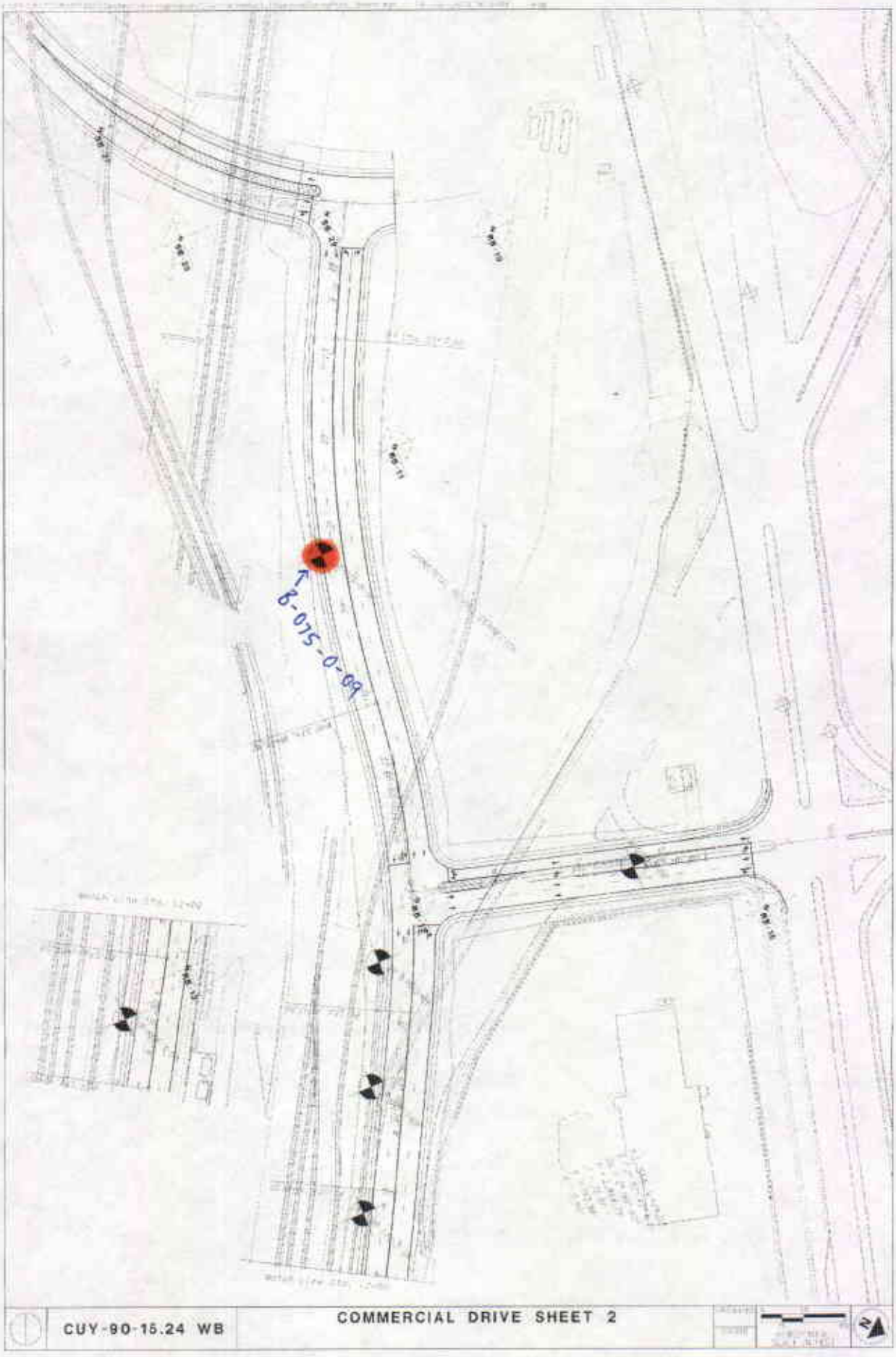
FIGURE 2B

SOIL BORING LOCATION MAP
CUY-CLEVELAND INNERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX A

PROJECT PLANS


B-071-0-09
B-072-0-09
B-072-1-09
CUY-90-15.24 WB
COMMERCIAL DRIVE SHEET 1


B-075-0-09
CUY-90-15.24 WB
COMMERCIAL DRIVE SHEET 2

APPENDIX B

PHYSIOGRAPHIC MAP OF OHIO

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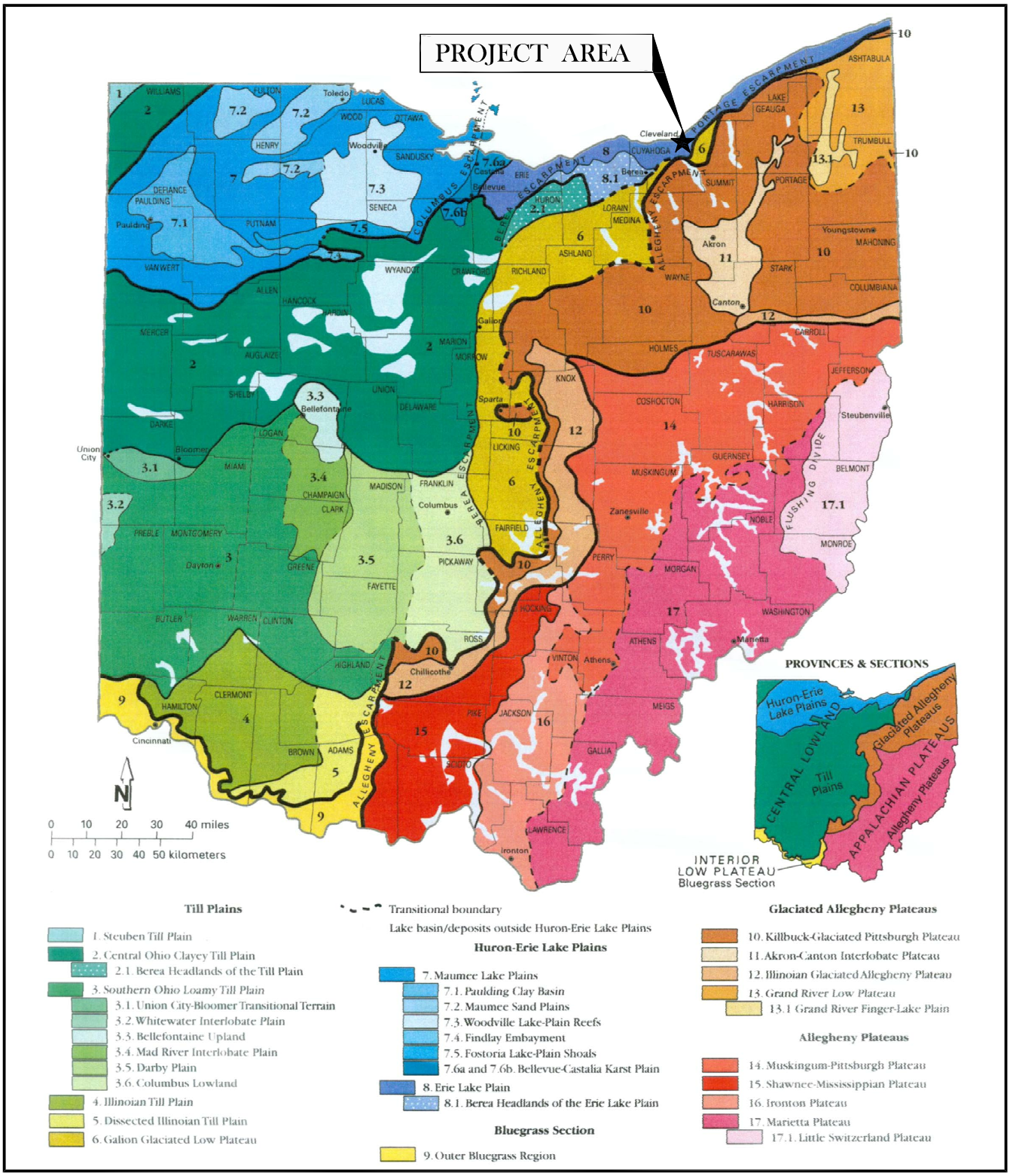
PHYSIOGRAPHIC REGIONS OF OHIO



HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX C

USGS TOPOGRAPHIC MAP

I:\2009\09004-14\CADD\MXDS\09004-14-TOPO-94.dwg mlendway Jan 21, 2010

USGS TOPOGRAPHIC MAP

1994 CLEVELAND SOUTH, OHIO QUADRANGLE

SCALE

1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

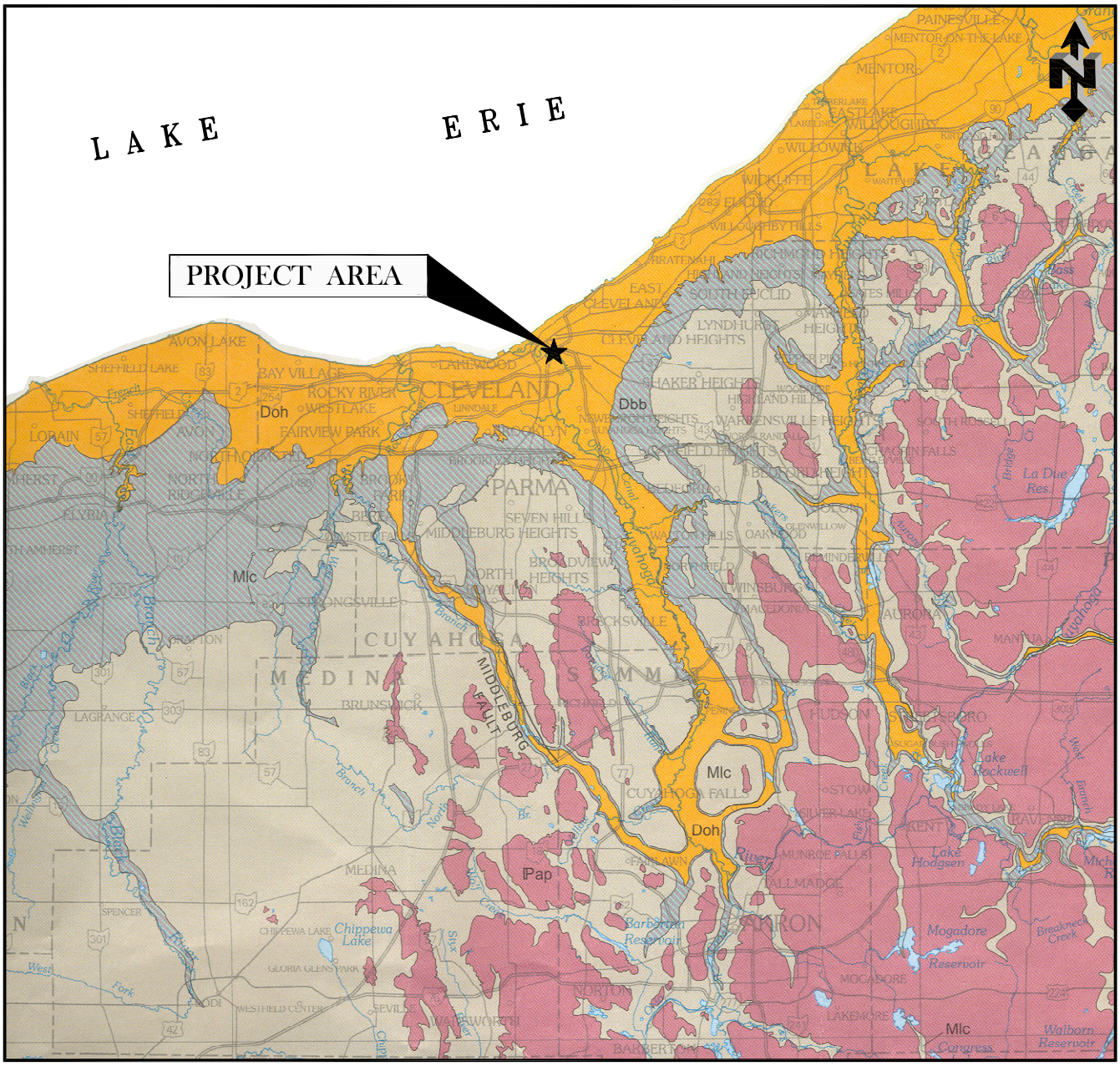
HzW ENVIRONMENTAL CONSULTANTS, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX D

GEOLOGIC MAP OF OHIO

2006 BEDROCK GEOLOGIC MAP OF OHIO



LEGEND

Doh — **Ohio Shale (Upper Devonian)** *(mapped interval includes Olentangy Shale south of central Delaware County)*—Unit consists generally of three members, in descending order: Cleveland, Chagrin, and Huron Members. Cleveland Member, shale; black; thickest in north-central portion of state; thins south and eastward; absent in northeastern portion of state. Chagrin Member, shale, siltstone, and very fine-grained sandstone; gray to greenish gray; thickest in northeastern portion of state; grades into underlying and overlying black shale members; thins southwestward, becomes Three Lick Bed in southern portion of state. Huron Member, shale; mostly black; carbonaceous; calcareous concretions common in lower portion. Olentangy Shale, mostly upper portion; thin; present but not mapped as separate unit south of central Delaware County; absent on Bellefontaine Outlier; see Olentangy Shale for description. Unit structurally deformed in Serpent Mound Impact Structure (see fig. 3).

HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

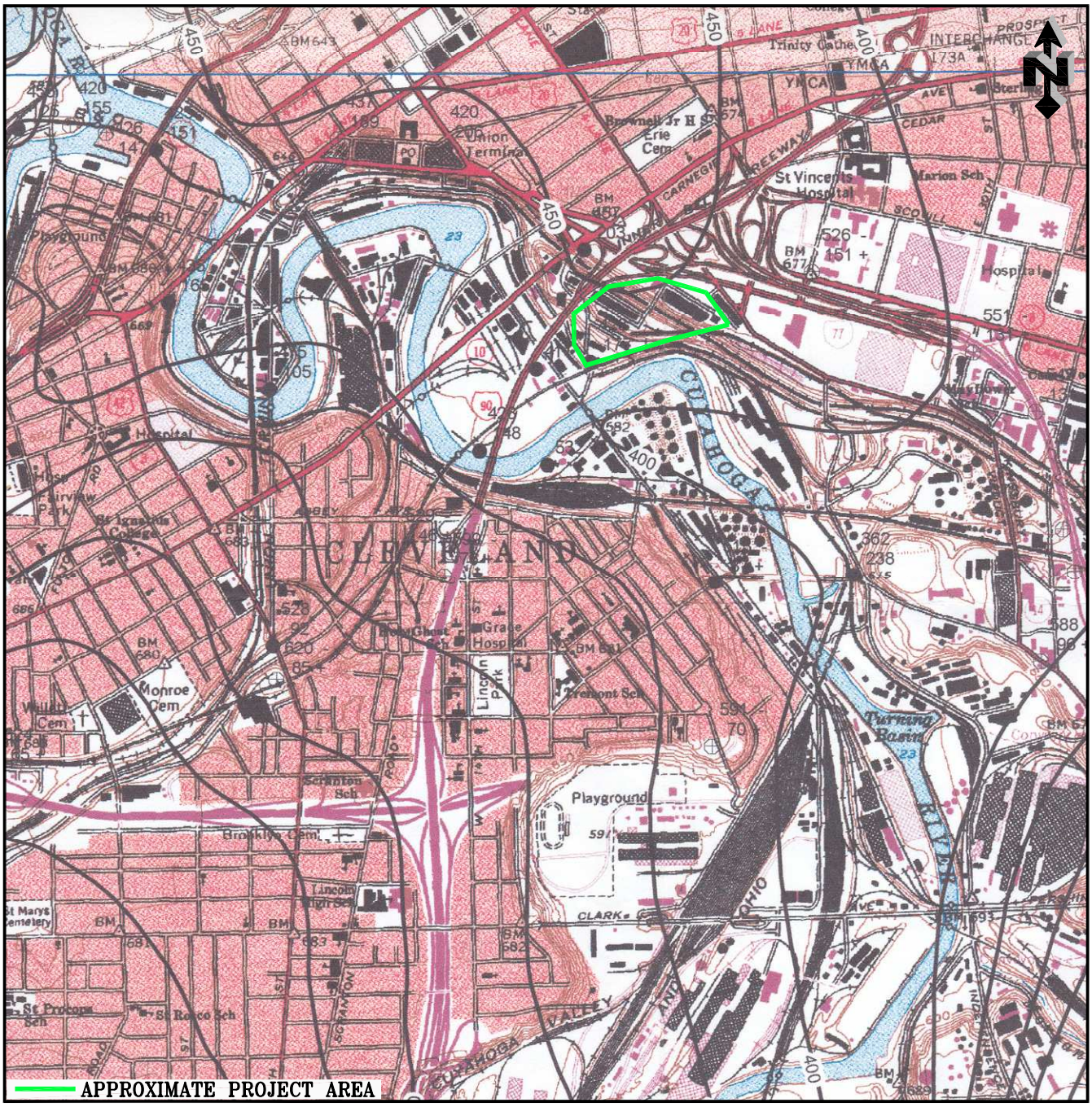
APPENDIX E

BEDROCK TOPOGRAPHY MAP

I:\2009\09004-14\CADDWGS\09004-14-ROCK-TOPO.dwg mlendway Jan 21, 2010

BEDROCK TOPOGRAPHY MAP

1996 CLEVELAND SOUTH, OHIO QUADRANGLE



SCALE

1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

HzW ENVIRONMENTAL CONSULTANTS, LLC

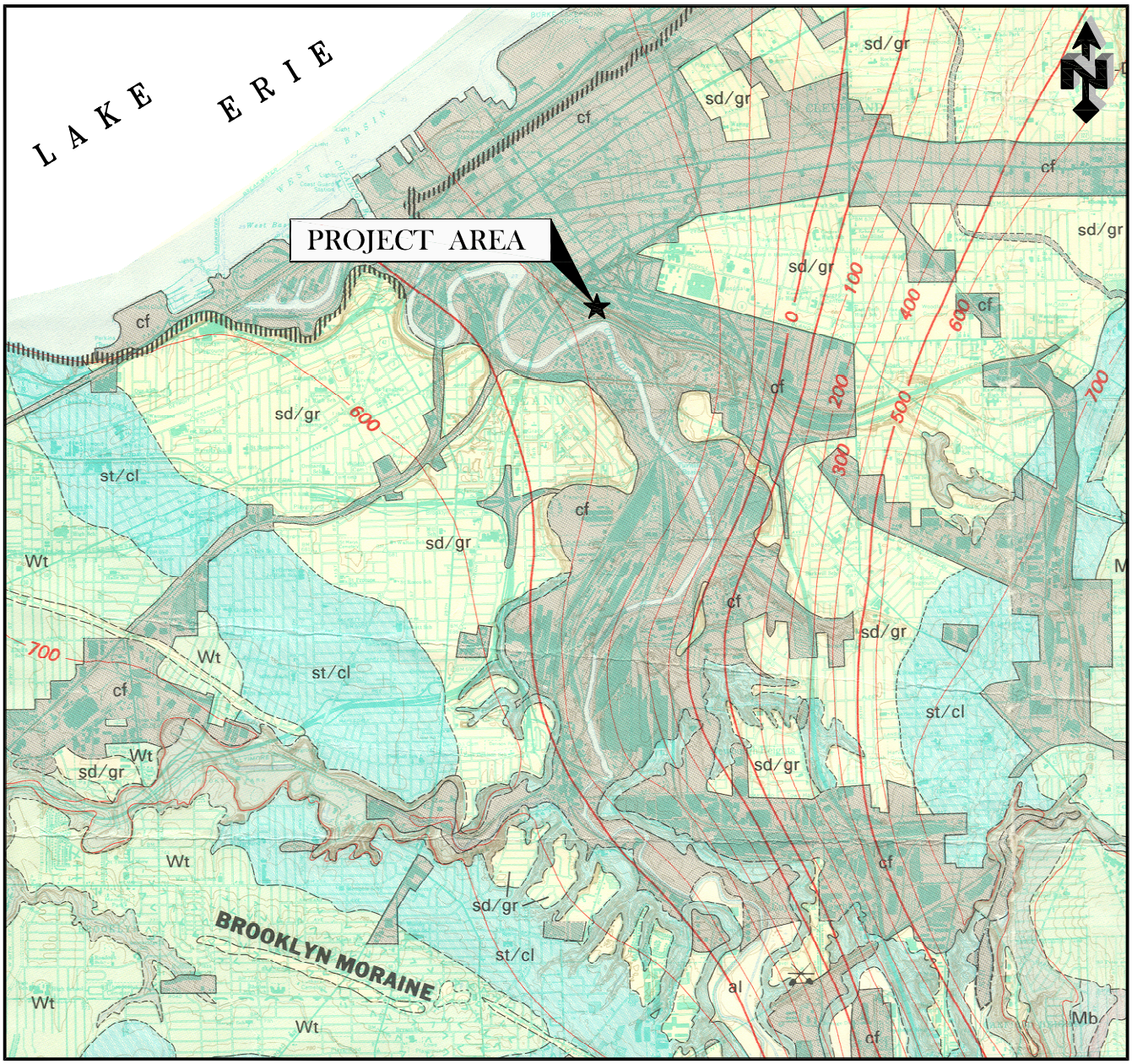
CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX F

GLACIAL GEOLOGY MAP OF CUYAHOGA COUNTY

I:\2009\H09004-14\CADD\MGS\09004-14-GLAC.dwg, mtendway Jan 21, 2010

GLACIAL & SURFICIAL GEOLOGY MAP OF OHIO



LEGEND

cf

Made land. Areas of reclaimed land, cut and fill, dumps, and continuous urban cover where 90 percent or more of the surface is covered with concrete, asphalt, building complexes, structures, or other manmade surfaces; does not include urbanized areas where manmade surfaces are intricately associated with other types of cover

HzW Environmental Consultants, LLC

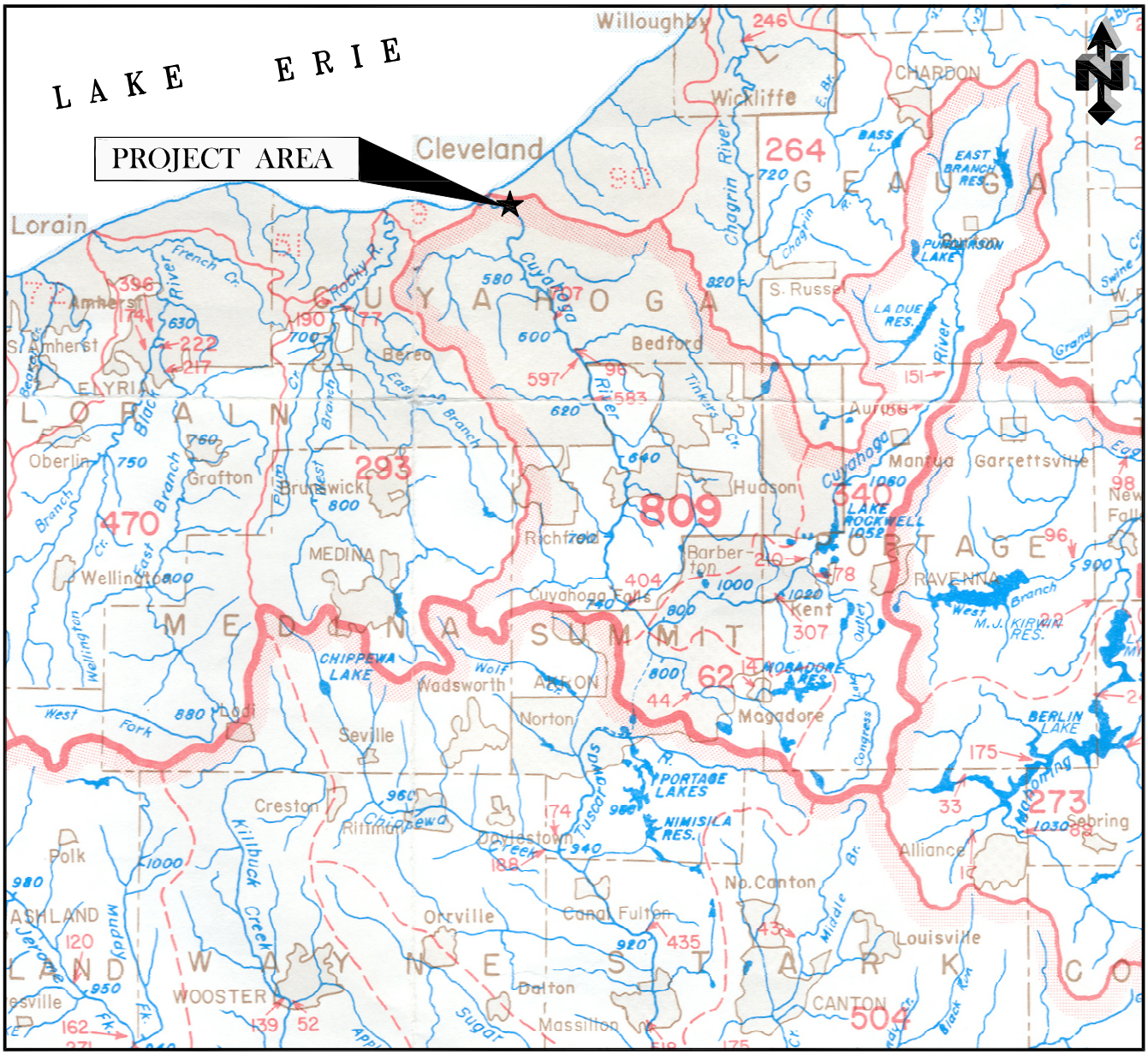
CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX G

PRINCIPAL STREAMS & THEIR DRAINAGE AREAS MAP OF OHIO

I:\2009\H09004-14\CADDWGS\09004-14-STRM.dwg, mlendway Jan 21, 2010

PRINCIPAL STREAMS AND DRAINAGE AREAS



LEGEND

Areas of drainage basins, in square miles, are shown by red figures as follows:

1757	*Areas enclosed by shaded red lines*
517	*Areas enclosed by unshaded red lines*
33	*Auxiliary land areas within the limits of the State.*
5715	*Drainage areas above points indicated by arrows*
715	*Approximate low-water elevation in feet above sea level.*
	Navigation lock and dam.
	Reservoir
	Selected urbanized areas, communities, and county seats chosen to aid in map orientation.

HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

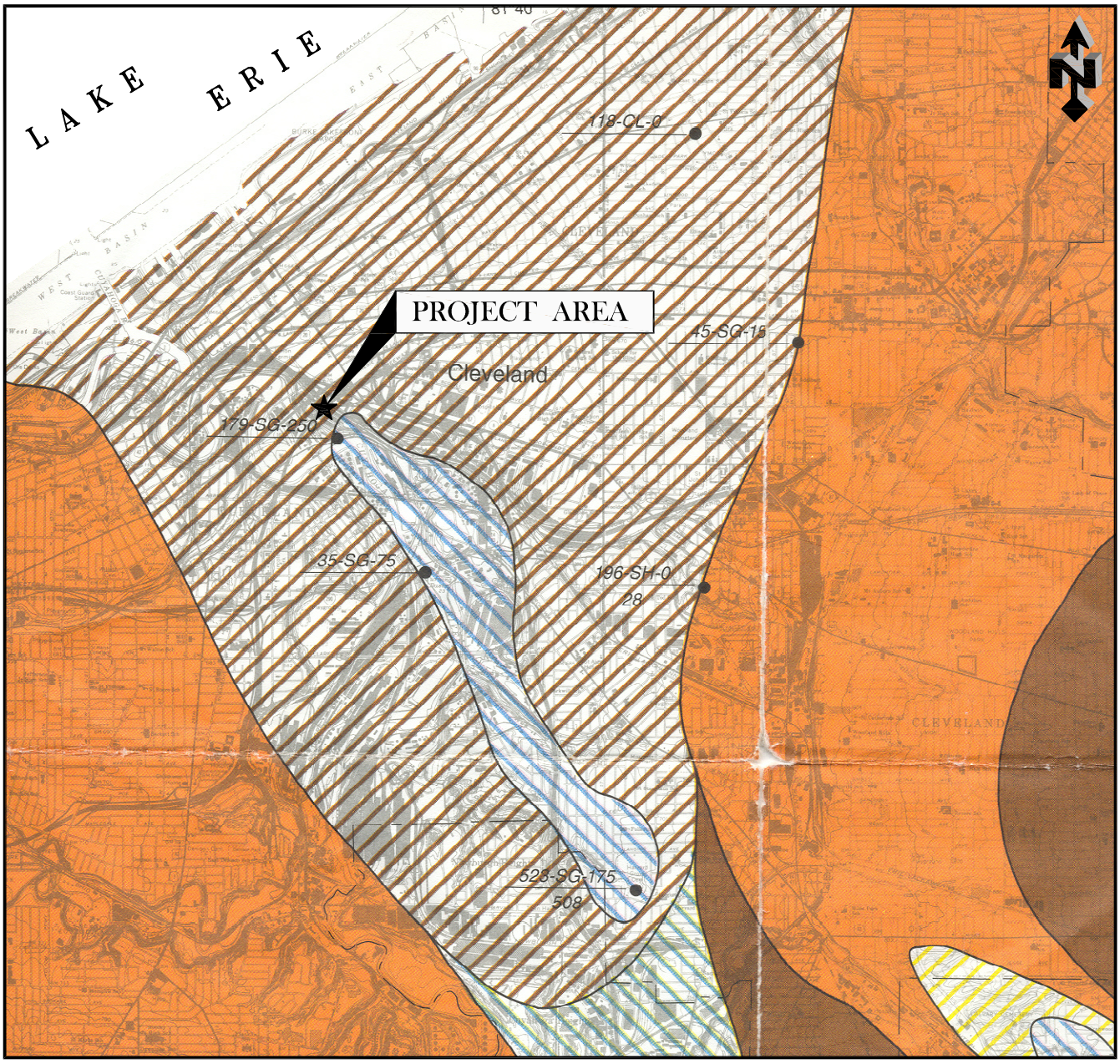
APPENDIX H

GROUND WATER RESOURCES MAP OF CUYAHOGA COUNTY

I:\2009\H09004-14\CADDWGS\09004-14-GRND-WAT.dwg, mtendray Jan 21, 2010

GROUND WATER RESOURCES MAP

1992 CUYAHOGA COUNTY, OHIO



LEGEND

AREAS IN WHICH 100 TO 300 GALLONS PER MINUTE MAY BE DEVELOPED

Good ground water areas. Permeable sand and gravel deposits interbedded with silt and clay lie in a buried valley. Yields of as much as 250 gallons per minute are available where sufficient coarse material is found. Exploratory drilling may be required to locate such deposits.

AREAS IN WHICH 3 TO 10 GALLONS PER MINUTE MAY BE DEVELOPED

Buried valleys contain 200 to 300 feet of fine sand, silt, and clay. Drilled wells yield meager supplies unless encountering thin, isolated sand and gravel lenses.

HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX I

SOIL SURVEY OF CUYAHOGA COUNTY

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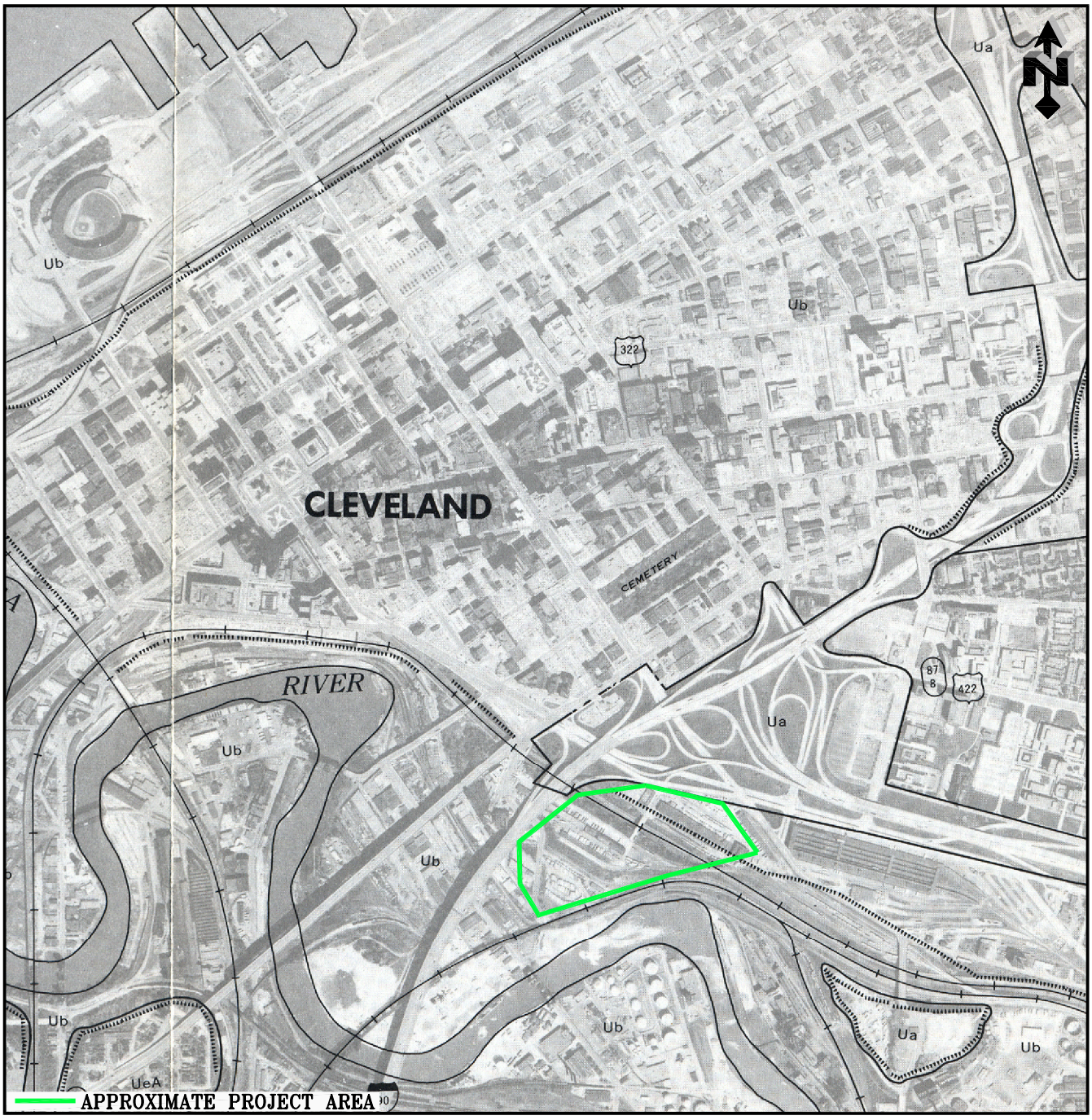
SOIL SURVEY MAP
1980 CUYAHOGA COUNTY, OHIO



SCALE

1:15840

0 — 1/4 — 1/2 — 3/4 — 1 MILE

0 — 1000 — 2000 — 3000 — 4000 — 5000 FEET

HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX J

OIL AND GAS WELL MAP

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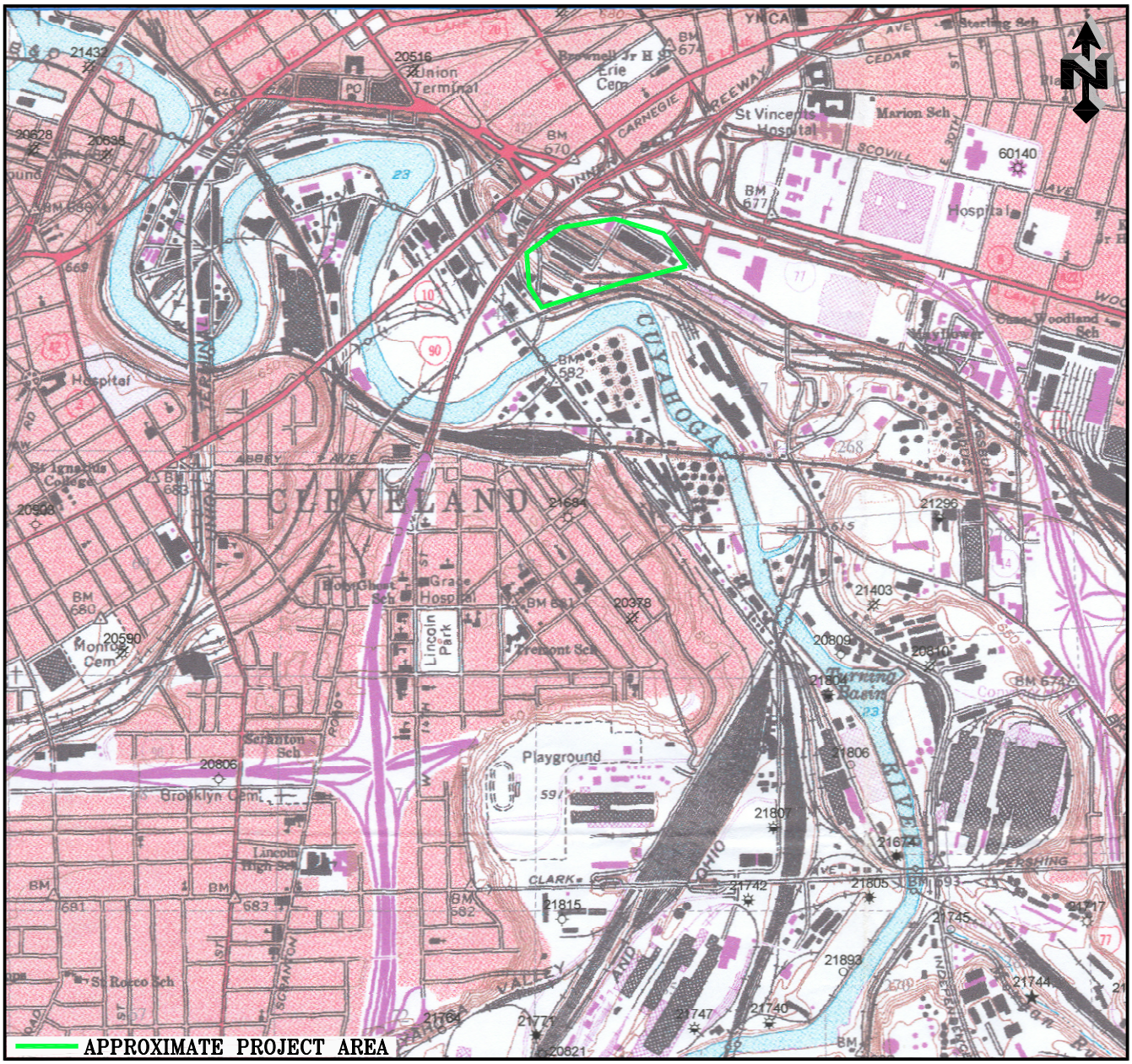
OIL AND GAS WELL MAP

2006 CLEVELAND SOUTH, OHIO QUADRANGLE



WELL SYMBOLS

- UNKNOWN STATUS
- BRINE FOR DUST CONTROL
- COALBED METHANE
- DRY HOLE
- DRY HOLE WITH GAS SHOW
- DRY HOLE WITH OIL AND GAS SHOW
- DRY HOLE WITH OIL SHOW
- EXPIRED PERMIT LOCATION
- GAS
- GAS WITH OIL SHOW
- GAS SHOW
- GAS AND OIL SHOW
- INJECTION
- LOST HOLE
- OBSERVATION
- OIL AND GAS CONVERTED TO WATER
- OIL
- OIL AND GAS
- OIL WITH GAS SHOW
- OIL SHOW
- PERMITTED LOCATION
- PLUGGED BRINE FOR DUST CONTROL
- PLUGGED GAS
- PLUGGED GAS WITH OIL SHOW
- PLUGGED INJECTION
- PLUGGED OIL
- PLUGGED OIL AND GAS
- PLUGGED OIL WITH GAS SHOW
- RADIOACTIVE TOOL LOST IN HOLE
- SOLUTION MINING
- GAS STORAGE
- STRATIGRAPHY TEST
- WATER SUPPLY

HzW Environmental Consultants, LLC

CUY - CLEVELAND INTERBELT
COMMERCIAL ROAD ALIGNMENT PROJECT AREA (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

APPENDIX K

SITE SPECIFIC HEALTH AND SAFETY PLAN

SITE-SPECIFIC HEALTH AND SAFETY PLAN

CUY-CLEVELAND INNERBELT
COMMERCIAL ROAD ALIGNMENT (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

December 2009

Prepared by
HzW Environmental Consultants, LLC
6105 Heisley Road
Mentor, Ohio 44060

EMPLOYEE ACKNOWLEDGEMENT FORM

I have read this site-specific health and safety plan, understand the material presented, have been given an opportunity to ask questions and will abide by the provisions stated in this site-specific plan under which this project is to be implemented.

Site Manager:_____
(Optional)

HzW Project Manager:_____

Contractor's Site Supervisor:_____
(Optional)

Field Technician:_____

Field Technician:_____

Field Technician:_____

Field Technician:_____

TABLE OF CONTENTS

APPENDICES

HEALTH AND SAFETY PLAN

1.0 OBJECTIVE

The objective of this Health and Safety Plan (HASP) is to identify, evaluate, and control safety and health hazards, and provide for emergency response to hazardous materials which may be encountered in the course of these field activities. This HASP has been prepared as a proactive and precautionary measure to deal with unanticipated health and safety concerns encountered during field activities. This HASP is applicable to HzW personnel and will remain at the project site for the duration of the project.

2.0 RESPONSIBILITIES

All HzW personnel are responsible for continuous adherence to the health and safety procedures, covered in this HASP, during the performance of their work. No person may work in any manner that conflicts with the intent or the inherent safety and environmental precautions expressed in these procedures.

2.1 Project Manager

The Project Manager or his/her designee is ultimately responsible for ensuring that all project activities are completed in compliance with requirements set forth in this plan.

The Project Manager or his/her designee in conjunction with HzW's Health and Safety Department will be responsible for developing, modifying, amending, and/or deleting the site-specific provisions of this HASP. The HASP will be revised if warranted by changing site conditions.

The Project Manager or his/her designee and/or HzW's Health and Safety Department are the contacts for regulatory agencies on matters of health and safety.

The Project Manager or his/her designee responsibilities include:

- General health and safety program administration in the field;
- Updating equipment or procedures based on information obtained during field operations;
- Establishing sampling and analysis parameters based on expected contaminants;
- Stopping work as required to ensure the health and safety of personnel;
- Developing site-specific and project specific employee response plans as required, based on expected hazards; and
- Distributing copies of the HASP to the appropriate persons, and ensuring that all distributed copies are promptly updated to include modifications, amendments, and/or deletions.

2.2 *HzW's Health and Safety Department*

HzW's Health and Safety Department in conjunction with the Project Manager will assist in developing, modifying, amending, and/or deleting the site-specific provisions of this HASP. The HASP will be revised if warranted by changing site conditions.

HzW's Health and Safety Department and/or the Project Manager or his/her designee are the contacts for regulatory agencies on matters of health and safety.

HzW's Health and Safety Department responsibilities include:

- Determining initial and subsequent personnel protection requirements;
- Reviewing significant accidents and illnesses related to possible environmental causes, and implementing corrective actions; and
- Developing site-specific and project specific employee response plans as required based on expected hazards.

2.3 *Field Technicians*

All field technicians working at the project site are required to comply with the provision of this HASP and all applicable federal, state, and local regulations. All field technicians will read and sign off on the Employee Acknowledgement Form included at the beginning of this HASP prior to arriving at the project site. A Field Technician's responsibilities include:

- Ensuring his/her own health and safety by completing tasks in a safe manner, and reporting any unsafe acts or conditions to their Project Manager or their designee;
- Monitoring themselves and their fellow employees for signs and symptoms of heat or cold stress and chemical exposure;
- Maintaining the operation and calibration of monitoring equipment; and
- Assuring that adequate first aid is present on site.

Key HASP personnel for this project are listed in ***Appendix A****.*

3.0 *SITE DESCRIPTION AND SCOPE OF WORK*

In general, the site is located to the north and east of Commercial Drive and Canal Road in the city of Cleveland, Cuyahoga County, Ohio. The site is comprised of separate parcels/properties owned by Norfolk Southern Railway. Two (2) properties consist of vacant land and one (1) is currently developed as parking lot. A scope of services was developed based on the findings of geotechnical drilling conducted in July 2009. A copy of HzW's proposal is included as **Appendix B**.

4.0 SITE CHARACTERIZATION AND CHEMICAL HAZARD ASSESSMENT

During July 2009, geotechnical drilling crews installed a series of soil borings for the proposed realignment of Commercial Drive between Canal Road and the proposed East Ninth Street Extension within the CUY-Cleveland Innerbelt project area. The geotechnical drilling crews documented encountering materials with odors and varying colors indicative of being corrosive. Historic Sanborn fire insurance maps indicate that the location of the site was previously utilized as railroad yards. Therefore, there is a potential for field personnel to be exposed to hazardous substance and petroleum constituents during assessment activities. A list of worst-case scenario chemicals is presented in **Appendix C**.

5.0 GENERAL WORK PRACTICES

- No food, beverages or tobacco products will be present, consumed, or used in areas where project activities are being conducted.
- Before eating, drinking or smoking, employees must wash their hands and remove any outer protective garments.
- First aid kits must be readily accessible at the project site.
- Fire extinguishers must be readily accessible at the project site. Where there is fire potential, fire extinguishers will be located in the adjacent area.
- Should there be any contaminated protective equipment, such as respirators, hoses, boots, etc., said equipment shall not be removed from the project site until such equipment has been cleaned, or properly packaged and labeled.
- Legible and understandable precautionary labels which comply with hazard communication requirements must be affixed prominently to containers of contaminated waste, debris and/or clothing.
- Where work is being performed at or near roadways, orange vests must be worn.
- Removal of any contaminated soil from protective clothing or equipment by blowing, shaking, or any other means that disperse contaminants into the air is prohibited.
- All areas that have been determined as contaminated at the project site must be clearly marked as such. No personnel, equipment, etc., must be removed from the site until they have been properly decontaminated, according to applicable state and federal regulations.

6.0 PERSONAL PROTECTIVE EQUIPMENT

This section is provided as a proactive measure should unanticipated hazardous materials or wastes be encountered during the project. The items in this section are presented to give a broad spectrum of alternative personal protective equipment (PPE) options to address a worst case scenario. It is not likely that the more comprehensive of these options will need to be implemented.

This section outlines maintenance and storage of PPE, decontamination, donning and doffing procedures, inspection and monitoring effectiveness and limitation.

6.1 Respiratory Protection

- Only employees who have been trained to wear and maintain respirators properly shall be allowed to enter areas requiring respiratory protection.
- Only properly cleaned, maintained, National Institute of Occupational Safety and Health (NIOSH) approved respirators shall be used on site.
- Selection of respirators, as well as any decision regarding upgrading or downgrading of respiratory protection, will be made by HzW's Health and Safety Department.
- Used air-purifying cartridges shall be replaced at the end of each shift or when breakthrough is suspected.
- Positive and negative pressure tests shall be performed each time the respiratory is donned.
- Only employees who have been both fit tested and have had a medical surveillance examination within the last 12 months will be allowed to work in atmospheres where respirators are required. Contractors hired by HzW shall provide certificates of respirator fit testing completed within the last 12 months for each employee on site.
- Respirator users shall be instructed in the proper use and limitation of respirators.
- If an employee has difficulty in breathing during the fit test or during use, he/she shall be evaluated medically to determine if he/she can wear a respirator safely while performing assigned tasks.
- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent medical surveillance examination, a physician determines that the health or safety of the employee will be impaired by respirator use.
- Contact lenses shall not be worn while using any type of respiratory protection.
- Respirators shall be cleaned and sanitized daily after use.
- Respirators shall be inspected during cleaning. Worn or deteriorated parts shall be replaced.
- Facial hair that might interfere with a good face-piece seal or proper operation of the respirator is prohibited.
- The Project Manager in conjunction with HzW's Health and Safety Department will review the respiratory protection program daily to ensure employees are properly wearing and maintaining their respirators and that the selected respiratory protection is adequately protecting the employees.

6.2 Levels of Protection

The following sections outline four (4) basic levels of PPE based on guidelines issued by NIOSH, the Occupational Safety and Health Administration (OSHA) and the United States Environmental Protection Agency (U.S. EPA). Selection of PPE is typically based upon the location and nature of the project, past use at the project site, the likelihood of encountering hazardous materials or waste, and any additional information gathered from previous sampling and analysis performed or sampling and

analysis performed as part of this HASP's Scope of Work. The PPE selected for this project site is outlined in **Appendix D**.

Specific levels of protection will be changed whenever additional information is obtained and/or site conditions and activities so dictate. Levels of protection can either be increased to the next higher level, or decreased to the next lower level. The decision to change levels of protection will be made by the Project Manager in conjunction with HzW's Health and Safety Department. If the need arises to protect health and safety, the Project Manager can upgrade protection levels without input from HzW's Health and Safety Department. However, the Project Manager must then discuss the decision with the Health and Safety Department as soon as feasible. Levels of protection will not be downgraded without prior approval from HzW's Health and Safety Department.

6.2.1 Level A Protection

Level A protection would be used when the greatest level of skin, respiratory and eye protection is required. This level of protection is typically required for fire fighting activities, oxygen deficient environments or immediately dangerous to life and health (IDLH) atmospheres. **Level A Protection is not anticipated at this time for HzW personnel at the project site.** The following equipment will be used for Level A protection:

- Full-face pressure demand SCBA (self-contained breathing apparatus) or a pressure demand (positive pressure) air line respirator with an escape bottle for IDLH atmospheres. (Assigned Protection Factor approximately 10,000 and 2000, respectively)
- Fully encapsulated chemical protective suit.
- Gloves: inner and outer chemically resistant.
- Chemical resistant, safety-toe boots.
- Booties/disposable boot covers.
- Hard hat (under suit).

6.2.2 Level B Protection

Level B respiratory protection is the same as Level A respiratory protection. However, the protective clothing is different. **Level B Protection is not anticipated at this time for HzW personnel at the project site.** The following equipment will be used for Level B protection:

- Full-face, positive pressure SCBA or a pressure demand (positive pressure) airline respirator with an escape bottle for IDLH atmospheres.
- Coated Tyvek (or other chemical resistant) coveralls with hood.
- Inner and outer chemical resistant gloves.
- Chemical resistant safety toe boots.
- Booties/disposable boot covers.

- Hard Hat.

6.2.3 *Level C Protection*

Level C Protection is mandatory for any personnel entering an area where the airborne contaminants exceed or may exceed OSHA PELs. **Level C Protection is not anticipated at this time for HzW personnel at the project site.** A full-face air-purifying respirator may only be utilized if:

- The chemical compounds have adequate warning properties;
- The personnel have passed qualitative fits tests for the particular mask as previous required in the HASP;
- The appropriate filter cartridges are used and their service limitation are not exceeded; and
- The project's operations will not encounter unknown compounds or excessive concentrations of known compounds.

Half face respirators will be used only when approved by the Project Manager in conjunction with HzW's Health and Safety Department.

The following equipment will be used for Level C protection:

- Full-faced, air purifying canister-equipped respirator;
- Coated Tyvek® (or other chemical resistant) coverall with hood;
- Chemical resistant, safety-toe boots;
- Booties/disposable boot covers;
- Inner and outer chemical resistant gloves;
- Hard had (with goggles if half-face respirator is used);
- Respirator cartridges will be changed daily, and also upon the detection of any chemical odor by the worker.

6.2.4 *Level D Protection*

Level D protection is the minimum level of protection required at the site. **Level D protection is anticipated at this time for HzW personnel the project site**. The following equipment will be used for Level D protection:

- Half-face air-purifying respirators, as necessary;
- Protective coveralls;
- Safety glasses;
- Safety-toe boots or shoes;
- Gloves of an appropriate material;
- Hard hat, as necessary; and
- Hearing protection, as necessary.

6.3 *Using Personal Protective Equipment*

All personnel at the project site will comply with the required PPE, according to established procedures in this HASP to minimize exposure potential. When leaving the project site, personal protective equipment will be removed according to these established procedures to minimize the potential for the spread of contamination.

6.3.1 Donning Procedure – Level D

- Put on protective coveralls;
- Put on boots;
- Put on gloves;
- If hearing protection is required, put in earplugs;
- Put on hardhat, if necessary; and
- Put on safety glasses or goggles.

6.3.2 Doffing Procedure – Level D

- Remove excess soil and/or other material from outer clothing and boots while at excavation area;
- Before leaving the project site, remove coveralls, boots, gloves, safety goggles and hard hat;
- If disposable coveralls are used, place them in the appropriate refuse container; and
- If coveralls require laundering, place in appropriate laundry receptacle.

6.3.3 Donning Procedures – Levels C and B

- Remove street clothes and store in a clean location;
- Put on protective coveralls;
- Put on boots and boot covers and tape the coveralls;
- Don respirator and check for secure fit;
- Put on gloves;
- Tape the cuff of the gloves over the coveralls at the wrist;
- If hearing protection is required, put in earplugs;
- Put hood or head covering over the respirator;
- Put on hard hat, if necessary, over the hood and respirator (Tape to secure from falling off); and
- Put on any remaining protective equipment such as safety glasses or goggles.

6.3.4 Doffing Procedures – Levels C and B

At the discretion of HzW's Health and Safety Department and depending on the activities, one person may remain outside the project site to assist in

decontamination of personnel leaving the site. Whenever a person requires decontamination, the following sequence of stations will be used:

Station 1. Exiting personnel will remove excess soil and/or other materials from their outer clothing and boots.

Station 2. Required equipment at Station 2 shall include the following:

- Plastic lined receptacle
- Chair
- Clean, damp cloths
- Paper towels
- Plastic bags

At Station 2, personnel will wipe their respirators (if used), hard hats, and boots with clean, damp cloths and then remove those items. If the inner gloves are contaminated or appear to be dirty, they must be removed and replaced prior to wiping off equipment. All items removed are then hand-carried to the next station.

Station 3. Required equipment at Station 3 shall include the following:

- Wash basin with soap and water
- Respirator sanitation station

At this Station, personnel will thoroughly wash their hands and face. Respirators will be sanitized and then placed in a clean, plastic ziplock bag. Lined waste receptacles containing disposable equipment, garments and PPE will be removed and disposed in accordance with RCRA regulations.

6.4 Personal Protective Equipment Selection

The level of PPE can be based on measurements of the work environment when such measurements can be made in real-time. When the assessment of the work environment depends on laboratory analysis of samples collected or past land use, then the selection of PPE will be made on the professional judgment of possible or expected exposures.

7.0 SITE MONITORING

If determined necessary by field personnel, HzW's Project Manager or HzW's Health and Safety Department, monitoring of atmospheric and/or breathing zone atmospheric conditions will be performed during on-site activities using real-time instrumentation, a photoionization detector (PID) and a lower explosive limit (LEL) meter, to determine

total organic contaminant concentrations and/or the percentage of explosive gas vapors. Site monitoring of atmospheric conditions will not be conducted at the site during on-site activities. As necessary, monitoring of the breathing zone will be conducted prior to initiation of on-site activities and continue during activities. Site monitoring will be performed at the point of highest expected concentration with the sample media located at the ground surface and within the breathing zone at 4 to 6 feet above the ground surface.

The work area air monitoring program addressed in this section has been developed to aid in the selection of PPE and to document exposures to on-site personnel. Prior to commencement of project activities, PID scans will be utilized as a preliminary indication of site conditions. PID and LEL readings will also be taken in the breathing zone and over excavated soil as sampling activities proceed. PID and LEL reading times will be recorded on an air monitoring log. Monitoring may be decreased if the results prove to be negative or uniform below ½ of PEL for the chemicals of concern. Based on known site conditions, the monitoring program will take into account the following factors:

- Determining when peak concentrations may be encountered; and
- Determining when and where unusual contaminants may be present.

8.0 PERSONAL EXPOSURE AIR MONITORING

The personal exposure air monitoring program addressed in this section has been developed to aid in the selection of PPE and to document exposures to on-site personnel. Personal exposure air monitoring is not anticipated at this time. However, information pertaining to personal exposure air monitoring is presented below should personal exposure air monitoring be deemed necessary at the project site by the Project Manager and/or HzW's Health and Safety Department.

The frequency and duration of personnel monitoring will be at the discretion of HzW's Health and Safety Department. In situations where personnel exposure is being evaluated, the personnel sample will be collected in the breathing zone of the employee.

When applicable, site personnel will be notified of air sampling results as soon as they are available. Where samples require laboratory analysis, the results will be made known to site personnel the day following receipt of results.

The personal exposure air monitoring program may include real-time instrumentation (direct reading instruments) and/or integrated air sampling (personal sampling pump methods). Appropriate NIOSH or OSHA sampling and analytical procedures will be utilized for time-weighted average monitoring. All air monitoring equipment will be maintained and operated in accordance with manufacturers' recommendations. Real time instrument maintenance and calibration data will be recorded in the air-monitoring log. When applicable, calibration of sampling pumps will also be documented in the daily field notes.

8.1 Real-Time Sampling Methods

Real-time air monitoring will be conducted using the PID. Direct reading Draeger tubes for detection of specific contaminants may also be used periodically during the project.

8.2 Integrated Air Monitoring

Integrated air monitoring may be performed to determine;

- The presence of a specific contaminants or contaminants;
- Peak concentrations; and
- Time–weighted average concentrations.

Personal air monitoring will be conducted when high concentrations of volatile organics are anticipated. Air samples will be collected using Draeger tubes, diffusion type organic vapor monitor badges or 8-hour personal monitoring pumps. Air analysis will be done for targeted contaminants as determined by the Project Manager in conjunction with HzW's Health and Safety Department.

8.3 Noise Monitoring

Noise monitoring will not be conducted at the project site.

8.4 Equipment Tampering

On-site personnel must wear monitoring equipment and the required personal protective equipment. Refusal to wear appropriate equipment and/or intentional tampering with sampling apparatus will lead to disciplinary action and immediate dismissal from the project site.

8.5 Monitoring Record

The Project Manager will be responsible for establishing and maintaining records of all required monitoring as described below:

- Employee name and social security number;
- Date, time, pertinent task information and exposure information;
- Type of PPE worn; and
- Engineering controls used to reduce exposure.

8.6 Notification

Employees will be notified of exposure in excess of the permissible exposure limit and will be provided with follow-up medical monitoring when required.

9.0 MEDICAL SURVEILLANCE EXAMINATION

All HzW field personnel will have successfully completed an initial and annual physical examination. The examination is designed to meet the requirements of 29 CFR 1920.120 for possible exposure to hazardous materials or waste. The medical surveillance examination consists of the following:

- Medical and occupational medical history and physical examination;
- Visual test
- Urinalysis
- Audiogram
- Spirometry
- EKG (Age 40 and over)
- dt Tetanus
- Chest X-ray
- CBC with differential
- 13 Blood Chemistry Tests
- Blood Lead and Zinc Protoporphrin
- Cholinesterase
- PCBs
- Mercury
- Cadmium

The following information is provided to the examining physician:

- Description of employee's duties;
- Anticipated chemical exposures and levels;
- Description of PPE to be used; and
- Information from previous medical examinations.

Exit medical surveillance examinations are provided to HzW field personnel upon termination of employment.

A copy of the medical examination report is provided at the employee's request. The employee will be informed of any medical conditions that would result in work restriction.

10.0 FIRST AID AND MEDICAL TREATMENT

All field personnel must report any near-miss incident, accident, injury, or illness to HzW's Health and Safety Department as well as their Project Manager. First aid will be rendered expeditiously by a person qualified to do so. The employee's Project Manager will complete an accident/injury report and conduct an investigation of the incident as soon as emergency conditions (if any) no longer exist and medical or first-aid treatment has been rendered. The investigation should follow completion of the accident/injury

report. HzW's Health and Safety Department shall promptly receive for review a copy of the accident/injury report, and the results of the incident investigation.

11.0 MEDICAL RESTRICTION

When the examining physician determines a need to restrict a field employee from their job activities, that determination will be communicated to the employee's Project Manager as well as the Health and Safety Department. The Project Manager will ensure that the employee complies with the work restriction(s).

12.0 MEDICAL RECORDS

Medical and exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.120, and retained for a minimum of 30 years. Confidentiality of these records shall be maintained through retention.

13.0 EMERGENCY PROCEDURES

Should the need for outside medical attention arise, St. Vincent Charity Hospital located in Cleveland, Ohio will be used. In addition, a map, as well as directions from the project site to the hospital, is also included as **Appendix E**. The City of Cleveland Police Department will be called to handle any security incidents at the project site.

The Project Manager will establish evacuation routes and assembly areas for the project site. All personnel entering the site will be informed of these routes and assembly areas.

Unusual events, activities, odors, and conditions will be reported to the Project Manager and subsequently HzW's Health and Safety Department. Emergency telephone numbers will be available in each motor vehicle at the project site, along with a map and directions to the nearest hospital. A list of emergency telephone numbers is included as **Appendix F**.

All incidents will be dealt with in a manner which minimizes health risks to project site workers, the environment and the local community. In the case of a medical emergency, paramedics will be summoned without delay.

14.0 TRAINING

All field personnel shall have taken a 40-hour HAZWOPER training course with annual refreshers as well as first aid and CPR training. In addition, training shall cover Hazard Communication and Respiratory Protection.

All training shall be documented by a certificate signed by the instructor. A copy of each and every training certificate shall be maintained by HzW's Health and Safety Department. Subcontractors must provide to HzW's Health and Safety Department copies of certificates of training for all subcontractors personnel at the project site.

15.0 SAFETY MEETINGS

The Project Manager shall conduct a safety meeting at the beginning of each shift, or whenever new employees arrive at the project site once the project commences. Topics to be discussed at these meetings include health and safety considerations for the day's activities, necessary protective equipment (as applicable), problems encountered, and new operations. Attendance records and meeting notes shall be maintained by the Project Manager.

16.0 MATERIAL SAFETY DATA SHEETS

This HASP includes Material Safety Data Sheets (MSDSs) for the chemicals listed in **Appendix C**. The MSDSs shall be maintained on site as part of this HASP, and shall be accessible to all employees. A copy of each chemical's MSDS is also included in **Appendix C**.

APPENDIX A

KEY HASP PERSONNEL

The following is a list of potential personnel having responsibilities under this HASP:

Doug Wetzel	Project Manager
Joan Sablar	Health and Safety Representative
Steve Sablar	Senior Field Technician
Joshua Derico	Field Technician
Joseph Harcher	Field Technician

APPENDIX B

HzW's PROPOSAL

ATTACHMENT 1

SCOPE OF SERVICES for
TARGETED PHASE II ENVIRONMENTAL SITE ASSESSMENT
CUY-CLEVELAND INNERBELT, COMMERCIAL DRIVE ALIGNMENT PROJECT AREA

BACKGROUND

During July 2009, geotechnical drilling crews installed a series of borings for the proposed re-alignment of Commercial Drive between Canal Road and the proposed East Ninth Street Extension in the CUY-Cleveland Innerbelt project area. During installation of four borings (designated B-071, B-072, B-073 and B-075), the drilling crew encountered materials variously described as:

- Having a "bad odor" or being an "unknown blue/white material" that "looked [corrosive]" to a depth of over 20 feet below ground surface in B-071;
- An "unknown blue material" at a depth of less than 5 feet in B-072;
- An "unknown blue/green rock material" to a depth of less than 5 feet in B-073; and
- A "nasty…blue/green material" from 1.5 to 4.5 feet in B-075 which "smells bad" and the drilling crew was "…not sure if [it was] safe to touch."

A review of Sanborn fire insurance maps provided to HzW by ODOT's Office of Environmental Services (OES) indicated that the areas in question were historically occupied by railroad yards that were "full of tracks". Therefore, it is unclear what this discolored material could be.

In ODOT's Request for Task Order Proposal, it was requested that HzW install five soil borings to a depth of 20 feet. Based upon the above information, it would appear that the geotechnical drilling crews only encountered the material to a depth of 20 feet in one of the four borings. The material was encountered at a depth of less than 5 feet in three of the four geotechnical borings where this material was observed. Based upon a discussion with ODOT OES on November 3, 2009, it was agreed to reduce the number of borings from five (5) to four (4), and to reduce the depth at three of the four borings (those installed near locations B-072, B-073, and B-075) from 20 feet to 6 feet.

SCOPE OF TARGETED PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)

The proposed scope of investigation in the project area will consist of the following:

Task A: Pre-Assessment Planning and Support

1. Coordinating the location of proposed soil borings with the original geotechnical drilling crew, ODOT and affected property owners and/or tenants (as directed by ODOT), obtaining utility clearances, and otherwise obtaining clear access to soil boring locations.

2. Preparation of a site-specific health and safety plan (HASP) to be used by personnel responsible for implementing the targeted Phase II ESA. The HASP will be reviewed and signed by all personnel prior to initiation of field activities.

Task B: ***Physical Site Assessment***

1. Using Geoprobe® subsurface sampling techniques, install four (4) soil borings in the project area. One (in the general location of original geotechnical boring B-071) will penetrate to a terminal depth of twenty (20) feet below ground surface, while the other three borings (in the general locations of original geotechnical borings B-072, B-073, and B-075) will penetrate to a terminal depth of six (6) feet below ground surface. Soil samples will be collected continuously at 2-foot intervals in each boring from ground surface to terminal depth, with recovered materials logged in the field by a qualified field technician or field geologist.
2. In the event that any boring encounters the types of materials referenced by the geotechnical drilling crew, samples of the material will be collected and transferred to laboratory-supplied containers, and placed in an ice chest for preservation in the field. Based upon the geotechnical boring logs, HzW would anticipate encountering this material from between: depths of 0-14 feet at location B-071 (the strongest odor was noted at 8-10 feet) and perhaps near the terminal depth (20 feet); depths of 1-5 feet at location B-072; depths of 2-4 feet at location B-073; and depths of 1.5-4.5 feet at location B-075. Based upon this, it is anticipated that HzW would collect a maximum of: three (3) samples from the boring installed at location B-071; two (2) samples from the boring installed at location B-072; one (1) sample from the boring installed at location B-073; and two (2) samples from the boring installed at location B-075.
3. The eight (8) soil samples collected from these borings would be submitted to Test America Labs, Inc. of North Canton, Ohio, for analysis of: pH; hydrogen sulfide; arsenic, cadmium, chromium, hexavalent chromium, lead, and cyanide; volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs), and total petroleum hydrocarbons (TPH) by approved laboratory methods. Test America Labs, Inc. would be instructed in the proper preparation and handling of these samples, and to "hold" the samples for possible identification of tentatively identified compounds (TICs), which is included as a contingency analytical cost to this task order proposal.
4. Abandon all four (4) borings following installation using hydrated bentonite chips.

Task C: ***Data Evaluation/Report Preparation/Coordination***

This element will be conducted following completion of the physical site assessment portion of the Phase II ESA scope of work, and would consist of evaluating all analytical results upon receipt, and preparation of a report for submission to ODOT OES. This report will include a narrative of the circumstances surrounding the need and scope of Phase II ESA activities, site drawings showing the location of borings relative to on-site property features, and a discussion of the analytical results relative to comparable environmental standards in the State of Ohio. Three (3) copies of this report would be submitted to ODOT OES upon completion. In addition, this task includes time for coordination with ODOT District 12 and ODOT OES at ODOT District 12 Headquarters or via telephone to discuss the findings, the need for delineation of the materials encountered, and potential remedial options during anticipated construction activities in the CUY-Cleveland Innerbelt project area.

APPENDIX C

LIST OF POTENTIAL CHEMICAL CONTAMINANTS AT THE PROJECT SITE

POTENTIAL CHEMICAL CONTAMINANTS AT THE PROJECT SITE

A listing of the chemicals that are likely to be encountered at the Property is presented below.

- Trichloroethene
- Benzene
- Benzo(a)pyrene
- Arsenic
- Cadmium
- Cyanide
- Lead

A copy of each of these chemicals Material Safety Data Sheet is included for review.

MSDS Number: **T4940** * * * * * *Effective Date: 12/06/07* * * * * *Supercedes: 08/01/05*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRICHLOROETHYLENE

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
CAS No.: 79-01-6
Molecular Weight: 131.39
Chemical Formula: C2HCl3
Product Codes:
J.T. Baker: 5376, 9454, 9458, 9464, 9473
Mallinckrodt: 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	7901-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN

IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:
Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:
Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:
Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:
Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

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5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

lel: 8; uel: 12.5

Explosion:

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Trichloroethylene:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (Ceiling),
300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):
10 ppm (TWA) 25 ppm (STEL); A2 Suspected Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.

Odor:
Chloroform-like odor.

Solubility:
Practically insoluble in water. Readily miscible in organic solvents.

Specific Gravity:
1.47 @ 20C/4C

pH:
No information found.

% Volatiles by volume @ 21C (70F):
100

Boiling Point:
87C (189F)

Melting Point:
-73C (-99F)
Vapor Density (Air=1):
4.5
Vapor Pressure (mm Hg):
57.8 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.
Hazardous Decomposition Products:
May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.
Conditions to Avoid:
Heat, flame, ignition sources, light, moisture, incompatibles

---

11. Toxicological Information

Toxicological Data:
Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
This material has been linked to mutagenic effects in humans.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Trichloroethylene (79-01-6)	No	Yes	2A

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into

the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 4L

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	Canada-- DSL	NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations- Part 1\---------------

	-SARA 302-	------SARA 313------

Ingredient	RQ	TPQ	List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

\Federal, State & International Regulations- Part 2\

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Trichloroethylene (79-01-6)	100	U228	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: 2 Flammability: 1 Reactivity: 0
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
****

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet
Benzene

:C# 02610

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzene
Catalog Numbers: AC167660000, AC167660010, AC167660025, AC167660250, AC167665000, AC168650250, AC295330000, AC295330010, AC295330025, AC295330250, AC296880000, AC296880010, AC296880025, AC296880250, AC610230010, AC610231000, AC611001000, B243-4, B243J, B245-4, B245-500, B411-1, B411-4, B412-1, S79920ACS
Synonyms: Benzol; Cyclohexatriene; Phenyl hydride.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
71-43-2	Benzene	> 99	200-753-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear colorless liquid. Flash Point: -11 deg C.
Danger! Extremely flammable liquid and vapor. Vapor may cause flash fire. Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. Contains benzene. Benzene can cause cancer. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause blood abnormalities. May cause central nervous system effects.
Target Organs: Blood, central nervous system, respiratory system, eyes, bone marrow, immune system, skin.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation. Harmful if absorbed through the skin. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.
Ingestion: May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.
halation: Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central ..ervous system depression. Exposure may lead to irreversible bone marrow injury. Exposure may lead to aplastic anemia. Potential symptoms of overexposure by inhalation are dizziness, headache, vomiting, visual disturbances, staggering gait, hilarity, fatigue, and other symptoms of CNS depression.

Chronic: May cause bone marrow abnormalities with damage to blood forming tissues. May cause anemia and other blood cell abnormalities. Chronic exposure to benzene has been associated with an increased incidence of leukemia and multiple myeloma (tumor composed of cells of the type normally found in the bone marrow). Immunodepressive effects have been reported. This substance has caused adverse reproductive and fetal effects in laboratory animals.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Extremely flammable liquid and vapor. Vapor may cause flash fire. Approach fire from wind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire. May accumulate static electricity.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: -11 deg C (12.20 deg F)
Autoignition Temperature: 498 deg C (928.40 deg F)
Explosion Limits, Lower:1.3 vol %
Upper: 7.1 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Provide ventilation. Approach spill from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary

measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. See 29CFR 1910.1028 for the regulatory requirements for the control of employee exposure to benzene.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzene	0.5 ppm TWA; 2.5 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.1 ppm TWA 500 ppm IDLH	1 ppm TWA; 10 ppm TWA (applies to industry segments exempt from the benzene stan dard at 29 CFR 1910.1028); 25 ppm Ceiling (applies to industry segments exempt from the 1 ppm TWA and 5 ppm STEL of th e benzene standard); 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 C FR 1910.1028)

OSHA Vacated PELs: Benzene: 10 ppm TWA (unless specified in 1910.1028)
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear colorless
Odor: sweetish odor - aromatic odor
pH: Not applicable.
Vapor Pressure: 75 mm Hg @ 20 deg C
Vapor Density: 2.8 (air=1)
Evaporation Rate: Not available.
Viscosity: 0.647mPa @ 20 deg C
Boiling Point: 80.1 deg C
Freezing/Melting Point:5.5 deg C
Decomposition Temperature: Not available.
Solubility: 0.180 g/100 ml @ 25°C
Specific Gravity/Density:0.8765 @ 20°C
Molecular Formula:C6H6
Molecular Weight:78.11

Section 10 - Stability and Reactivity

emical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat, confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 71-43-2: CY1400000
LD50/LC50:
CAS# 71-43-2:
Dermal, guinea pig: LD50 = >9400 uL/kg;
Draize test, rabbit, eye: 88 mg Moderate;
Draize test, rabbit, eye: 2 mg/24H Severe;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, mouse: LC50 = 9980 ppm;
Inhalation, mouse: LC50 = 24 mL/kg/2H;
Inhalation, rat: LC50 = 10000 ppm/7H;
Inhalation, rat: LC50 = 34 mL/kg/2H;
Inhalation, rat: LC50 = 6.5 mL/kg/4H;
Oral, mouse: LD50 = 4700 mg/kg;
Oral, rat: LD50 = 930 mg/kg;
Oral, rat: LD50 = 1 mL/kg;
Oral, rat: LD50 = 1800 Benzene is considered very toxic; probable human oral lethal dose would be 50-500 mg/kg. Human inhalation of approximately 20,000 ppm (2% in air) was fatal in 5-10 minutes.While percutaneous absorption of liquid benzene through intact human skin can be limited (e.g., 0.05% of the applied dose), the absorbed dose via direct dermal contact combined with that received from body surface exposure to benzene in workplace air is such that a substantial fraction (20-40%) of the total exposure is due to skin absorption.
Carcinogenicity:
CAS# 71-43-2:

- **ACGIH:** A1 - Confirmed Human Carcinogen
- **California:** carcinogen, initial date 2/27/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

Epidemiology: IARC has concluded that epidemiological studies have established the relationship between benzene exposure and the development of acute myelogenous leukemia, and that there is sufficient evidence that benzene is carcinogenic to humans.
Teratogenicity: Inhalation, rat: TCLO = 50 ppm/24H (female 7-14 day(s) after conception) Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) and Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).; Inhalation,mouse: TCLo = 5 ppm (female 6-15 day(s) after conception) Effects on Embryo or Fetus - cytological changes (including somatic cell genetic aterial) and Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and arrow).
Reproductive Effects: Inhalation, rat: TCLO = 670 mg/m3/24H (female 15 day(s) pre-mating and female 1-22 day(s) after conception) female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated).; Oral, mouse: TDLo = 12 gm/kg (female 6-15 day(s)

after conception) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).
Mutagenicity: DNA Inhibition: Human, Leukocyte = 2200 umol/L.; DNA Inhibition: Human, HeLa cell = 2200 umol/L.; Mutation Test Systems - not otherwise specified: Human, Lymphocyte = 5 umol/L.; Cytogenetic Analysis: Inhalation, Human = 125 ppm/1Y.; Cytogenetic Analysis: Human, Leukocyte = 1 umol/L/72H.; Cytogenetic Analysis: Human, Lymphocyte = 1 mg/L.
Neurotoxicity: See actual entry in RTECS for complete information.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Mosquito Fish: TLm = 395 mg/L; 24 Hr; UnspecifiedFish: Goldfish: LC50 =46 mg/L; 24 Hr; Modified ASTM D 1345Fish: Fathead Minnow: LC50 = 15.1 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0)Fish: Rainbow trout: LC50 = 5.3 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0)Fish: Bluegill/Sunfish: LD50 = 20 mg/L; 24-48 Hr; Unspecified If benzene is released to soil, it will be subject to rapid volatilization near the surface and that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater. If benzene is released to water, it will be subject to rapid volatilization. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation.
Environmental: If benzene is released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase benzene will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days. The reaction time in polluted atmospheres which contain nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4-6 hours. Benzene is fairly soluble in water and is removed from the atmosphere in rain.
Physical: Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 71-43-2: waste number U019 (Ignitable waste, Toxic waste).

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	BENZENE	BENZENE
Hazard Class:	3	3
UN Number:	UN1114	UN1114
Packing Group:	II	II
Additional Info:		FLASHPOINT -11 C

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 71-43-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 71-43-2: 10 lb final RQ (receives an adjustable RQ of 10 lbs based on potential carcinoge
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 71-43-2: immediate, delayed, fire.
Section 313
This material contains Benzene (CAS# 71-43-2, > 99%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 71-43-2 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 71-43-2 is listed as a Hazardous Substance under the CWA. CAS# 71-43-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 71-43-2 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 71-43-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:
WARNING: This product contains Benzene, a chemical known to the state of California to cause cancer.
WARNING: This product contains Benzene, a chemical known to the state of California to cause male reproductive toxicity.
California No Significant Risk Level: CAS# 71-43-2: 6.4 æg/day NSRL (oral); 13 æg/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
T F
Risk Phrases:
R 11 Highly flammable.
R 36/38 Irritating to eyes and skin.
R 45 May cause cancer.
R 46 May cause heritable genetic damage.
R 48/23/24/25 Toxic : danger of serious damage to health by prolonged exposure through inhalation, contact with skin and if swallowed.
R 65 Harmful: may cause lung damage if swallowed.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

GK (Water Danger/Protection)
CAS# 71-43-2: 3

Canada - DSL/NDSL
CAS# 71-43-2 is listed on Canada's DSL List.

Canada - WHMIS
This product has a WHMIS classification of B2, D2A, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List
CAS# 71-43-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/11/1999
Revision #8 Date: 3/15/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Benzo(a)pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo(a)pyrene, 98%
Catalog Numbers: AC105600000, AC105600010, AC105601000
Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	98.0	200-028-5

Hazard Symbols: T
Risk Phrases: 45 46

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: slightly brown solid. Cancer suspect agent. Possible risk of harm to the unborn child.
Caution! The toxicological properties of this material have not been fully investigated. May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: None.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated.
Chronic: May cause cancer in humans.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: ; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	none listed	none listed	none listed

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use. Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: slightly brown
Odor: faint aromatic odor
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 495 deg C @ 760.00mm Hg
Freezing/Melting Point:175 - 177 deg C
Decomposition Temperature: Not available.
Solubility: 1.60x10-3 mg/l @25°C
Specific Gravity/Density: Not available.
Molecular Formula:C20H12
Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, acrid smoke and fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 50-32-8: DJ3675000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 50-32-8:
ACGIH: A2 - Suspected Human Carcinogen
California: carcinogen, initial date 7/1/87
NIOSH: potential occupational carcinogen (listed as Coal tar pitches)
NTP: Suspect carcinogen
OSHA: Possible Select carcinogen
IARC: Group 2A carcinogen

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information found.
Physical: No information found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)				No information available.
Hazard Class:					
UN Number:					
Packing Group:					

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 50-32-8 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.

SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 50-32-8: acute, chronic.
Section 313
This material contains Benzo[a]pyrene (CAS# 50-32-8, 98 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
T
Risk Phrases:
R 45 May cause cancer.
R 46 May cause heritable genetic damage.
R 60 May impair fertility.
R 61 May cause harm to the unborn child.

Safety Phrases:
S 37 Wear suitable gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 28A After contact with skin, wash immediately with plenty of water.

WGK (Water Danger/Protection)
CAS# 50-32-8: No information available.
Canada - DSL/NDSL
CAS# 50-32-8 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A.
Canadian Ingredient Disclosure List
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 50-32-8: OEL-AUSTRALIA;Carcinogen OEL-BELGIUM;Carcinogen OEL-FINLAND:TWA 0.01 mg/m3;Skin;Carcinogen OEL-FRANCE;Carcinogen OEL-GER

MANY;Carcinogen OEL-RUSSIA:STEL 0.00015 mg/m3;Carcinogen OEL-SWEDEN: TWA 0.005 mg/m3;STEL 0.03 mg/m3;Skin OEL IN BULGARIA, COLOMBIA, JORDA N, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #5 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

ICD GROUP METALS LLC
600 MADISON AVENUE
NEW YORK, N.Y. 10022
TEL: 212-644-1500 FAX: 212-644-1480

FOR EMERGENCY CALL:
CHEMTREC
1-800-424-9300

HMIS

HEALTH: 4	FLAMMABILITY: 0
REACTIVITY: 1	PROTECTION: H

SECTION A - PRODUCT INFORMATION

TRADE NAME : ARSENIC METAL
CAS NUMBER : 7440-38-2
SYNONYMS : ARSENIC METAL
CHEMICAL FAMILY : METALS GROUP 5a
FORMULA : As

REVISION DATE : AUGUST 1, 2001

SECTION B - HAZARDOUS COMPONENTS

COMPONENT	CAS NO.	%	PEL/TLV
ARSENIC METAL	7440-38-2	100 %	0.01mg(As)m^3 OSHA TWA CFR 29 (1910.1018) 0.5mg/m^3 OSHA TWA (AS INORGANIC COMPOUND) 0.2mg/m^3 ACGIH TWA 0.002mg/m^3/15 min NIOSH 100mg/m^3 IDLH-CARCINOGEN

SECTION C - PHYSICAL PROPERTIES

BOILING POINT (° C) : SUBLIMES @ 612
MELTING POINT (° C) : 814 @ 36 ATM
VAPOR PRESSURE (mm Hg) : 1 mm @ 372 ° C
VAPOR DENSITY (AIR = 1) : N/A
SOLUBILITY IN WATER : INSOLUBLE
ODOR THRESHOLD : N/A
APPEARANCE & ODOR : SILVER GRAY CRYSTALS/NO ODOR AS METAL, AS COMPOUND AsH_3 HAS GARLIC ODOR

SPECIFIC GRAVITY: 5.727
FREEZING POINT (°) : N/A
PERCENT VOLATILE (BY WT.) : N/A
EVAPORATION RATE : N/A
Ph (% IN WATER) : NONE

SECTION D - FIRE & EXPLOSION DATA

FLASH POINT (°) : N/A
FLAMMABLE LIMITS : LEL : (N/A) UEL : (N/A) AUTO IGNITION TEMP (° F): (N/A)
EXTINGUISHING MEDIA : WATER : (X) FOAM : (X) CO_2: (X) DRY CHEMICAL: (X)

SPECIAL FIRE FIGHTING PROCEDURES : RESTRICT PERSONS NOT WEARING PROTECTIVE EQUIPMENT FROM AREA. TRY TO SNUFF FIRE WITH SAND, DRY MEDIA, FOAM, OR CO_2. IF NO OTHER OPTIONS AVAILABLE, USE WATER & ALWAYS WEAR SELF CONTAINED BREATHING APPARATUS OR NIOSH TOXIC VAPOR RESPIRATOR.

UNUSUAL FIRE & EXPLOSION HAZARDS : HEATED ARSENIC IN CONTACT WITH ACID OR WATER VAPOR CAN PRODUCE HIGHLY TOXIC FUMES. ASENIC REACTS VIGOROUSLY WITH OXIDIZING MATERIALS. EXPLOSION HAZARD IN THE FORM OF DUST. IN THE EVENT OF A FIRE OR

;LICHT
SPILL, CONTACT
REGIONAL OFFICE OF THE FEDERAL

THE STATE DEPT. OF THE ENVIRONMENT & YOUR ENVIRONMENTAL PROTECTION AGENCY.

SECTION E - REACTIVITY DATA

STABILITY :	STABLE
INCOMPATIBILITY :	ACIDS, OXIDIZING AGENTS SUCH AS HALOGENS, PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, HYDROCHLORIC ACID, SULFURIC ACID, NITRIC ACID, BROMINE AZIDE, DIRUBIDIUM ACETYLIDE, ZINC, NCl_3, NITRATES, Na_2O_2, HEXAFLUORO ISOPROPYL IDEMEAMINO LITHIUM
HAZARDOUS DECOMPOSITION PRODUCTS :	ARSENIC FUMES, ARSINE, OTHER ARSENIC COMPOUNDS
HAZARDOUS POLYMERIZATION :	WILL NOT OCCUR
CONDITIONS TO AVOID :	AVOID OPEN CONTAINERS SITTING IN HUMID ATMOSPHERE

SECTION F - PERSONAL PROTECTIVE EQUIPMENT INFO

RESPIRATORY EQUIPMENT :	NIOSH APPROVED TOXIC VAPOR RESPIRATOR TO PARTICULATE & FUME AIR LEVEL
PROTECTIVE GLOVES :	NEOPRENE OR PLABTIC
EYE PROTECTION :	GOGGLES/GLASSES
VENTILATION :	LOCAL EXHAUST/MECHANICAL (GENERAL) SCRUBBER OR TRAP IF POSSIBLE
OTHER PROTECTIVE EQUIPMENT :	LAB COAT

SECTION G - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE :	AIR 0.002mg/m³/15min, HUMAN TDLo 7857 mg/kg/55Y :SKN(:GIT ORAL)
PRIMARY ROUTES OF EXPOSURE :	INHALATION/INGESTION/SKIN
ORAL LD_{50} :	NO, ORAL RAT TDLo 605ug/kg, ORAL-MAN TDLo 7857mg/kg/55y SKN
DERMAL IRRITATION-RABBIT :	NO, SUBCUTANEOUS IMPLANT RABBIT TDLo 75mg/kg
EYE IRRITATION-RABBIT :	NO
OSHA PEL :	0.01mg/m³
ACGIH TLV :	0.2mg/m³
EFFECTS OF OVEREXPOSURE :	ORAL - NAUSEA, COLD SWEATS, VOMITING, DIARRHEA, BLOOD STOOLS, COLLAPSE, SHOCK, LOSS OF APPETITE, CRAMPS, JAUNDICE, SKIN ABNORMALITIES
KNOWN EFFECTS ON OTHER ILLNESSES :	GASTROINTESTINAL, NERVOUS SYSTEM, LIVER & KIDNEY PROBLEMS, AFTER EXPOSURE HAVE URINE TEST.

LISTED CARCINOGEN : NONE ( ) OSHA (Y) NTP (Y) IARC (Y) OTHER(Y)

SECTION H - EMERGENCY & FIRST AID DATA

SKIN :	FLUSH WITH SOAP WATER. AVOID RUBBING INTO THE SKIN. CONTACT PHYSICIAN IMMEDIATELY.
EYES :	FLUSH WITH WATER FOR 15 MINUTES. CONTACT PHYSICIAN IMMEDIATELY.
INHALATION :	REMOVE TO FRESH AIR. PROVIDE OXYGEN IF NECESSARY. CONTACT PHYSICIAN IMMEDIATELY.
INGESTION :	TREATMENT WITH BAS(DIMERCAPTOL) IS OF QUESTIONABLE EFFECTIVENESS IN TRIVALENT ARSENIC COMPOUNDS. INDUCE VOMITING & DO GASTRIC LAVAGE. GET PERSONNEL TO HOSPITAL IMMEDIATELY. A PHYSICIAN CAN INITIATE AN EXCHANGE TRANSFUSION & DIALYSIS. ALSO ADSORPTION & REMOVAL WITH ANIMAL BONE COAL OR $Fe(OH)_3$

SECTION I - SPILL & DISPOSAL INFORMATION

STEPS TO BE TAKEN IN CASE OF SPILL OR LEAK:
WEARING RESPIRATOR, GLOVES, GOGGLES, LAB COAT, GATHER UP CHUNKS, GRANULES, OR POWDER WITH VACUUM OR UTENSILS RESERVED FOR POISONOUS SOLIDS.

WASTE DISPOSAL INFORMATION:
SOLID WASTES SHOULD BE VITRIFIED, PLACED IN LABELLED CONTAINER & BURIED IN A EPA SUPERVISED FACILITY. ETCHING SOLUTIONS & CUTTING WASTES SHOULD BE PRECIPITATED, CEMENTED/VITRIFIED & BURIED IN METAL/PLASTIC LABELLED CONTAINERS & BURIED IN EPA SUPERVISED FACILITY. PASS GAS THROUGH POTASSIUM PERMANGANATE, PRECIPITATE & TREAT AS ABOVE.

RCRA HAZARDOUS WASTE :NO () YES (X) RCRA # : () D004
CERCLA : NO () YES (X) RQ (1 LB.)

FOLLOW ALL LOCAL, STATE AND FEDERAL INFORMATION AND REGULATIONS

SECTION J - OTHER REGULATORY INFORMATION

TSCA: WE CERTIFY THAT ALL COMPONENTS OF THIS PRODUCT ARE REGISTERED UNDER THE REGULATIONS OF THE TOXIC SUBSTANCES CONTROL ACT.

SARA TITLE III, SECT. 313: LISTED (X) NOT LISTED ()

DOT REGULATED : YES: (X) NO: () RQ : (1 LB.) UN/NA NO.: (X) UN 1558 PROPER SHIPPING NAME: ARSENIC
EMERGENCY RESPONSE GUIDE NO.: 53
HAZARD CLASSIFICATION : (X) POISON 6.1 LABEL : (X) POISON PG II

SECTION K - SPECIAL PRECAUTIONS

FOR INDUSTRIAL USE ONLY

HANDLING & STORAGE INFORMATION: PRIOR TO WORKING WITH ARSENIC, PERSONNEL SHOULD BE TRAINED IN PROPER HANDLING & STORAGE. STORE IN ORIGINAL PACKAGING IN COOL DRY AREA. WHEN HANDLING PLACE INTO INERT ATOMSPHERE IMMEDIATELY. WEAR RESPIRATORY PROTECTION, GLOVES & EYE PROTECTION.
OTHER PRECAUTIONS : MINIMUM - HAVE QUARTERLY MEDICAL CHECKS INCLUDING URINE TESTS OF PERSONNEL WORKING WITH ARSENIC OR ARSENIC COMPOUNDS. DO NOT SMOKE OR EAT IN WORK AREA.

MSDS Number: A7512 * * * * * *Effective Date: 02/16/06* * * * * *Supercedes: 05/08/03*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ARSENIC TRIOXIDE

1. Product Identification

Synonyms: Arsenic (III) oxide; arsenic sesquioxide; arsenous trioxide, white arsenic
CAS No.: 1327-53-3
Molecular Weight: 197.84
Chemical Formula: As2O3
Product Codes: 0061

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Arsenic Trioxide	132753-3	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE LIVER AND KIDNEY DAMAGE. USE ONLY WITH ADEQUATE VENTILATION AND RESPIRATORY EQUIPMENT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Cancer Causing)
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Arsenic may cause inflammation of the mucous membranes with cough and foamy sputum, restlessness, dyspnea, cyanosis, and rales. Symptoms like those from ingestion exposure may follow. May cause pulmonary edema.
Ingestion:
Arsenic is highly toxic! May cause burning in esophagus, vomiting, and bloody diarrhea. Symptoms of cold and clammy skin, low blood pressure, weakness, headache, cramps, convulsions, and coma may follow. May cause damage to liver and kidneys. A suspected fetal toxin. Death may occur from circulatory failure. Estimated lethal dose 120 milligrams.
Skin Contact:
May cause irritation, symptoms including redness, itching, and pain.
Eye Contact:
May cause irritation with itching, burning, watering of eyes; may cause conjunctiva damage.
Chronic Exposure:
Arsenic on repeated or prolonged skin contact may cause bronzing of the skin, edema, dermatitis, and lesions. Repeated or prolonged inhalation of dust may cause damage to the nasal septum. Chronic exposure from inhalation or ingestion may cause hair and weight loss, a garlic odor to the breath and perspiration, excessive salivation and perspiration, central nervous system damage, hepatitis, gastrointestinal disturbances, cardiovascular damage, and kidney and liver damage. Arsenic compounds are known human carcinogens and may be teratogenic based on effects in laboratory animals.
Aggravation of Pre-existing Conditions:
No information found.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse. Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to this substance.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
If emesis if unsuccessful after two doses of Ipecac, consider gastric lavage. Monitor urine arsenic level. Alkalization of urine may help prevent disposition of red cell breakdown products in renal tubular cells. If acute exposure is significant, maintain high urine output and monitor volume status, preferably with central venous pressure line. Abdominal X-rays should be done routinely for all ingestions. Chelation therapy with BAL, followed by n-penicillamine is recommended, but specific dosing guidelines are not clearly established.

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5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Toxic fumes of arsenic trioxide and arsine may be formed in fire situations.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
10 ug(As)/m3 ppm (TWA)
-ACGIH Threshold Limit Value (TLV):
0.01 mg(As)/m3 (TWA),
listed as A1, confirmed human carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face high efficiency dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:
Any area where inorganic arsenic is stored, handled, used, etc., must be established as a 'Regulated Area' with controlled access, limited to authorized persons. Containers of inorganic arsenic and Regulated Areas must be labeled to show a CANCER SUSPECT AGENT is present. Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing arsenic or lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (arsenic: 29 CFR 1910 .1018; lead: 29 CFR 1910.1025).

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9. Physical and Chemical Properties

Appearance:
Transparent crystals, or white powder.

Odor:
Odorless.

Solubility:
3.7 g/100 ml water @ 20C (68F)

Specific Gravity:
3.74

pH:

No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
465C (869F)
Melting Point:
315C (599F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Emits toxic fumes of arsenic when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Oxidizers, tannic acid, infusion cinchona and other vegetable astringent infusions and decoctions, iron solutions, rubidium carbide, chlorine trifluoride, fluorine, hydrogen fluoride, oxygen difluoride, acids, bases, sodium chlorate, zinc filings, other reactive metals and mercury. Corrosive to metals in the presence of moisture.
Conditions to Avoid:
Incompatibles.

---

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 14.6 mg/kg; investigated as a mutagen, tumorigen, reproductive effector.
Reproductive Toxicity:
Has shown teratogenic effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Arsenic Trioxide (1327-53-3)	Yes	No	1

---

2. Ecological Information

Environmental Fate:

When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may biodegrade to a moderate extent. This material is not expected to significantly bioaccumulate.
Environmental Toxicity:
No information found.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

International (Water, I.M.O.)

Proper Shipping Name: ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

International (Air, I.C.A.O.)

Proper Shipping Name: ARSENIC TRIOXIDE
Hazard Class: 6.1
UN/NA: UN1561
Packing Group: II
Information reported for product/size: 500G

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Arsenic Trioxide (1327-53-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Arsenic Trioxide (1327-53-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations- Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	-----SARA 313----- List	Chemical Catg.
Arsenic Trioxide (1327-53-3)	1	100*	No	Arsenic comp

--------\Federal, State & International Regulations- Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Arsenic Trioxide (1327-53-3)	1	P012	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 2Z
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE LIVER AND KIDNEY DAMAGE. USE ONLY WITH ADEQUATE VENTILATION AND RESPIRATORY EQUIPMENT.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet
Cadmium metal, granular

CC# 03720

Section 1 - Chemical Product and Company Identification

MSDS Name: Cadmium metal, granular
Catalog Numbers: AC612135000, S79935, C3-500
Synonyms: None.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-43-9	Cadmium	100	231-152-8

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: silver white granules.
Danger! Flammable solid. May be fatal if inhaled. Harmful if swallowed. Causes eye, skin, and respiratory tract irritation. Contains cadmium. Cancer hazard. Avoid creating dust. Can cause lung and kidney disease. Inhalation of fumes may cause metal-fume fever. Air sensitive. May cause reproductive and fetal effects.
Target Organs: Blood, kidneys, liver, lungs, skeletal structures, prostate.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation.
Ingestion: Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion may produce fluid loss, acute renal failure, and cardiopulmonary depression.
Inhalation: May be fatal if inhaled. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. Damage may be delayed. May cause nausea, vomiting, abdominal pain, diarrhea, chest tightness, weakness, and delayed pulmonary edema. In humans inhalation causes proteinuria, an excess of protein in the urine.
Chronic: May cause respiratory tract cancer. Repeated inhalation may cause chronic bronchitis. Chronic inhalation may cause nasal septum ulceration and perforation. Cadmium and compounds may cause lung, liver and kidney damage and lung and prostate cancer in humans. May cause loss of smell, emphysema, anemia, bone demineralization, and lung fibrosis. The primary target organ for chronic cadmium disease is clearly the kidney.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Attempt rescue only after notifying at least one other person of the emergency and putting into effect established emergency procedures. Do not become a casualty yourself.
Notes to Physician: Administration of calcium disodium EDTA may be useful in acute poisoning with its use at the discretion of qualified medical personnel. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material can spontaneously ignite (pyrophoric) when exposed to air at normal or slightly elevated temperatures. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid. May burn rapidly with flare burning effect. May re-ignite after fire is extinguished. Dangerous fire hazard in the form of dust when exposed to heat or flame.
Extinguishing Media: Use dry sand, graphite powder, dry sodium chloride-based extinguishers.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 4; Flammability: 2; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Place under an inert atmosphere.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Do not breathe dust, vapor, mist, or gas. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air. Use only in a chemical fume hood. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat and flame. Keep away from sources of ignition. Store in a tightly closed

container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood. See 29CFR 1910.1027 for regulations applying to all occupational exposures to cadmium and cadmium compounds, in all forms.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cadmium	0.01 mg/m3 TWA; 0.002 mg/m3 TWA (respirable fraction)	9 mg/m3 IDLH (dust and fume)	0.2 mg/m3 TWA (dust); 0.1 mg/m3 TWA (fume); 0.6 mg/m3 Ceiling (dust); 0.3 mg/m3 Ceiling (fume); 2.5 æg/m3 Action Level; 5 æg/m3 TWA (Do not eat, drink or chew tobacco or gum or apply cosmetics in reg ulated areas. Carcinogen - dust can cause lung and kidney disease. See 29 CFR 1910.1027)

OSHA Vacated PELs: Cadmium: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Granules
Appearance: silver white
Odor: odorless
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: 765 deg C @ 760 mmHg
Freezing/Melting Point:321 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:8.64 @ 25°C
Molecular Formula: Cd
Molecular Weight:112.40

Section 10 - Stability and Reactivity

Chemical Stability: Oxidizes when exposed to air. Easily tarnishes in moist air. Powder or liquid is ·rophoric. Contact with acid liberates gas.
Conditions to Avoid: Ignition sources, dust generation, excess heat, prolonged exposure to air.
Incompatibilities with Other Materials: Strong oxidizing agents, acids, sulfur, zinc, selenium, tellurium.
Hazardous Decomposition Products: Toxic cadmium oxide fumes.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7440-43-9: EU9800000
LD50/LC50:
CAS# 7440-43-9:
Inhalation, rat: LC50 = 25 mg/m3/30M;
Oral, mouse: LD50 = 890 mg/kg;
Oral, rat: LD50 = 2330 mg/kg;

Carcinogenicity:
CAS# 7440-43-9:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 10/1/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

Epidemiology: Occupational exposure to cadmium has been implicated in a significant increase in prostate and respiratory tract cancer. There is evidence of a significant excess of respiratory cancer deaths among a cohort of cadmium production workers, and concluded that cadmium and its compounds are potential carcinogens.
Teratogenicity: Oral, rat: TDLo = 155 mg/kg (male 13 week(s) pre-mating and female 13 week(s) pre-mating - 3 week(s) after conception) Effects on Newborn - growth statistics (e.g.%, reduced weight gain) and Effects on Newborn - behavioral.; Oral, rat: TDLo = 23 mg/kg (female 1-22 day(s) after conception) Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).; Oral, mouse: TDLo = 1700 mg/kg (female 8-12 day(s) after conception) Effects on Newborn - viability index (e.g., # alive at day 4 per # born alive) and Effects on Newborn - growth statis
Reproductive Effects: Oral, rat: TDLo = 21500 ug/kg (multigenerations) Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea).; Intraperitoneal, rat: TDLo = 1124 ug/kg (male 1 day(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).
Mutagenicity: Micronucleus Test: Mouse, Embryo = 6 umol/L.; Cytogenetic Analysis: Hamster, Ovary = 1 umol/L.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: TLm = 30 ppm; 24 Hr; Hard waterFish: Striped bass: LC50 = 0.001

ppm; 24-48 Hr; Static bioassayFish: Fathead Minnow: TL50 = 7.2 ppm; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LCO = 0.08 ppm; 96 Hr; Static bioassay (Hard water) No data available.
Environmental: Cadmium can enter the air from natural sources.
Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	TOXIC SOLIDS, FLAMMABLE, ORGANIC, N.O.S.	Toxic Solid, Flammable, Organic, N.O.S. (CADMIUM METAL)
Hazard Class:	6.1	6.1
UN Number:	UN2930	UN2930
Packing Group:	I	I

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7440-43-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 7440-43-9: 10 lb final RQ (no reporting of releases of this hazardous substance is required
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7440-43-9: immediate, delayed, fire.
Section 313
This material contains Cadmium (CAS# 7440-43-9, 100%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 7440-43-9 (listed as Chromium compounds) is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS#

7440-43-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-43-9 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7440-43-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Cadmium, a chemical known to the state of California to cause cancer.
WARNING: This product contains Cadmium, a chemical known to the state of California to cause male reproductive toxicity.
California No Significant Risk Level: CAS# 7440-43-9: 0.05 æg/day NSRL (inhalation)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+ F

Risk Phrases:

R 11 Highly flammable.
R 25 Toxic if swallowed.
R 26 Very toxic by inhalation.
R 45 May cause cancer.

Safety Phrases:

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 7440-43-9: No information available.

Canada - DSL/NDSL

CAS# 7440-43-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1A, B4.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7440-43-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/28/1999
Revision #6 Date: 6/06/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MSDS Number: **P5708** * * * * * *Effective Date: 02/21/07* * * * * *Supercedes: 01/19/06*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM CYANIDE

1. Product Identification

Synonyms: Potassium cyanide, solid; hydrocyanic acid, potassium salt
CAS No.: 151-50-8
Molecular Weight: 65.12
Chemical Formula: KCN
Product Codes:
J.T. Baker: 3080
Mallinckrodt: 6881

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Cyanide	151-50-8	96 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CONTACT WITH ACIDS LIBERATES POISONOUS GAS. CAUSES

BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS BLOOD, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM AND THYROID.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color. However, if a physical injury or lack of oxygen is involved, the skin color may be bluish. Reddening of the eyes and pupil dilation are symptoms of cyanide poisoning. Cyanosis (blue discoloration of the skin) tends to be associated with severe cyanide poisonings.

Inhalation:
Corrosive to the respiratory tract. The substance inhibits cellular respiration and may cause blood, central nervous system, and thyroid changes. May cause headache, weakness, dizziness, labored breathing nausea and vomiting, which can be followed by weak and irregular heart beat, unconsciousness, convulsions, coma and death.
Ingestion:
Highly Toxic! Corrosive to the gastro-intestinal tract with burning in the mouth and esophagus, and abdominal pain. Larger doses may produce sudden loss of consciousness and prompt death from respiratory arrest. Smaller but still lethal doses may prolong the illness for one or more hours. Bitter almonds odor may be noted on the breath or vomitus. Other symptoms may be similar to those noted for inhalation exposure.
Skin Contact:
Corrosive. May cause severe pain and skin burns. Solutions are corrosive to the skin and eyes, and may cause deep ulcers which heal slowly. May be absorbed through the skin, with symptoms similar to those noted for inhalation.
Eye Contact:
Corrosive. Symptoms may include redness, pain, blurred vision, and eye damage.
Chronic Exposure:
Prolonged or repeated skin exposure may cause a "cyanide" rash and nasal sores.
Aggravation of Pre-existing Conditions:
Workers using cyanides should have a preplacement and periodic medical exam. Those with history of central nervous system, thyroid, skin, heart or lung diseases may be more susceptible to the effects of this substance.

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4. First Aid Measures

IN CASE OF CYANIDE POISONING, start first aid treatment immediately, then get medical attention. A cyanide antidote kit (amyl nitrite, sodium nitrite and sodium thiosulfate) should be available in any cyanide work area. Actions to be taken in case of cyanide poisoning should be

planned and practiced before beginning work with cyanides. Oxygen and amyl nitrite can be given by a first responder before medical help arrives. Allow victim to inhale amyl nitrite for 15-30 seconds per minute until sodium nitrite and sodium thiosulfate can be administered intravenously (see Note to Physician). A new amyl nitrite ampule should be used every 3 minutes. If conscious but symptoms (nausea, difficult breathing, dizziness, etc.) are evident, give oxygen. If consciousness is impaired (non-responsiveness, slurred speech, confusion, drowsiness) or the patient is unconscious but breathing, give oxygen and amyl nitrite by means of a respirator. If not breathing, give oxygen and amyl nitrite immediately by means of a positive pressure respirator (artificial respiration).

Inhalation:
If inhaled, remove to fresh air. Administer antidote kit and oxygen per pre-planned instructions if symptoms occur. Keep patient warm and at rest. Do not give mouth to mouth resuscitation.

Ingestion:
If ingested, antidote kit and oxygen should be administered per above. If the patient is conscious, immediately give the patient activated charcoal slurry. Never give anything by mouth to an unconscious person. Do not induce vomiting as it could interfere with resuscitator use.

Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse. Administer antidote kit and oxygen per preplanned instructions if symptoms occur.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
If patient does not respond to amyl nitrite, inject intravenously with 10mL of a 3% solution of sodium nitrite at a rate of not more than 2.5 to 5 mL per minute.Once nitrite administration is complete, follow directly with 50 mL of a 25% solution of sodium thiosulfate at the same rate by the same route. Give victim oxygen and keep under observation. If exposure was severe, watch victim for 24-48 hours. If signs of cyanide poisoning persist or reappear, repeat nitrite and thiosulfate injections 1 hour later in 1/2 the original doses. Cyanocabalamin (B12), 1 mg intramuscularly, may speed recovery. Moderate cyanide exposures need be treated only by supportive measures such as bed rest and oxygen.

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5. Fire Fighting Measures

Fire:
Not combustible, but upon decomposition or contact with acids, this material releases highly flammable and toxic hydrogen cyanide gas.

Explosion:
Not considered an explosion hazard, but upon heating with chlorates or nitrites to 450C (842F) may cause an explosion. Violent explosion occurs if melted with nitrite salt. Sealed containers may rupture when heated.

Fire Extinguishing Media:
Do Not use carbon dioxide. Carbon dioxide can react with this material in the presence of moisture to produce hydrogen cyanide. Water may be used on nearby fires not involving this material. Use alkali dry chemical. Water spray may be used to keep fire exposed containers cool. Reacts slowly with water to form hydrogen cyanide. Use any means suitable for extinguishing surrounding fire.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing

apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Spills: Ventilate area of leak or spill. Allow only qualified personnel to handle spill. Clean-up personnel require protective clothing and respiratory protection from vapors. Collect material and place in a closed container for recovery or disposal. Do not flush to sewer! Decontaminate liquid or solid residues in spill area with sodium or calcium hypochlorite solution.

US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from incompatibles. Workers must carefully follow good hygienic practices, including no eating, drinking, or smoking in workplace. Proper use and maintenance of protective equipment is essential. Workers using cyanide need preplacement and annual medical exams. Special training should be given to workers using cyanide. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do not store near combustibles or flammables because subsequent fire fighting with water could lead to cyanide solution runoff. Do not store under sprinkler systems. All persons with the potential for cyanide poisoning should be trained to provide immediate First Aid using oxygen and amyl nitrite. A cyanide anitdote kit (amyl nitrite, sodium nitrite, and sodium thiosulfate) should be readily available in cyanide workplaces. The antidotes should be checked annually to ensure they are still within their shelf-lives. Identification of community hospital resources and emergency medical squads in order to equip and train them on handling cyanide emergencies is essential.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
5 mg/m3 skin (TWA) (as CN)
-ACGIH Threshold Limit Value (TLV):
5 mg/m3 (STEL) Ceiling, skin, as CN
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-

facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
White deliquescent granular solid.
Odor:
Bitter almonds.
Solubility:
Very soluble in water.
Specific Gravity:
1.55 @ 20C/4C
pH:
11 (0.1 N aqueous solution)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1625C (2957F)
Melting Point:
634C (1173F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:

Very stable when dry. Moisture will cause slow decomposition, releasing poisonous hydrogen cyanide gas.

Hazardous Decomposition Products:

Emits toxic fumes of cyanide and oxides of nitrogen when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong acids and strong oxidizers. Reacts with acids to liberate toxic and flammable hydrogen cyanide gas. Water or weak alkaline solutions can produce dangerous amounts of hydrogen cyanide in confined areas. Can react with carbon dioxide in ordinary air to form hydrogen cyanide gas.

Conditions to Avoid:
Heat, moisture, incompatibles.

11. Toxicological Information

Oral rat LD50: 6 mg/kg. Investigated as a mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Potassium Cyanide (151-50-8)	No	No	None

12. Ecological Information

Environmental Fate:
This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate.
Environmental Toxicity:
This material is expected to be very toxic to aquatic life. This material is expected to be very toxic to terrestrial life.

13. Disposal Considerations

Cyanides must be oxidized to harmless waste before disposal. An alkaline solution (pH about 10) is treated with chlorine or commercial bleach in excess to decompose cyanide. When cyanide-free, it can be neutralized. Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, POTASSIUM CYANIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1680
Packing Group: I
Information reported for product/size: 12KG

International (Water, I.M.O.)

Proper Shipping Name: POTASSIUM CYANIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1680
Packing Group: I
Information reported for product/size: 12KG

International (Air, I.C.A.O.)

Proper Shipping Name: POTASSIUM CYANIDE, SOLID
Hazard Class: 6.1
UN/NA: UN1680
Packing Group: I
Information reported for product/size: 220LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Potassium Cyanide (151-50-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	Canada DSL	Canada NDSL	Phil.
Potassium Cyanide (151-50-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations- Part 1\----------------

Ingredient	SARA 302 RQ	SARA 302 TPQ	SARA 313 List	SARA 313 Chemical Catg.
Potassium Cyanide (151-50-8)	10	100	No	Cyanide comp

--------\Federal, State & International Regulations- Part 2\----------------

Ingredient	CERCLA	RCRA 261.33	TSCA 8(d)
Potassium Cyanide (151-50-8)	10	P098	No

Chemical Weapons Convention: Yes TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: 4X
Poison Schedule: S7
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CONTACT WITH ACIDS LIBERATES POISONOUS GAS. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS BLOOD, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM AND THYROID.
Label Precautions:
Do not breathe dust.
Do not get in eyes, on skin, or on clothing.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
IN ALL CASES, GET MEDICAL ATTENTION IMMEDIATELY. KEEP A CYANIDE ANTIDOTE KIT (amyl nitrite, sodium nitrite and sodium thiosulfate) in area of product use or storage. First-aiders must take precautions to avoid contact with cyanide substance. If ingested, administer antidote kit and oxygen per pre-planned instructions. If the patient is conscious, immediately give the patient activated charcoal slurry. Never give anything by mouth to an unconscious person. Do not induce vomiting as it could interfere with resuscitator use. If inhaled, remove to fresh air. Administer antidote kit and oxygen per pre-planned instructions if symptoms occur. Keep patient warm and at rest. Do not give mouth to mouth resuscitation. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Administer antidote kit and oxygen per preplanned instructions if symptoms occur.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 14.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

International Chemical Safety Cards

CALCIUM CYANIDE

ICSC: 0407

CALCIUM CYANIDE
Calcid
Calcyanide
Calcyan
$C_2CaN_2/Ca(CN)_2$
Molecular mass: 92.1

CAS # 592-01-8
RTECS # EW0700000
ICSC # 0407
UN # 1575
EC # 020-002-00-5

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible but forms flammable gas on contact with water or damp air.	NO open flames, NO sparks, and NO smoking. NO contact with water, carbon dioxide, acids. NO contact with hot surfaces.	Powder, dry sand. NO hydrous agents. NO water. NO carbon dioxide.
EXPLOSION			
EXPOSURE		STRICT HYGIENE!	IN ALL CASES CONSULT A DOCTOR!
• **INHALATION**	Burning sensation. Cough. Dizziness. Headache. Red colouration of the skin. Laboured breathing. Nausea. Shortness of breath. Unconsciousness. Vomiting. Convulsions. Coma. Death.	Local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention. See Notes.
• **SKIN**	MAY BE ABSORBED! Skin burns. Pain. Itching. Papules (further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. See Notes.
• **EYES**	Pain. Blurred vision. Possible permanent loss of vision. Severe deep burns.	Face shield or eye protection in combination with breathing protection if powder. Contact lenses should not be worn when working with this chemical.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Confusion. Burning sensation in the mouth. Numbness or tightness in throat. Salivation. Convulsions followed by paralysis (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention. See Notes.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Do NOT wash away into sewer. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Prevent contact with water or moist substances (extra personal	Fireproof. Separated from strong oxidants, acids, food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Airtight. Do not transport with food and feedstuffs. T symbol R: 28-32 S: 7/8-23-36/37-45 UN Hazard Class: 6.1

protection: complete protective clothing including self-contained breathing apparatus).		UN Packing Group: I

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0407 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

CALCIUM CYANIDE

ICSC: 0407

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE CRYSTALS OR POWDER.
CRYSTALLINE POWDER , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating above 350°C producing toxic fumes (hydrogen cyanide, nitrous oxides). Reacts violently with water, moist air, carbon dioxide, acids, acidic salts producing highly toxic and flammable hydrogen cyanide. Reacts violently when heated with nitrites, nitrates, chlorates and perchlorates.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV (as CN): ppm; 5 mg/m^3 (skin) (ACGIH 1991-1992).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin or or by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20° C when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is corrosive to the eyes, the skin and the respiratory tract. Inhalation of the substance may cause lung oedema (see Notes). The substance may cause effects on the nervous system, blood, heart and respiratory tract. Exposure at high level may result in death.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. May cause reproductive toxicity in humans.

PHYSICAL PROPERTIES	Decomposes below melting point at >350°C°C Relative density (water = 1): 1.85	Solubility in water: reaction
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to water, aquatic organisms, soil.	

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT take working clothes home. Aero, Cyanogas are trade names.

Transport Emergency Card: TEC (R)-61G16
NFPA Code: H 3; F 0; R 0;

ADDITIONAL INFORMATION

IMPORTANT

Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national

LEGAL NOTICE:	legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

MSDS Number: **L2347** * * * * * *Effective Date: 07/05/07* * * * * *Supercedes: 05/07/07*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LEAD METAL

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575
CAS No.: 7439-92-1
Molecular Weight: 207.19
Chemical Formula: Pb
Product Codes:
J.T. Baker: 2256, 2266
Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	743992-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS

THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:

POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:

Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:

Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:

Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:

Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to

an unconscious person. Get medical attention.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For lead, metal and inorganic dusts and fumes, as Pb:
-OSHA Permissible Exposure Limit (PEL): 0.05 mg/m3 (TWA)
For lead, elemental and inorganic compounds, as Pb:
-ACGIH Threshold Limit Value (TLV): 0.05 mg/m3 (TWA), A3 animal carcinogen
ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information).
For lead, inorganic:
-NIOSH Recommended Exposure Limit (REL): 0.1 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face high efficiency particulate respirator (NIOSH type N100 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

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9. Physical and Chemical Properties

Appearance:
Small, white to blue-gray metallic shot or granules.

Odor:
Odorless.

Solubility:
Insoluble in water.

Density:
11.34

pH:
No information found.

% Volatiles by volume @ 21C (70F):

0
Boiling Point:
1740C (3164F)
Melting Point:
327.5C (622F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
1.77 @ 1000C (1832F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

Toxicological Data:
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).
Carcinogenicity:
EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Lead (7439-92-1)	No	No	2B

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12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to leach into groundwater. This material

may bioaccumulate to some extent.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Lead (7439-92-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Lead (7439-92-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

WARNING:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO

CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: None allocated.
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

APPENDIX D

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

CUY-CLEVELAND INNERBELT
COMMERCIAL ROAD ALIGNMENT (PID 77510)
CLEVELAND, CUYAHOGA COUNTY, OHIO

PERSONAL PROTECTION EQUIPMENT

The personal protective equipment requirements for HzW personnel for on-site activities were selected and based on previous land use and previous investigations. Therefore, unless more information is obtained regarding employee exposure at this specific site, such as personal or area air monitoring data or data from the PID indicates that a higher level of PPE is required, then the following PPE, at a minimum is required to be worn:

Respirator:	As necessary
Protective Clothing:	Protective Coveralls/As necessary
Gloves:	Nitrile
Boots:	Safety-toe boots or shoes
Hard Hat:	As necessary
Safety Glasses:	As necessary
Ear Protection:	Disposable, 30-32 dB noise reduction

*****ANY PPE REQUIREMENTS OF THE FACILITY SHALL SUPERSEDE THOSE PRESENTED IN THIS HASP**.***

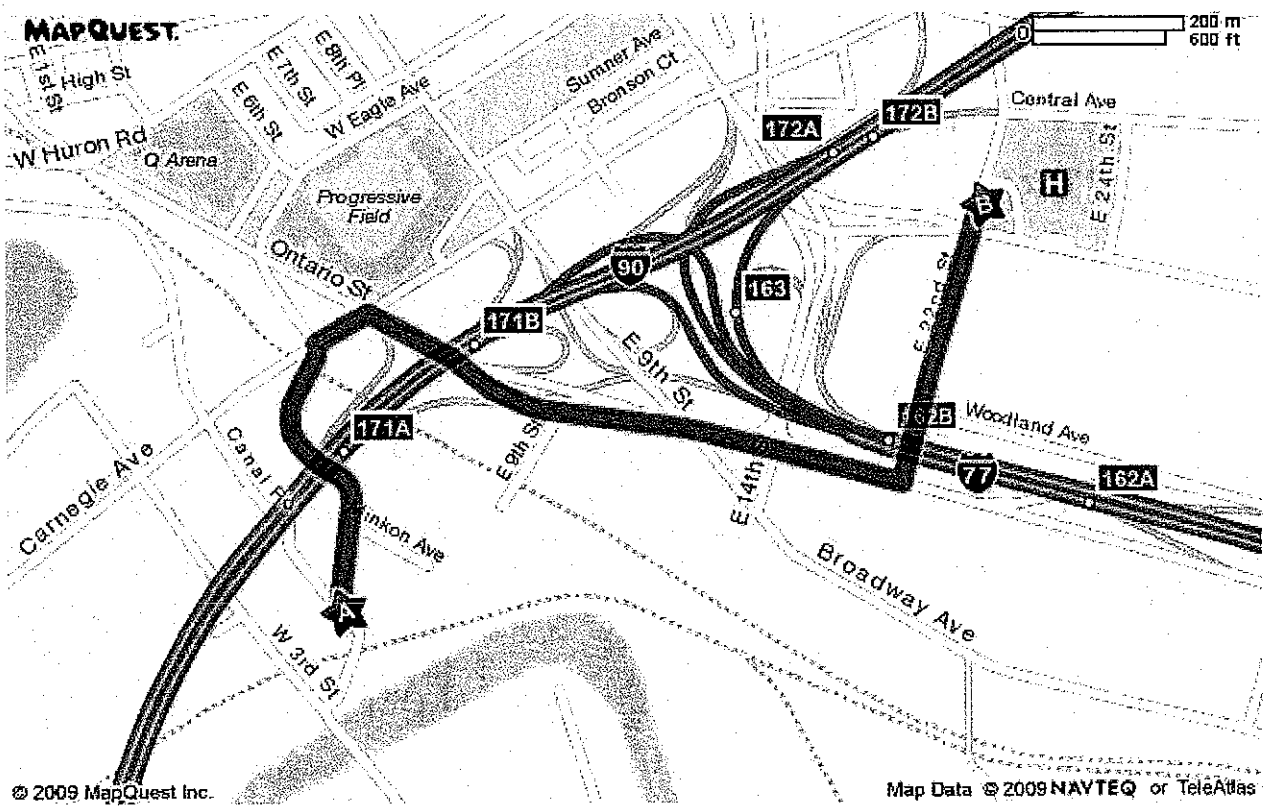
APPENDIX E

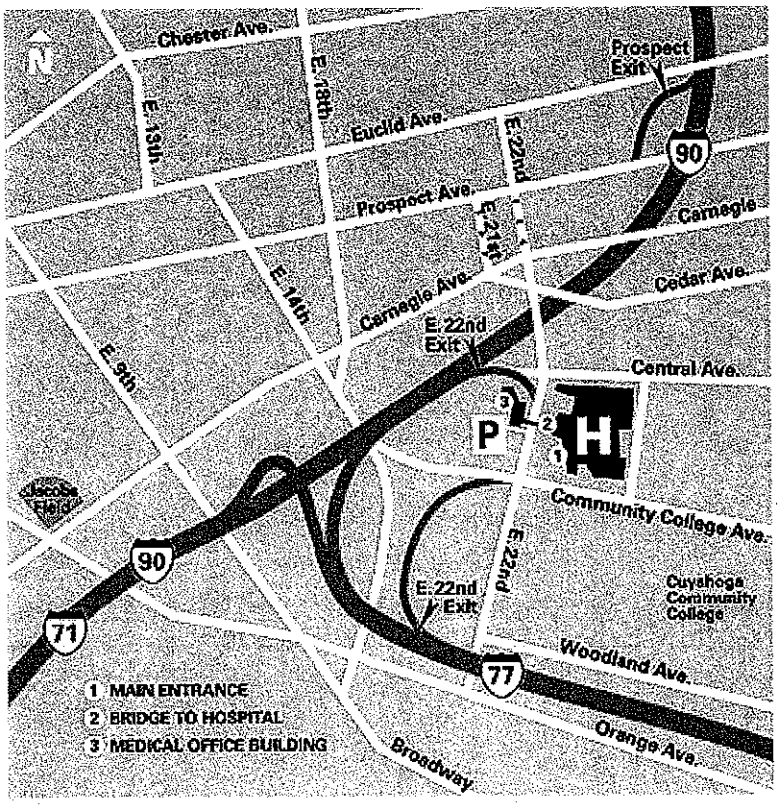
LOCATION, MAP AND DIRECTIONS TO NEAREST HOSPITAL

St. Vincent Charity Hospital
2351 East 22nd Street
Cleveland, Ohio 44115
Phone: (216) 816-6200

Directions:

1.	Go **NORTH** on **COMMERCIAL ROAD** towards **CARNEGIE AVENUE**	0.3 mile
2.	Turn **RIGHT** onto **CARNEGIE AVENUE**	
3.	Stay in **RIGHT LANE**, continue to intersection with **BROADWAY AVENUE** (US 422/SR 14/SR 43/SR 87)	0.1 mile
4.	Turn **RIGHT** onto **BROADWAY AVENUE** and stay in **LEFT LANE**	
5.	Continue on **BROADWAY AVENUE** to **EAST 22ND STREET**	0.5 mile
6.	Turn **LEFT** onto **EAST 22ND STREET**	
7.	Continue to **ST. VINCENT CHARITY HOSPITAL** on **RIGHT**	0.3 mile




N
Chester Ave.
E. 13th
E. 18th
Euclid Ave.
E. 22nd
Prospect Exit
90
Prospect Ave.
E. 21st
Carnegie
Cedar Ave.
E. 14th
Carnegie Ave.
E. 22nd Exit
E. 9th
Central Ave.
3
2
1
P
H
Community College Ave.
Jacobs Field
90
E. 22nd
Cuyahoga Community College
E. 22nd Exit
71
77
Woodland Ave.
1 MAIN ENTRANCE
2 BRIDGE TO HOSPITAL
3 MEDICAL OFFICE BUILDING
Orange Ave.
Broadway

APPENDIX F

EMERGENCY INFORMATION AND PHONE NUMBERS

EMERGENCY INFORMATION AND PHONE NUMBERS

OHIO EPA

- NORTHEAST DISTRICT OFFICE (TWINSBURG)..... 1-330-963-1200
- OFFICE OF EMERGENCY RESPONSE..... 1-800-282-9378

UNITED STATES EPA

- CERCLA/RCRA HOTLINE..... 1-800-424-9346
- NATIONAL RESPONSE CENTER 1-800-424-8802
- EPCRA HOTLINE 1-800-535-0202

HAZMAT

- EMERGENCY..... 911

CITY OF CLEVELAND DEPT. OF PUBLIC HEALTH..... 1-216-664-2324

CLEVELAND FIRE DEPARTMENT..... 911
(non-emergency) 1-216-664-6664

CLEVELAND POLICE DEPARTMENT..... 911
(non-emergency) 1-216-623-5000

CITY OF CLEVELAND WATER DEPARTMENT..... 1-216-664-3060
(water main breaks/leaks)

OHIO UTILITY PROTECTION SERVICE (OUPS) 1-800-362-2764
OUPS Reference #: A934301376, A934301383 and A934301391

APPENDIX L

SOIL BORING LOGS

Bore ID: HB-071

Project No.: H09004-14

Project: Phase II ESA

HzW Representative: JAD/JAH

Location: CUY-Innerbelt Commercial Road (PID 77510)

HzW ENVIRONMENTAL CONSULTANTS, LLC

Drill Date: 12/17/2009

Drilled By: HzW Environmental

Drill Method: Hydrualic Direct Push

Sample Method: Macro Core

Depth (feet)	Symbol	Description	PID (ppm)	Remarks
0		Ground Surface		
0 – 4		Brown sandy CLAY w/ gravel, slag and brick fragments, dry, firm		
4 – 6		Brown CLAY w/ sand, black slag and brick fragments, dry, firm		
6 – 8		Black and dark brown sandy CLAY w/ slag and gravel, dry, firm, slight sulfur odor		
8 – 10		Black and dark brown sandy SLAG w/ clay, gravel and wood fragments, strong sulfur odor		The 8-10 foot interval submitted for laboratory analysis
10 – 14		Dark gray and brown sandy CLAY w/ gray slag, dry, firm, slight sulfur odor		The 10-12 foot interval submitted for laboratory analysis
14 – 16		Dark gray and black SAND w/ slag, trace clay, dry, dense		
16 – 20		Dark brown and gray sandy SLAG w/ trace clay, dry, dense, slight sulfur odor from 16-18'		The 16-18 foot interval submitted for laboratory analysis
20		End of Bore		
21				

Bore ID: HB-072

Project No.: H09004-14

Project: Phase II ESA

HzW Representative: JAD/JAH

Location: CUY-Innerbelt Commercial Road (PID 77510)

HzW ENVIRONMENTAL CONSULTANTS, LLC

Drill Date: 12/17/2009

Drilled By: HzW Environmental

Drill Method: Hydrualic Direct Push

Sample Method: Macro Core

Depth (feet)	Symbol	Description	PID (ppm)	Remarks
0		Ground Surface		
		Dak brown and black coarse sandy SLAG w/ trace clay, dry, loose		
1				
2		Dark brown and black sandy SLAG, dry, dense		
3				The 2-4 foot interval submitted for laboratory analysis
4		Black and dark gray sandy SLAG w/ additional large slag pieces, dry, dense		
5				The 4-6 foot interval submitted for laboratory analysis
6		End of Bore		
7				

Bore ID: HB-073

Project No.: H09004-14

Project: Phase II ESA

HzW Representative: JAD/JAH

Location: CUY-Innerbelt Commercial Road (PID 77510)

HzW ENVIRONMENTAL CONSULTANTS, LLC

Drill Date: 12/17/2009

Drilled By: HzW Environmental

Drill Method: Hydrualic Direct Push

Sample Method: Macro Core

Depth (feet)	Symbol	Description	PID (ppm)	Remarks
0		Ground Surface		
		White and gray SLAG		
1		Brown and black sandy SLAG w/ brick fragments		Strong, unidentifable odor in 0-2' interval; the 0-2' interval submitted for laboratory analysis
2		Brown and black coarse sandy SLAG w/ trace clay, brick and gravel, damp, dense		
3				
4				
5		Brown medium SAND, damp, dense		
6		End of Bore		
7				

Bore ID: HB-075

Project No.: H09004-14

Project: Phase II ESA

HzW Representative: JAD/JAH

Location: CUY-Innerbelt Commercial Road (PID 77510)

HzW ENVIRONMENTAL CONSULTANTS, LLC

Drill Date: 12/17/2009

Drilled By: HzW Environmental

Drill Method: Hydrualic Direct Push

Sample Method: Macro Core

Depth (feet)	Symbol	Description	PID (ppm)	Remarks
0		Ground Surface		
		Brown coasre SAND w/ gray crushed slag, dry, loose		
1				The 0-2 foot interval submitted for laboratory analysis
2				
3				The 2-4 foot interval submitted for laboratory analysis
4		Brown coarse SAND w/ gravel		
5		Gray silty SAND, damp, soft		
6		End of Bore		
7				

APPNEDIX M

LABORATORY ANALYTICAL REPORTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Affidavit by Certified Lab Pursuant to OAC 3745-300-13(M)

TestAmerica Laboratories, Inc.

State of Ohio

ss:

County of Stark

I, Opal Davis-Johnson, being first duly sworn according to law, state that, to the best of my knowledge, information and belief:

1. I am an adult over the age of eighteen (18) years old and competent to testify herein.

2. I am employed by TestAmerica Laboratories, Inc. as Laboratory Director and authorized to submit this affidavit on behalf of TestAmerica North Canton.

3. The purpose of this submission is to support a request for a no further action letter or other aspects of a voluntary action, under Ohio's Voluntary Action Program (VAP) as set forth in Ohio Revised Code Chapter 3746 and Ohio Administrative Code (OAC) Chapter 3745-300.

4. TestAmerica North Canton performed analyses on behalf of **HZW Environmental Consultants** for a voluntary action at property known as **Commercial Road, located Northeast of Commercial & Canal Roads in Cleveland**

5. This affidavit applies to and is submitted with the following information, data, documents or reports for the property:

Laboratory Report Number	Report Date
A9L180492	**January 11, 2010**

6. TestAmerica North Canton was a VAP certified laboratory pursuant to OAC 3745-300-04 when it performed analyses referenced herein.

7. The analyses under this affidavit consist of certified data, as described by OAC 3745-300-04(B) with the exception of the analytes, parameter groups, or methods listed below:

Method:	Analyte/Compound:
9030B/9034	Sulfide
9045	Corrosivity

8. TestAmerica North Canton performed the analyses within its current VAP certification. The laboratory was certified for each analyte, parameter group and method used at the time that it performed the analyses. The analyses were performed consistent with the laboratory's standard operating procedures and quality assurance program plan as approved under OAC 3745-300-04.

9. The information, data, documents, and reports identified under this affidavit are true, accurate, and complete.

Further affiant sayeth naught.

Signature of Affiant

Sworn to before me this 13th day of January, 2010.

NOTARY PUBLIC STATE OF OHIO

JEFFREY C. SMITH
Notary Public, State of Ohio
My Commission Expires Feb. 12, 2012

Jeffrey C. Smith
Notary Public

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

PROJECT NO. H09004-14

COMMERCIAL RD.

Lot #: A9L180492

Doug Wetzel

HZW Environmental Consultants
6105 Heisley Rd
Mentor, OH 44060

TESTAMERICA LABORATORIES, INC.

Approved for release.
Nathan Pietras
Project Manager
1/11/2010 3:20 PM

Nathan Pietras
Project Manager
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January 11, 2010

ACCREDITED IN ACCORDANCE WITH nelac

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CASE NARRATIVE

A9L180492

The following report contains the analytical results for eight solid samples submitted to TestAmerica North Canton by HZW Environmental Consultants from the Commercial Rd. Site, project number H09004-14. The samples were received December 18, 2009, according to documented sample acceptance procedures.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Doug Wetzel on January 04, 2010, and January 07, 2010. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by a dry weight adjustment footnote at the bottom of the analytical report page. The list of parameters which are never reported on a dry weight basis is included on the Sample Summary.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

All parameters were evaluated to the reporting limit with the exception of Total Residue as Percent Solids, Extractable Petroleum Hydrocarbons and Semivolatile Organic Compounds by GC/MS which were evaluated to the method detection limit and include appropriate qualifiers.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Nathan Pietras, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the cooler upon sample receipt was 0.0°C.

GC/MS VOLATILES

The matrix spike/matrix spike duplicate(s) for batch(es) 9356203 had RPD's and recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The internal standard areas were outside acceptance limits for sample(s) HB-071(10-12'), HB-071(16-18') and HB-072(2-4') due to matrix effects. (Refer to IS report following this case narrative for additional detail.)

Sample(s) HB-071(8-10') had elevated reporting limits due to TICs.

Sample(s) HB-071(10-12'), HB-071(16-18') and HB-072(2-4') were reanalyzed at a dilution due to internal standard recoveries outside of acceptance limits, per Ohio VAP requirements. Only compounds associated with internal standards that met criteria are reported from each analysis.

There were no client requested Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples in batch 9356563. Therefore, the laboratory has included a Laboratory Control Sample Duplicate (LCSD) in the QC batch. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system.

GC/MS SEMIVOLATILES

Sample HB-075(0-2') had elevated reporting limits due to matrix interferences.

The batch QC for batch 9353017 was unable to be reported due to re-preparation of the parent sample and the original sample was not reported.

CASE NARRATIVE (continued)

PURGEABLE PETROLEUM HYDROCARBONS-8015

The matrix spike/matrix spike duplicate(s) for batch(es) 9363092 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

There were no client requested Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples in batch 9354104. Therefore, the laboratory has included a Laboratory Control Sample Duplicate (LCSD) in the QC batch. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system.

EXTRACTABLE PETROLEUM HYDROCARBONS-8015

The sample(s) that contain results between the MDL and the RL were flagged with "J". There is a possibility of false positive or mis-identification at these quantitation levels. In analytical methods requiring confirmation of the analyte reported, confirmation was performed only down to the standard reporting limit (SRL). The acceptance criteria for QC samples may not be met at these quantitation levels.

The generic batch MS/MSDs for batch(es) 9353014 was extracted and analyzed. But unable to be reported due to LIMS limitations

METALS

The analytical results met the requirements of the laboratory's QA/QC program.

GENERAL CHEMISTRY

Sample HB-072(4-6') for Hexavalent Chromium is suspect to have a reducing agent based on the results obtained from method of standard addition.

The matrix spike/matrix spike duplicate data for batch(es) 9357388 and 9362384 are not included in this report. The batch QC samples, which document the effect of a specific sample matrix on method performance, were not associated with a sample reported in this lot. The data, therefore, has no bearing on the samples reported herein. In order to document compliance with the QC requirement for an MS/MSD per 20 environmental samples, a summary of sample/QC associations has been provided following this case narrative.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data. Program or agency specific requirements take precedence over the requirements listed in this narrative.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

QUALITY CONTROL ELEMENTS NARRATIVE (continued)

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

TestAmerica Certifications and Approvals:

The laboratory is certified for the analytes listed on the documents below. These are available upon request.
California (#01144CA), Connecticut (#PH-0590), Florida (#E87225),
Illinois (#200004), Kansas (#E10336), Minnesota (#39-999-348), New Jersey (#OH001), New York (#10975), Nevada (#OH-000482008A), OhioVAP (#CL0024), Pennsylvania (#008), West Virginia (#210), Wisconsin (#999518190),NAVY, ARMY, USDA Soil Permit

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Data File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\UX81645.D
Report Date: 24-Dec-2009 14:30

TestAmerica North Canton

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: a3ux8a.i
Lab File ID: UX81645.D
Lab Smp Id: LRCRC1AK
Analysis Type: VOA
Quant Type: ISTD
Operator: 402279
Method File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\8260SUX8.m
Misc Info: M91223A,8260SUX8,1-8260.SUB,402279

Calibration Date: 23-DEC-2009
Calibration Time: 19:33
Client Smp ID: HB-071(10-12')
Level: LOW
Sample Type: SOIL

		AREA LIMIT				
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF	
1 Fluorobenzene	895502	447751	1791004	717055	-19.93	
2 Chlorobenzene-d5	695105	347553	1390210	403978	-41.88	
3 1,4-Dichlorobenze	375553	187777	751106	107352	-71.41	<-

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Fluorobenzene	5.31	4.81	5.81	5.30	-0.02
2 Chlorobenzene-d5	7.85	7.35	8.35	7.85	-0.01
3 1,4-Dichlorobenze	10.04	9.54	10.54	10.04	0.05

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

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Data File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\UX81630.D
Report Date: 24-Dec-2009 14:13

TestAmerica North Canton

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: a3ux8a.i
Lab File ID: UX81630.D
Lab Smp Id: LRCRE1AK
Analysis Type: VOA
Quant Type: ISTD
Operator: 402279
Calibration Date: 23-DEC-2009
Calibration Time: 19:33
Client Smp ID: HB-071(10-12')
Level: LOW
Sample Type: SOIL
Method File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\8260SUX8.m
Misc Info: M91223A,8260SUX8,1-8260.SUB,402279

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Fluorobenzene	895502	447751	1791004	664514	-25.79	
2 Chlorobenzene-d5	695105	347553	1390210	333803	-51.98	<-
3 1,4-Dichlorobenze	375553	187777	751106	78423	-79.12	<-

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Fluorobenzene	5.31	4.81	5.81	5.31	0.05
2 Chlorobenzene-d5	7.85	7.35	8.35	7.85	-0.04
3 1,4-Dichlorobenze	10.04	9.54	10.54	10.04	0.03

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

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Data File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\UX81631.D
Report Date: 24-Dec-2009 14:16

TestAmerica North Canton

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: a3ux8a.i
Lab File ID: UX81631.D
Lab Smp Id: LRCRH1AK
Analysis Type: VOA
Quant Type: ISTD
Operator: 402279
Calibration Date: 23-DEC-2009
Calibration Time: 19:33
Client Smp ID: HB-072(2-4')
Level: LOW
Sample Type: SOIL
Method File: \\cansvr11\dd\chem\MSV\a3ux8a.i\M91223A.b\8260SUX8.m
Misc Info: M91223A,8260SUX8,1-8260.SUB,402279

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Fluorobenzene	895502	447751	1791004	684851	-23.52
2 Chlorobenzene-d5	695105	347553	1390210	332213	-52.21 <-
3 1,4-Dichlorobenze	375553	187777	751106	77254	-79.43 <-

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
1 Fluorobenzene	5.31	4.81	5.81	5.31	0.05
2 Chlorobenzene-d5	7.85	7.35	8.35	7.85	0.04
3 1,4-Dichlorobenze	10.04	9.54	10.54	10.04	0.03

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

TESTAMERICA LABORATORIES, INC.

MS RUN NUMBER REVIEW

Lot ID	Smp#	Work Order	Batch	MS Run#	SDG	Prep Date	Method
A9L180470	001	LRA5L1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	002	LRA5R1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	003	LRA5T1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	004	LRA5V1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	005	LRA5W1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	006	LRA5X1AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	007	LRA511AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	008	LRA531AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	009	LRA541AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	010	LRA551AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	011	LRA571AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180470	012	LRA591AE	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180492	001	LRCET1AL	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180492	002	LRCRC1AL	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L180492	003	LRCRE1AL	9357388	9357236		12/23/09	MCAWW 335.2 CLP-M
A9L220458	004	LRG481AH	9357388	9357236	9L03652	12/23/09	MCAWW 335.2 CLP-M
A9L220458	004	LRG481AL D	9357388	9357236	9L03652	12/23/09	MCAWW 335.2 CLP-M
A9L220458	004	LRG481AK S	9357388	9357236	9L03652	12/23/09	MCAWW 335.2 CLP-M
A9L170448	001	LQ8JA1AR	9357395	9357236		12/23/09	SW846 9012A
A9L150490	003	LQ4981AA	9362383	9362205		12/28/09	SW846 9012A
A9L150490	003	LQ4981AD D	9362383	9362205		12/28/09	SW846 9012A
A9L150490	003	LQ4981AC S	9362383	9362205		12/28/09	SW846 9012A
A9L180492	004	LRCRH1AL	9362384	9362205		12/28/09	MCAWW 335.2 CLP-M
A9L180492	005	LRCRK1AL	9362384	9362205		12/28/09	MCAWW 335.2 CLP-M
A9L180492	006	LRCRM1AL	9362384	9362205		12/28/09	MCAWW 335.2 CLP-M
A9L180492	007	LRCRP1AL	9362384	9362205		12/28/09	MCAWW 335.2 CLP-M
A9L180492	008	LRCRR1AL	9362384	9362205		12/28/09	MCAWW 335.2 CLP-M

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-071(8-10') 12/17/09 11:40 001				
C20-C34	250	31	mg/kg	SW846 8015B
C10-C20	260	23	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	2700	1200	ug/kg	SW846 8015A MOD
Arsenic	10.0	1.2	mg/kg	SW846 6010B
Chromium	11.2	0.58	mg/kg	SW846 6010B
Lead	38.8	0.35	mg/kg	SW846 6010B
Benzo(a)anthracene	2200	380	ug/kg	SW846 8270C
Benzo(b)fluoranthene	3300	380	ug/kg	SW846 8270C
Benzo(k)fluoranthene	570	380	ug/kg	SW846 8270C
Benzo(a)pyrene	2200	380	ug/kg	SW846 8270C
Chrysene	2200	380	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	1400	380	ug/kg	SW846 8270C
Naphthalene	55000	380	ug/kg	SW846 8270C
Acenaphthene	7000	380	ug/kg	SW846 8270C
Anthracene	2400	380	ug/kg	SW846 8270C
Benzo(ghi)perylene	830	380	ug/kg	SW846 8270C
Fluoranthene	8800	380	ug/kg	SW846 8270C
Fluorene	5300	380	ug/kg	SW846 8270C
2-Methylnaphthalene	7900	380	ug/kg	SW846 8270C
Phenanthrene	13000	380	ug/kg	SW846 8270C
Pyrene	5600	380	ug/kg	SW846 8270C
1-Methylnaphthalene	4100	380	ug/kg	SW846 8270C
Corrosivity	9.5		No Units	SW846 9045A
Percent Solids	86.8	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	48.5	34.6	mg/kg	SW846 9030B/9034
Total Cyanide	0.80	0.58	mg/kg	MCAWW 335.2 CLP-M
HB-071(10-12') 12/17/09 11:40 002				
C20-C34	220	31	mg/kg	SW846 8015B
C10-C20	170	23	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	170	120	ug/kg	SW846 8015A MOD
Arsenic	11.3	1.2	mg/kg	SW846 6010B
Cadmium	0.31	0.23	mg/kg	SW846 6010B
Chromium	14.4	0.58	mg/kg	SW846 6010B
Lead	65.9	0.35	mg/kg	SW846 6010B
Benzo(a)anthracene	1500	51	ug/kg	SW846 8270C
Benzo(b)fluoranthene	2200	51	ug/kg	SW846 8270C
Benzo(k)fluoranthene	830	51	ug/kg	SW846 8270C
Benzo(a)pyrene	1300	51	ug/kg	SW846 8270C
Chrysene	1500	51	ug/kg	SW846 8270C

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-071(10-12') 12/17/09 11:40 002				
Dibenz(a,h)anthracene	380	51	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	940	51	ug/kg	SW846 8270C
Naphthalene	3700	51	ug/kg	SW846 8270C
Acenaphthene	1300	51	ug/kg	SW846 8270C
Acenaphthylene	270	51	ug/kg	SW846 8270C
Anthracene	940	51	ug/kg	SW846 8270C
Benzo(ghi)perylene	960	51	ug/kg	SW846 8270C
Fluoranthene	4000	51	ug/kg	SW846 8270C
Fluorene	1300	51	ug/kg	SW846 8270C
2-Methylnaphthalene	3300	51	ug/kg	SW846 8270C
Phenanthrene	5400	51	ug/kg	SW846 8270C
Pyrene	3100	51	ug/kg	SW846 8270C
1-Methylnaphthalene	2000	51	ug/kg	SW846 8270C
Methylene chloride	12	5.8	ug/kg	SW846 8260A
Acetone	36	23	ug/kg	SW846 8260A
Carbon disulfide	14	5.8	ug/kg	SW846 8260A
Toluene	7.1	5.8	ug/kg	SW846 8260A
Xylenes (total)	11	5.8	ug/kg	SW846 8260A
Corrosivity	10.1		No Units	SW846 9045A
Percent Solids	86.8	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	90.2	34.6	mg/kg	SW846 9030B/9034
Total Cyanide	2.1	0.58	mg/kg	MCAWW 335.2 CLP-M
HB-071(16-18') 12/17/09 11:40 003				
C20-C34	150	31	mg/kg	SW846 8015B
C10-C20	72	23	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	150	110	ug/kg	SW846 8015A MOD
Arsenic	9.7	1.1	mg/kg	SW846 6010B
Chromium	22.9	0.57	mg/kg	SW846 6010B
Lead	55.7	0.34	mg/kg	SW846 6010B
Benzo(a)anthracene	810	30	ug/kg	SW846 8270C
Benzo(b)fluoranthene	1000	30	ug/kg	SW846 8270C
Benzo(k)fluoranthene	420	30	ug/kg	SW846 8270C
Benzo(a)pyrene	660	30	ug/kg	SW846 8270C
Chrysene	850	30	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	180	30	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	440	30	ug/kg	SW846 8270C
Naphthalene	3400	30	ug/kg	SW846 8270C
Acenaphthene	900	30	ug/kg	SW846 8270C
Acenaphthylene	120	30	ug/kg	SW846 8270C
Anthracene	490	30	ug/kg	SW846 8270C

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-071(16-18') 12/17/09 11:40 003				
Benzo(ghi)perylene	450	30	ug/kg	SW846 8270C
Fluoranthene	2200	30	ug/kg	SW846 8270C
Fluorene	870	30	ug/kg	SW846 8270C
2-Methylnaphthalene	1600	30	ug/kg	SW846 8270C
Phenanthrene	2700	30	ug/kg	SW846 8270C
Pyrene	1800	30	ug/kg	SW846 8270C
1-Methylnaphthalene	960	30	ug/kg	SW846 8270C
Methylene chloride	7.3	5.7	ug/kg	SW846 8260A
Carbon disulfide	12	5.7	ug/kg	SW846 8260A
Corrosivity	10.4		No Units	SW846 9045A
Percent Solids	87.9	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	148	34.1	mg/kg	SW846 9030B/9034
Total Cyanide	0.73	0.57	mg/kg	MCAWW 335.2 CLP-M
HB-072(2-4') 12/17/09 12:20 004				
C20-C34	140	30	mg/kg	SW846 8015B
C10-C20	44	23	mg/kg	SW846 8015B
Arsenic	8.6	1.1	mg/kg	SW846 6010B
Chromium	10.6	0.56	mg/kg	SW846 6010B
Lead	27.0	0.34	mg/kg	SW846 6010B
Benzo(a)anthracene	840	7.5	ug/kg	SW846 8270C
Benzo(b)fluoranthene	1100	7.5	ug/kg	SW846 8270C
Benzo(k)fluoranthene	390	7.5	ug/kg	SW846 8270C
Benzo(a)pyrene	630	7.5	ug/kg	SW846 8270C
Chrysene	840	7.5	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	150	7.5	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	460	7.5	ug/kg	SW846 8270C
Naphthalene	580	7.5	ug/kg	SW846 8270C
Acenaphthene	110	7.5	ug/kg	SW846 8270C
Acenaphthylene	140	7.5	ug/kg	SW846 8270C
Anthracene	360	7.5	ug/kg	SW846 8270C
Benzo(ghi)perylene	500	7.5	ug/kg	SW846 8270C
Fluoranthene	1500	7.5	ug/kg	SW846 8270C
Fluorene	140	7.5	ug/kg	SW846 8270C
2-Methylnaphthalene	780	7.5	ug/kg	SW846 8270C
Phenanthrene	1100	7.5	ug/kg	SW846 8270C
Pyrene	1400	7.5	ug/kg	SW846 8270C
1-Methylnaphthalene	520	7.5	ug/kg	SW846 8270C
Methylene chloride	11	5.6	ug/kg	SW846 8260A
Carbon disulfide	8.0	5.6	ug/kg	SW846 8260A
Corrosivity	10.2		No Units	SW846 9045A
Percent Solids	88.7	10.0	%	MCAWW 160.3 MOD

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-072(2-4') 12/17/09 12:20 004				
Acid-soluble sulfide	287	33.8	mg/kg	SW846 9030B/9034
Total Cyanide	2.9	0.56	mg/kg	MCAWW 335.2 CLP-M
HB-072(4-6') 12/17/09 12:20 005				
C20-C34	220	31	mg/kg	SW846 8015B
C10-C20	82	23	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	700	580	ug/kg	SW846 8015A MOD
Arsenic	9.3	1.2	mg/kg	SW846 6010B
Chromium	19.7	0.58	mg/kg	SW846 6010B
Lead	38.4	0.35	mg/kg	SW846 6010B
Benzo(a)anthracene	1300	15	ug/kg	SW846 8270C
Benzo(b)fluoranthene	2100	15	ug/kg	SW846 8270C
Benzo(k)fluoranthene	750	15	ug/kg	SW846 8270C
Benzo(a)pyrene	1200	15	ug/kg	SW846 8270C
Chrysene	1500	15	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	260	15	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	760	15	ug/kg	SW846 8270C
Naphthalene	910	15	ug/kg	SW846 8270C
Acenaphthene	140	15	ug/kg	SW846 8270C
Acenaphthylene	340	15	ug/kg	SW846 8270C
Anthracene	410	15	ug/kg	SW846 8270C
Benzo(ghi)perylene	850	15	ug/kg	SW846 8270C
Fluoranthene	2100	15	ug/kg	SW846 8270C
Fluorene	180	15	ug/kg	SW846 8270C
2-Methylnaphthalene	1400	15	ug/kg	SW846 8270C
Phenanthrene	1400	15	ug/kg	SW846 8270C
Pyrene	2100	15	ug/kg	SW846 8270C
1-Methylnaphthalene	860	15	ug/kg	SW846 8270C
Carbon disulfide	27	5.8	ug/kg	SW846 8260A
Benzene	27	5.8	ug/kg	SW846 8260A
Toluene	44	5.8	ug/kg	SW846 8260A
Xylenes (total)	20	5.8	ug/kg	SW846 8260A
Hexavalent Chromium	2.5	0.92	mg/kg	SW846 7196A
Corrosivity	10.2		No Units	SW846 9045A
Percent Solids	86.7	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	289	34.6	mg/kg	SW846 9030B/9034
Total Cyanide	2.1	0.58	mg/kg	MCAWW 335.2 CLP-M

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-073(0-2') 12/17/09 12:50 006				
C20-C34	130	31	mg/kg	SW846 8015B
C10-C20	120	23	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	210	110	ug/kg	SW846 8015A MOD
Arsenic	9.3	1.1	mg/kg	SW846 6010B
Cadmium	0.33	0.23	mg/kg	SW846 6010B
Chromium	10.6	0.57	mg/kg	SW846 6010B
Lead	115	0.34	mg/kg	SW846 6010B
Benzo(a)anthracene	1100	15	ug/kg	SW846 8270C
Benzo(b)fluoranthene	1500	15	ug/kg	SW846 8270C
Benzo(k)fluoranthene	420	15	ug/kg	SW846 8270C
Benzo(a)pyrene	1000	15	ug/kg	SW846 8270C
Chrysene	960	15	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	290	15	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	600	15	ug/kg	SW846 8270C
Naphthalene	880	15	ug/kg	SW846 8270C
Acenaphthene	82	15	ug/kg	SW846 8270C
Acenaphthylene	150	15	ug/kg	SW846 8270C
Anthracene	240	15	ug/kg	SW846 8270C
Benzo(ghi)perylene	820	15	ug/kg	SW846 8270C
Fluoranthene	1600	15	ug/kg	SW846 8270C
Fluorene	87	15	ug/kg	SW846 8270C
2-Methylnaphthalene	1500	15	ug/kg	SW846 8270C
Phenanthrene	1200	15	ug/kg	SW846 8270C
Pyrene	1500	15	ug/kg	SW846 8270C
1-Methylnaphthalene	1000	15	ug/kg	SW846 8270C
Toluene	5.8	5.7	ug/kg	SW846 8260A
Ethylbenzene	11	5.7	ug/kg	SW846 8260A
Xylenes (total)	47	5.7	ug/kg	SW846 8260A
Corrosivity	11.0		No Units	SW846 9045A
Percent Solids	88.4	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	302	33.9	mg/kg	SW846 9030B/9034
Total Cyanide	4.6	0.57	mg/kg	MCAWW 335.2 CLP-M
HB-075(0-2') 12/17/09 13:20 007				
C20-C34	610	150	mg/kg	SW846 8015B
C10-C20	100 J	110	mg/kg	SW846 8015B
Gasoline Range Organics (C6-C12)	780	570	ug/kg	SW846 8015A MOD
Arsenic	4.7	1.1	mg/kg	SW846 6010B
Cadmium	0.23	0.23	mg/kg	SW846 6010B
Chromium	18.6	0.57	mg/kg	SW846 6010B

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-075(0-2') 12/17/09 13:20 007				
Lead	21.3	0.34	mg/kg	SW846 6010B
Benzo(a)anthracene	2900	76	ug/kg	SW846 8270C
Benzo(b)fluoranthene	2500	76	ug/kg	SW846 8270C
Benzo(k)fluoranthene	940	76	ug/kg	SW846 8270C
Benzo(a)pyrene	2100	76	ug/kg	SW846 8270C
Chrysene	2600	76	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	460	76	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	1100	76	ug/kg	SW846 8270C
Naphthalene	230	76	ug/kg	SW846 8270C
Acenaphthene	190	76	ug/kg	SW846 8270C
Acenaphthylene	100	76	ug/kg	SW846 8270C
Anthracene	860	76	ug/kg	SW846 8270C
Benzo(ghi)perylene	1200	76	ug/kg	SW846 8270C
Fluoranthene	5100	76	ug/kg	SW846 8270C
Fluorene	210	76	ug/kg	SW846 8270C
2-Methylnaphthalene	180	76	ug/kg	SW846 8270C
Phenanthrene	2500	76	ug/kg	SW846 8270C
Pyrene	6100	76	ug/kg	SW846 8270C
1-Methylnaphthalene	150	76	ug/kg	SW846 8270C
Xylenes (total)	26	5.7	ug/kg	SW846 8260A
Corrosivity	11.5		No Units	SW846 9045A
Percent Solids	87.9	10.0	%	MCAWW 160.3 MOD
Acid-soluble sulfide	61.6	34.1	mg/kg	SW846 9030B/9034
HB-075(2-4') 12/17/09 13:20 008				
C20-C34	110	15	mg/kg	SW846 8015B
C10-C20	48	11	mg/kg	SW846 8015B
Arsenic	10.4	1.1	mg/kg	SW846 6010B
Chromium	8.9	0.55	mg/kg	SW846 6010B
Lead	107	0.33	mg/kg	SW846 6010B
Benzo(a)anthracene	2900	29	ug/kg	SW846 8270C
Benzo(b)fluoranthene	3200	29	ug/kg	SW846 8270C
Benzo(k)fluoranthene	1200	29	ug/kg	SW846 8270C
Benzo(a)pyrene	2500	29	ug/kg	SW846 8270C
Chrysene	2600	29	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	500	29	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	1500	29	ug/kg	SW846 8270C
Naphthalene	820	29	ug/kg	SW846 8270C
Acenaphthene	570	29	ug/kg	SW846 8270C
Acenaphthylene	72	29	ug/kg	SW846 8270C
Anthracene	1300	29	ug/kg	SW846 8270C
Benzo(ghi)perylene	1600	29	ug/kg	SW846 8270C

(Continued on next page)

EXECUTIVE SUMMARY - Detection Highlights

A9L180492

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
HB-075(2-4') 12/17/09 13:20 008				
Fluoranthene	5500	29	ug/kg	SW846 8270C
Fluorene	570	29	ug/kg	SW846 8270C
2-Methylnaphthalene	1000	29	ug/kg	SW846 8270C
Phenanthrene	4800	29	ug/kg	SW846 8270C
Pyrene	5400	29	ug/kg	SW846 8270C
1-Methylnaphthalene	610	29	ug/kg	SW846 8270C
Corrosivity	8.7		No Units	SW846 9045A
Percent Solids	90.6	10.0	%	MCAWW 160.3 MOD

ANALYTICAL METHODS SUMMARY

A9L180492

PARAMETER	ANALYTICAL METHOD
Corrosivity	SW846 9045A
Extractable Petroleum Hydrocarbons	SW846 8015B
Hexavalent Chromium	SW846 7196A
Semivolatile Organic Compounds by GC/MS	SW846 8270C
Sulfides, Total 9030B/9034	SW846 9030B/9034
Total Cyanide	MCAWW 335.2 CLP-M
Total Residue as Percent Solids	MCAWW 160.3 MOD
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics	SW846 8015A MOD
Volatile Organics by GC/MS	SW846 8260A

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A9L180492

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LRCET	001	HB-071(8-10')	12/17/09	11:40
LRCRC	002	HB-071(10-12')	12/17/09	11:40
LRCRE	003	HB-071(16-18')	12/17/09	11:40
LRCRH	004	HB-072(2-4')	12/17/09	12:20
LRCRK	005	HB-072(4-6')	12/17/09	12:20
LRCRM	006	HB-073(0-2')	12/17/09	12:50
LRCRP	007	HB-075(0-2')	12/17/09	13:20
LRCRR	008	HB-075(2-4')	12/17/09	13:20

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

GC/MS Volatiles

Lot-Sample #...: A9L180492-001 **Work Order #...:** LRCET1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/20/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9356563
Dilution Factor: 19.92
% Moisture.....: 13 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	23000	ug/kg
Benzene	ND	5700	ug/kg
Bromodichloromethane	ND	5700	ug/kg
Bromoform	ND	5700	ug/kg
Bromomethane	ND	11000	ug/kg
2-Butanone	ND	23000	ug/kg
Carbon disulfide	ND	5700	ug/kg
Carbon tetrachloride	ND	5700	ug/kg
Chlorobenzene	ND	5700	ug/kg
Dibromochloromethane	ND	5700	ug/kg
Chloroethane	ND	11000	ug/kg
Chloroform	ND	5700	ug/kg
Chloromethane	ND	11000	ug/kg
1,1-Dichloroethane	ND	5700	ug/kg
1,2-Dichloroethane	ND	5700	ug/kg
1,1-Dichloroethene	ND	5700	ug/kg
1,2-Dichloroethene (total)	ND	5700	ug/kg
1,2-Dichloropropane	ND	5700	ug/kg
cis-1,3-Dichloropropene	ND	5700	ug/kg
trans-1,3-Dichloropropene	ND	5700	ug/kg
Ethylbenzene	ND	5700	ug/kg
2-Hexanone	ND	23000	ug/kg
Methylene chloride	ND	5700	ug/kg
4-Methyl-2-pentanone	ND	23000	ug/kg
Styrene	ND	5700	ug/kg
1,1,2,2-Tetrachloroethane	ND	5700	ug/kg
Tetrachloroethene	ND	5700	ug/kg
Toluene	ND	5700	ug/kg
1,1,1-Trichloroethane	ND	5700	ug/kg
1,1,2-Trichloroethane	ND	5700	ug/kg
Trichloroethene	ND	5700	ug/kg
Vinyl chloride	ND	2300	ug/kg
Xylenes (total)	ND	5700	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	74 DIL	(59 - 138)
1,2-Dichloroethane-d4	0.0 DIL,*	(61 - 130)
Toluene-d8	70 DIL	(60 - 143)
4-Bromofluorobenzene	76 DIL	(47 - 158)

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HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

GC/MS Volatiles

Lot-Sample #...: A9L180492-001 Work Order #...: LRCET1AK Matrix.....: SO

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

* Surrogate recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-001 Work Order #...: LRCET1AD Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 50
% Moisture.....: 13 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	2200	380	ug/kg
Benzo(b)fluoranthene	3300	380	ug/kg
Benzo(k)fluoranthene	570	380	ug/kg
Benzo(a)pyrene	2200	380	ug/kg
Chrysene	2200	380	ug/kg
Dibenz(a,h)anthracene	ND	380	ug/kg
Indeno(1,2,3-cd)pyrene	1400	380	ug/kg
Naphthalene	55000	380	ug/kg
Acenaphthene	7000	380	ug/kg
Acenaphthylene	ND	380	ug/kg
Anthracene	2400	380	ug/kg
Benzo(ghi)perylene	830	380	ug/kg
Fluoranthene	8800	380	ug/kg
Fluorene	5300	380	ug/kg
2-Methylnaphthalene	7900	380	ug/kg
Phenanthrene	13000	380	ug/kg
Pyrene	5600	380	ug/kg
1-Methylnaphthalene	4100	380	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	65 DIL	(24 - 112)
2-Fluorobiphenyl	0.0 DIL,*	(34 - 110)
Terphenyl-d14	87 DIL	(41 - 119)
Phenol-d5	63 DIL	(28 - 110)
2-Fluorophenol	61 DIL	(26 - 110)
2,4,6-Tribromophenol	0.0 DIL,*	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

* Surrogate recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

GC Volatiles

Lot-Sample #...: A9L180492-001 **Work Order #...:** LRCET1AJ **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/19/09 **Analysis Date..:** 12/19/09
Prep Batch #...: 9354104
Dilution Factor: 10
% Moisture.....: 13 **Method.....:** SW846 8015A MOD

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**2700**	**1200**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	103	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

GC Semivolatiles

Lot-Sample #...:	A9L180492-001	**Work Order #...:**	LRCET1AC	**Matrix.....:**	SO
Date Sampled...:	12/17/09 11:40	**Date Received..:**	12/18/09		
Prep Date.....:	12/19/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9353014				
Dilution Factor:	10				
% Moisture.....:	13	**Method.....:**	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**250**	**31**	**mg/kg**
C10-C20	**260**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	28 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

TOTAL Metals

Lot-Sample #...: A9L180492-001 Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	10.0	1.2	mg/kg	SW846 6010B	12/21-12/23/09	LRCET1AE
		Dilution Factor: 1				
Cadmium	ND	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCET1AF
		Dilution Factor: 1				
Chromium	11.2	0.58	mg/kg	SW846 6010B	12/21-12/23/09	LRCET1AG
		Dilution Factor: 1				
Lead	38.8	0.35	mg/kg	SW846 6010B	12/21-12/23/09	LRCET1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(8-10')

General Chemistry

Lot-Sample #...: A9L180492-001 Work Order #...: LRCET Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	48.5	34.6	mg/kg	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1				
Corrosivity	9.5		No Units	SW846 9045A	12/19/09	9353120
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.92	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	86.8	10.0	%	MCAWW 160.3 MOD	12/22-12/23/09	9356363
		Dilution Factor: 1				
Total Cyanide	0.80	0.58	mg/kg	MCAWW 335.2 CLP-M	12/23/09	9357388
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC/MS Volatiles

Lot-Sample #...: A9L180492-002 **Work Order #...:** LRCRC1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/24/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9362414
Dilution Factor: 1
% Moisture.....: 13 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	12	ug/kg
Bromomethane	ND	12	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	12	ug/kg
Methylene chloride	**12**	**5.8**	**ug/kg**
Acetone	**36**	**23**	**ug/kg**
Carbon disulfide	**14**	**5.8**	**ug/kg**
1,1-Dichloroethene	ND	5.8	ug/kg
1,1-Dichloroethane	ND	5.8	ug/kg
1,2-Dichloroethene (total)	ND	5.8	ug/kg
Chloroform	ND	5.8	ug/kg
1,2-Dichloroethane	ND	5.8	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.8	ug/kg
Carbon tetrachloride	ND	5.8	ug/kg
Bromodichloromethane	ND	5.8	ug/kg
1,2-Dichloropropane	ND	5.8	ug/kg
cis-1,3-Dichloropropene	ND	5.8	ug/kg
Trichloroethene	ND	5.8	ug/kg
Dibromochloromethane	ND	5.8	ug/kg
1,1,2-Trichloroethane	ND	5.8	ug/kg
Benzene	ND	5.8	ug/kg
trans-1,3-Dichloropropene	ND	5.8	ug/kg
Bromoform	ND	5.8	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg
2-Hexanone	ND	23	ug/kg
Tetrachloroethene	ND	5.8	ug/kg
Toluene	**7.1**	**5.8**	**ug/kg**
Chlorobenzene	ND	5.8	ug/kg
Ethylbenzene	ND	5.8	ug/kg
Styrene	ND	5.8	ug/kg
Xylenes (total)	**11**	**5.8**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	81	(59 - 138)
1,2-Dichloroethane-d4	81	(61 - 130)
Toluene-d8	83	(60 - 143)
4-Bromofluorobenzene	63	(47 - 158)

(Continued on next page)

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC/MS Volatiles

Lot-Sample #...: A9L180492-002 Work Order #...: LRCRC1AK Matrix.....: SO

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC/MS Volatiles

Lot-Sample #...: A9L180492-002 **Work Order #...:** LRCRC2AK **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 10
% Moisture.....: 13 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
1,1,2,2-Tetrachloroethane	ND	58	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	94	(59 - 138)
1,2-Dichloroethane-d4	88	(61 - 130)
Toluene-d8	96	(60 - 143)
4-Bromofluorobenzene	84	(47 - 158)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-002 Work Order #...: LRCRC1AD Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 6.66
% Moisture.....: 13 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	1500	51	ug/kg
Benzo(b)fluoranthene	2200	51	ug/kg
Benzo(k)fluoranthene	830	51	ug/kg
Benzo(a)pyrene	1300	51	ug/kg
Chrysene	1500	51	ug/kg
Dibenz(a,h)anthracene	380	51	ug/kg
Indeno(1,2,3-cd)pyrene	940	51	ug/kg
Naphthalene	3700	51	ug/kg
Acenaphthene	1300	51	ug/kg
Acenaphthylene	270	51	ug/kg
Anthracene	940	51	ug/kg
Benzo(ghi)perylene	960	51	ug/kg
Fluoranthene	4000	51	ug/kg
Fluorene	1300	51	ug/kg
2-Methylnaphthalene	3300	51	ug/kg
Phenanthrene	5400	51	ug/kg
Pyrene	3100	51	ug/kg
1-Methylnaphthalene	2000	51	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	66 DIL	(24 - 112)
2-Fluorobiphenyl	64 DIL	(34 - 110)
Terphenyl-d14	91 DIL	(41 - 119)
Phenol-d5	72 DIL	(28 - 110)
2-Fluorophenol	79 DIL	(26 - 110)
2,4,6-Tribromophenol	76 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC Volatiles

Lot-Sample #...:	A9L180492-002	**Work Order #...:**	LRCRC1AJ	**Matrix.....:**	SO
Date Sampled...:	12/17/09 11:40	**Date Received..:**	12/18/09		
Prep Date.....:	12/23/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9358085				
Dilution Factor:	1				
% Moisture.....:	13	**Method.....:**	SW846 8015A MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**170**	**120**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	92	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

GC Semivolatiles

Lot-Sample #...:	A9L180492-002	**Work Order #...:**	LRCRC1AC	**Matrix.....:**	SO
Date Sampled...:	12/17/09 11:40	**Date Received..:**	12/18/09		
Prep Date.....:	12/19/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9353014				
Dilution Factor:	10				
% Moisture.....:	13	**Method.....:**	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**220**	**31**	**mg/kg**
C10-C20	**170**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	23 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

TOTAL Metals

Lot-Sample #...: A9L180492-002 Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	11.3	1.2	mg/kg	SW846 6010B	12/21-12/23/09	LRCRC1AE
		Dilution Factor: 1				
Cadmium	0.31	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRC1AF
		Dilution Factor: 1				
Chromium	14.4	0.58	mg/kg	SW846 6010B	12/21-12/23/09	LRCRC1AG
		Dilution Factor: 1				
Lead	65.9	0.35	mg/kg	SW846 6010B	12/21-12/23/09	LRCRC1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(10-12')

General Chemistry

Lot-Sample #...: A9L180492-002 **Work Order #...:** LRCRC **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	**90.2**	**34.6**	**mg/kg**	**SW846 9030B/9034**	**12/23/09**	**9357096**
		Dilution Factor: 1				
Corrosivity	**10.1**		**No Units**	**SW846 9045A**	**12/19/09**	**9353120**
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.92	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	**86.8**	**10.0**	**%**	**MCAWW 160.3 MOD**	**12/22-12/23/09**	**9356363**
		Dilution Factor: 1				
Total Cyanide	**2.1**	**0.58**	**mg/kg**	**MCAWW 335.2 CLP-M**	**12/23/09**	**9357388**
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

GC/MS Volatiles

Lot-Sample #...: A9L180492-003 **Work Order #...:** LRCRE1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 1
% Moisture.....: 12 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	11	ug/kg
Bromomethane	ND	11	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	11	ug/kg
Methylene chloride	**7.3**	**5.7**	**ug/kg**
Acetone	ND	23	ug/kg
Carbon disulfide	**12**	**5.7**	**ug/kg**
1,1-Dichloroethene	ND	5.7	ug/kg
1,1-Dichloroethane	ND	5.7	ug/kg
1,2-Dichloroethene (total)	ND	5.7	ug/kg
Chloroform	ND	5.7	ug/kg
1,2-Dichloroethane	ND	5.7	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.7	ug/kg
Carbon tetrachloride	ND	5.7	ug/kg
Bromodichloromethane	ND	5.7	ug/kg
1,2-Dichloropropane	ND	5.7	ug/kg
cis-1,3-Dichloropropene	ND	5.7	ug/kg
Trichloroethene	ND	5.7	ug/kg
Benzene	ND	5.7	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	98	(59 - 138)
1,2-Dichloroethane-d4	88	(61 - 130)
Toluene-d8	78	(60 - 143)
4-Bromofluorobenzene	56	(47 - 158)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

GC/MS Volatiles

Lot-Sample #...: A9L180492-003 **Work Order #...:** LRCRE2AK **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/24/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9362414
Dilution Factor: 5
% Moisture.....: 12 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dibromochloromethane	ND	28	ug/kg
1,1,2-Trichloroethane	ND	28	ug/kg
trans-1,3-Dichloropropene	ND	28	ug/kg
Bromoform	ND	28	ug/kg
2-Hexanone	ND	110	ug/kg
Tetrachloroethene	ND	28	ug/kg
1,1,2,2-Tetrachloroethane	ND	28	ug/kg
Toluene	ND	28	ug/kg
Chlorobenzene	ND	28	ug/kg
Ethylbenzene	ND	28	ug/kg
Styrene	ND	28	ug/kg
Xylenes (total)	ND	28	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	97	(59 - 138)
1,2-Dichloroethane-d4	86	(61 - 130)
Toluene-d8	92	(60 - 143)
4-Bromofluorobenzene	80	(47 - 158)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-003 Work Order #...: LRCRE1AD Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 4
% Moisture.....: 12 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	810	30	ug/kg
Benzo(b)fluoranthene	1000	30	ug/kg
Benzo(k)fluoranthene	420	30	ug/kg
Benzo(a)pyrene	660	30	ug/kg
Chrysene	850	30	ug/kg
Dibenz(a,h)anthracene	180	30	ug/kg
Indeno(1,2,3-cd)pyrene	440	30	ug/kg
Naphthalene	3400	30	ug/kg
Acenaphthene	900	30	ug/kg
Acenaphthylene	120	30	ug/kg
Anthracene	490	30	ug/kg
Benzo(ghi)perylene	450	30	ug/kg
Fluoranthene	2200	30	ug/kg
Fluorene	870	30	ug/kg
2-Methylnaphthalene	1600	30	ug/kg
Phenanthrene	2700	30	ug/kg
Pyrene	1800	30	ug/kg
1-Methylnaphthalene	960	30	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	63 DIL	(24 - 112)
2-Fluorobiphenyl	61 DIL	(34 - 110)
Terphenyl-d14	85 DIL	(41 - 119)
Phenol-d5	73 DIL	(28 - 110)
2-Fluorophenol	74 DIL	(26 - 110)
2,4,6-Tribromophenol	58 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

GC Volatiles

Lot-Sample #...:	A9L180492-003	**Work Order #...:**	LRCRE1AJ	**Matrix.....:**	SO
Date Sampled...:	12/17/09 11:40	**Date Received..:**	12/18/09		
Prep Date.....:	12/23/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9358085				
Dilution Factor:	1				
% Moisture.....:	12	**Method.....:**	SW846 8015A MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**150**	**110**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	90	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

GC Semivolatiles

Lot-Sample #...: A9L180492-003 **Work Order #...:** LRCRE1AC **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
Prep Date.....: 12/19/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9353014
Dilution Factor: 10
% Moisture.....: 12 **Method.....:** SW846 8015B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**150**	**31**	**mg/kg**
C10-C20	**72**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	21 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

TOTAL Metals

Lot-Sample #...: A9L180492-003 Matrix.....: SO
Date Sampled...: 12/17/09 11:40 Date Received..: 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	9.7	1.1	mg/kg	SW846 6010B	12/21-12/23/09	LRCRE1AE
		Dilution Factor: 1				
Cadmium	ND	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRE1AF
		Dilution Factor: 1				
Chromium	22.9	0.57	mg/kg	SW846 6010B	12/21-12/23/09	LRCRE1AG
		Dilution Factor: 1				
Lead	55.7	0.34	mg/kg	SW846 6010B	12/21-12/23/09	LRCRE1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-071(16-18')

General Chemistry

Lot-Sample #...: A9L180492-003 **Work Order #...:** LRCRE **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	**148**	**34.1**	**mg/kg**	**SW846 9030B/9034**	**12/23/09**	**9357096**
		Dilution Factor: 1				
Corrosivity	**10.4**		**No Units**	**SW846 9045A**	**12/19/09**	**9353120**
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.91	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	**87.9**	**10.0**	**%**	**MCAWW 160.3 MOD**	**12/22-12/23/09**	**9356363**
		Dilution Factor: 1				
Total Cyanide	**0.73**	**0.57**	**mg/kg**	**MCAWW 335.2 CLP-M**	**12/23/09**	**9357388**
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

GC/MS Volatiles

Lot-Sample #...: A9L180492-004 **Work Order #...:** LRCRH1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 1
% Moisture.....: 11 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	11	ug/kg
Bromomethane	ND	11	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	11	ug/kg
Methylene chloride	**11**	**5.6**	**ug/kg**
Acetone	ND	23	ug/kg
Carbon disulfide	**8.0**	**5.6**	**ug/kg**
1,1-Dichloroethene	ND	5.6	ug/kg
1,1-Dichloroethane	ND	5.6	ug/kg
1,2-Dichloroethene (total)	ND	5.6	ug/kg
Chloroform	ND	5.6	ug/kg
1,2-Dichloroethane	ND	5.6	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.6	ug/kg
Carbon tetrachloride	ND	5.6	ug/kg
Bromodichloromethane	ND	5.6	ug/kg
1,2-Dichloropropane	ND	5.6	ug/kg
cis-1,3-Dichloropropene	ND	5.6	ug/kg
Trichloroethene	ND	5.6	ug/kg
Benzene	ND	5.6	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	102	(59 - 138)
1,2-Dichloroethane-d4	90	(61 - 130)
Toluene-d8	81	(60 - 143)
4-Bromofluorobenzene	57	(47 - 158)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

GC/MS Volatiles

Lot-Sample #...: A9L180492-004 **Work Order #...:** LRCRH2AK **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
Prep Date.....: 12/24/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9362414
Dilution Factor: 5
% Moisture.....: 11 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dibromochloromethane	ND	28	ug/kg
1,1,2-Trichloroethane	ND	28	ug/kg
trans-1,3-Dichloropropene	ND	28	ug/kg
Bromoform	ND	28	ug/kg
2-Hexanone	ND	110	ug/kg
Tetrachloroethene	ND	28	ug/kg
1,1,2,2-Tetrachloroethane	ND	28	ug/kg
Toluene	ND	28	ug/kg
Chlorobenzene	ND	28	ug/kg
Ethylbenzene	ND	28	ug/kg
Styrene	ND	28	ug/kg
Xylenes (total)	ND	28	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	98	(59 - 138)
1,2-Dichloroethane-d4	90	(61 - 130)
Toluene-d8	94	(60 - 143)
4-Bromofluorobenzene	79	(47 - 158)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-004 Work Order #...: LRCRH1AD Matrix.....: SO
Date Sampled...: 12/17/09 12:20 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 1
% Moisture.....: 11 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	840	7.5	ug/kg
Benzo(b)fluoranthene	1100	7.5	ug/kg
Benzo(k)fluoranthene	390	7.5	ug/kg
Benzo(a)pyrene	630	7.5	ug/kg
Chrysene	840	7.5	ug/kg
Dibenz(a,h)anthracene	150	7.5	ug/kg
Indeno(1,2,3-cd)pyrene	460	7.5	ug/kg
Naphthalene	580	7.5	ug/kg
Acenaphthene	110	7.5	ug/kg
Acenaphthylene	140	7.5	ug/kg
Anthracene	360	7.5	ug/kg
Benzo(ghi)perylene	500	7.5	ug/kg
Fluoranthene	1500	7.5	ug/kg
Fluorene	140	7.5	ug/kg
2-Methylnaphthalene	780	7.5	ug/kg
Phenanthrene	1100	7.5	ug/kg
Pyrene	1400	7.5	ug/kg
1-Methylnaphthalene	520	7.5	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	58	(24 - 112)
2-Fluorobiphenyl	64	(34 - 110)
Terphenyl-d14	86	(41 - 119)
Phenol-d5	70	(28 - 110)
2-Fluorophenol	72	(26 - 110)
2,4,6-Tribromophenol	51	(10 - 118)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

GC Volatiles

Lot-Sample #...: A9L180492-004 **Work Order #...:** LRCRH1AJ **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9358085
Dilution Factor: 1
% Moisture.....: 11 **Method.....:** SW846 8015A MOD

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	ND	110	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	82	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

GC Semivolatiles

Lot-Sample #...: A9L180492-004	**Work Order #...:** LRCRH1AC	**Matrix.....:** SO	
Date Sampled...: 12/17/09 12:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/19/09	**Analysis Date..:** 12/23/09		
Prep Batch #...: 9353014			
Dilution Factor: 10			
% Moisture.....: 11	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**140**	**30**	**mg/kg**
C10-C20	**44**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	24 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

TOTAL Metals

Lot-Sample #...: A9L180492-004 Matrix.....: SO
Date Sampled...: 12/17/09 12:20 Date Received..: 12/18/09
% Moisture.....: 11

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	8.6	1.1	mg/kg	SW846 6010B	12/21-12/23/09	LRCRH1AE
		Dilution Factor: 1				
Cadmium	ND	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRH1AF
		Dilution Factor: 1				
Chromium	10.6	0.56	mg/kg	SW846 6010B	12/21-12/23/09	LRCRH1AG
		Dilution Factor: 1				
Lead	27.0	0.34	mg/kg	SW846 6010B	12/21-12/23/09	LRCRH1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(2-4')

General Chemistry

Lot-Sample #...: A9L180492-004 **Work Order #...:** LRCRH **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
% Moisture.....: 11

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	287	33.8 Dilution Factor: 1	mg/kg	SW846 9030B/9034	12/23/09	9357096
Corrosivity	10.2	 Dilution Factor: 1	No Units	SW846 9045A	12/19/09	9353120
Hexavalent Chromium	ND	0.90 Dilution Factor: 1	mg/kg	SW846 7196A	12/23-12/24/09	9357236
Percent Solids	88.7	10.0 Dilution Factor: 1	%	MCAWW 160.3 MOD	12/22-12/23/09	9356363
Total Cyanide	2.9	0.56 Dilution Factor: 1	mg/kg	MCAWW 335.2 CLP-M	12/28/09	9362384

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

GC/MS Volatiles

Lot-Sample #...: A9L180492-005 **Work Order #...:** LRCRK1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 1
% Moisture.....: 13 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	12	ug/kg
Bromomethane	ND	12	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	12	ug/kg
Methylene chloride	ND	5.8	ug/kg
Acetone	ND	23	ug/kg
Carbon disulfide	**27**	**5.8**	**ug/kg**
1,1-Dichloroethene	ND	5.8	ug/kg
1,1-Dichloroethane	ND	5.8	ug/kg
1,2-Dichloroethene (total)	ND	5.8	ug/kg
Chloroform	ND	5.8	ug/kg
1,2-Dichloroethane	ND	5.8	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.8	ug/kg
Carbon tetrachloride	ND	5.8	ug/kg
Bromodichloromethane	ND	5.8	ug/kg
1,2-Dichloropropane	ND	5.8	ug/kg
cis-1,3-Dichloropropene	ND	5.8	ug/kg
Trichloroethene	ND	5.8	ug/kg
Dibromochloromethane	ND	5.8	ug/kg
1,1,2-Trichloroethane	ND	5.8	ug/kg
Benzene	**27**	**5.8**	**ug/kg**
trans-1,3-Dichloropropene	ND	5.8	ug/kg
Bromoform	ND	5.8	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg
2-Hexanone	ND	23	ug/kg
Tetrachloroethene	ND	5.8	ug/kg
1,1,2,2-Tetrachloroethane	ND	5.8	ug/kg
Toluene	**44**	**5.8**	**ug/kg**
Chlorobenzene	ND	5.8	ug/kg
Ethylbenzene	ND	5.8	ug/kg
Styrene	ND	5.8	ug/kg
Xylenes (total)	**20**	**5.8**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	91	(59 - 138)
1,2-Dichloroethane-d4	81	(61 - 130)
Toluene-d8	85	(60 - 143)
4-Bromofluorobenzene	74	(47 - 158)

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HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

GC/MS Volatiles

Lot-Sample #...: A9L180492-005 Work Order #...: LRCRK1AK Matrix.....: SO

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-005 Work Order #...: LRCRK1AD Matrix.....: SO
Date Sampled...: 12/17/09 12:20 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 2
% Moisture.....: 13 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	1300	15	ug/kg
Benzo(b)fluoranthene	2100	15	ug/kg
Benzo(k)fluoranthene	750	15	ug/kg
Benzo(a)pyrene	1200	15	ug/kg
Chrysene	1500	15	ug/kg
Dibenz(a,h)anthracene	260	15	ug/kg
Indeno(1,2,3-cd)pyrene	760	15	ug/kg
Naphthalene	910	15	ug/kg
Acenaphthene	140	15	ug/kg
Acenaphthylene	340	15	ug/kg
Anthracene	410	15	ug/kg
Benzo(ghi)perylene	850	15	ug/kg
Fluoranthene	2100	15	ug/kg
Fluorene	180	15	ug/kg
2-Methylnaphthalene	1400	15	ug/kg
Phenanthrene	1400	15	ug/kg
Pyrene	2100	15	ug/kg
1-Methylnaphthalene	860	15	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	60 DIL	(24 - 112)
2-Fluorobiphenyl	65 DIL	(34 - 110)
Terphenyl-d14	82 DIL	(41 - 119)
Phenol-d5	73 DIL	(28 - 110)
2-Fluorophenol	70 DIL	(26 - 110)
2,4,6-Tribromophenol	60 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

GC Volatiles

Lot-Sample #...: A9L180492-005	**Work Order #...:** LRCRK1AJ	**Matrix.....:** SO	
Date Sampled...: 12/17/09 12:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/23/09	**Analysis Date..:** 12/23/09		
Prep Batch #...: 9358085			
Dilution Factor: 5			
% Moisture.....: 13	**Method.....:** SW846 8015A MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**700**	**580**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	92	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

GC Semivolatiles

Lot-Sample #...: A9L180492-005	**Work Order #...:** LRCRK1AC		**Matrix.....:** SO
Date Sampled...: 12/17/09 12:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/19/09	**Analysis Date..:** 12/23/09		
Prep Batch #...: 9353014			
Dilution Factor: 10			
% Moisture.....: 13	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**220**	**31**	**mg/kg**
C10-C20	**82**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	26 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

TOTAL Metals

Lot-Sample #...: A9L180492-005 **Matrix.....:** SO
Date Sampled...: 12/17/09 12:20 **Date Received..:** 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	**9.3**	**1.2**	**mg/kg**	**SW846 6010B**	**12/21-12/23/09**	**LRCRK1AE**
		Dilution Factor: 1				
Cadmium	ND	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRK1AF
		Dilution Factor: 1				
Chromium	**19.7**	**0.58**	**mg/kg**	**SW846 6010B**	**12/21-12/23/09**	**LRCRK1AG**
		Dilution Factor: 1				
Lead	**38.4**	**0.35**	**mg/kg**	**SW846 6010B**	**12/21-12/23/09**	**LRCRK1AH**
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-072(4-6')

General Chemistry

Lot-Sample #...: A9L180492-005 Work Order #...: LRCRK Matrix.....: SO
Date Sampled...: 12/17/09 12:20 Date Received..: 12/18/09
% Moisture.....: 13

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	289	34.6	mg/kg	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1				
Corrosivity	10.2		No Units	SW846 9045A	12/19/09	9353120
		Dilution Factor: 1				
Hexavalent Chromium	2.5	0.92	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	86.7	10.0	%	MCAWW 160.3 MOD	12/22-12/23/09	9356363
		Dilution Factor: 1				
Total Cyanide	2.1	0.58	mg/kg	MCAWW 335.2 CLP-M	12/28/09	9362384
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

GC/MS Volatiles

Lot-Sample #...: A9L180492-006 **Work Order #...:** LRCRM1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 12:50 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 1
% Moisture.....: 12 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	11	ug/kg
Bromomethane	ND	11	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	11	ug/kg
Methylene chloride	ND	5.7	ug/kg
Acetone	ND	23	ug/kg
Carbon disulfide	ND	5.7	ug/kg
1,1-Dichloroethene	ND	5.7	ug/kg
1,1-Dichloroethane	ND	5.7	ug/kg
1,2-Dichloroethene (total)	ND	5.7	ug/kg
Chloroform	ND	5.7	ug/kg
1,2-Dichloroethane	ND	5.7	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.7	ug/kg
Carbon tetrachloride	ND	5.7	ug/kg
Bromodichloromethane	ND	5.7	ug/kg
1,2-Dichloropropane	ND	5.7	ug/kg
cis-1,3-Dichloropropene	ND	5.7	ug/kg
Trichloroethene	ND	5.7	ug/kg
Dibromochloromethane	ND	5.7	ug/kg
1,1,2-Trichloroethane	ND	5.7	ug/kg
Benzene	ND	5.7	ug/kg
trans-1,3-Dichloropropene	ND	5.7	ug/kg
Bromoform	ND	5.7	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg
2-Hexanone	ND	23	ug/kg
Tetrachloroethene	ND	5.7	ug/kg
1,1,2,2-Tetrachloroethane	ND	5.7	ug/kg
Toluene	**5.8**	**5.7**	**ug/kg**
Chlorobenzene	ND	5.7	ug/kg
Ethylbenzene	**11**	**5.7**	**ug/kg**
Styrene	ND	5.7	ug/kg
Xylenes (total)	**47**	**5.7**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	91	(59 - 138)
1,2-Dichloroethane-d4	85	(61 - 130)
Toluene-d8	90	(60 - 143)
4-Bromofluorobenzene	71	(47 - 158)

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HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

GC/MS Volatiles

Lot-Sample #...: A9L180492-006 Work Order #...: LRCRM1AK Matrix.....: SO

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-006 Work Order #...: LRCRM1AD Matrix.....: SO
Date Sampled...: 12/17/09 12:50 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 2
% Moisture.....: 12 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	1100	15	ug/kg
Benzo(b)fluoranthene	1500	15	ug/kg
Benzo(k)fluoranthene	420	15	ug/kg
Benzo(a)pyrene	1000	15	ug/kg
Chrysene	960	15	ug/kg
Dibenz(a,h)anthracene	290	15	ug/kg
Indeno(1,2,3-cd)pyrene	600	15	ug/kg
Naphthalene	880	15	ug/kg
Acenaphthene	82	15	ug/kg
Acenaphthylene	150	15	ug/kg
Anthracene	240	15	ug/kg
Benzo(ghi)perylene	820	15	ug/kg
Fluoranthene	1600	15	ug/kg
Fluorene	87	15	ug/kg
2-Methylnaphthalene	1500	15	ug/kg
Phenanthrene	1200	15	ug/kg
Pyrene	1500	15	ug/kg
1-Methylnaphthalene	1000	15	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	68 DIL	(24 - 112)
2-Fluorobiphenyl	66 DIL	(34 - 110)
Terphenyl-d14	79 DIL	(41 - 119)
Phenol-d5	67 DIL	(28 - 110)
2-Fluorophenol	74 DIL	(26 - 110)
2,4,6-Tribromophenol	48 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

GC Volatiles

Lot-Sample #...: A9L180492-006 **Work Order #...:** LRCRM1AJ **Matrix.....:** SO
Date Sampled...: 12/17/09 12:50 **Date Received..:** 12/18/09
Prep Date.....: 12/28/09 **Analysis Date..:** 12/28/09
Prep Batch #...: 9363092
Dilution Factor: 1
% Moisture.....: 12 **Method.....:** SW846 8015A MOD

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**210**	**110**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	99	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

GC Semivolatiles

Lot-Sample #...:	A9L180492-006	**Work Order #...:**	LRCRM1AC	**Matrix.....:**	SO
Date Sampled...:	12/17/09 12:50	**Date Received..:**	12/18/09		
Prep Date.....:	12/19/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9353014				
Dilution Factor:	10				
% Moisture.....:	12	**Method.....:**	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**130**	**31**	**mg/kg**
C10-C20	**120**	**23**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	34 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

TOTAL Metals

Lot-Sample #...: A9L180492-006 **Matrix.....:** SO
Date Sampled...: 12/17/09 12:50 **Date Received..:** 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	9.3	1.1	mg/kg	SW846 6010B	12/21-12/23/09	LRCRM1AE
		Dilution Factor: 1				
Cadmium	0.33	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRM1AF
		Dilution Factor: 1				
Chromium	10.6	0.57	mg/kg	SW846 6010B	12/21-12/23/09	LRCRM1AG
		Dilution Factor: 1				
Lead	115	0.34	mg/kg	SW846 6010B	12/21-12/23/09	LRCRM1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-073(0-2')

General Chemistry

Lot-Sample #...: A9L180492-006 **Work Order #...:** LRCRM **Matrix.....:** SO
Date Sampled...: 12/17/09 12:50 **Date Received..:** 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	**302**	**33.9**	**mg/kg**	**SW846 9030B/9034**	**12/23/09**	**9357096**
		Dilution Factor: 1				
Corrosivity	**11.0**		**No Units**	**SW846 9045A**	**12/19/09**	**9353120**
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.90	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	**88.4**	**10.0**	**%**	**MCAWW 160.3 MOD**	**12/22-12/23/09**	**9356363**
		Dilution Factor: 1				
Total Cyanide	**4.6**	**0.57**	**mg/kg**	**MCAWW 335.2 CLP-M**	**12/28/09**	**9362384**
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

GC/MS Volatiles

Lot-Sample #...: A9L180492-007 **Work Order #...:** LRCRP1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09
Prep Date.....: 12/21/09 **Analysis Date..:** 12/21/09
Prep Batch #...: 9356203
Dilution Factor: 1
% Moisture.....: 12 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	11	ug/kg
Bromomethane	ND	11	ug/kg
Vinyl chloride	ND	2.3	ug/kg
Chloroethane	ND	11	ug/kg
Methylene chloride	ND	5.7	ug/kg
Acetone	ND	23	ug/kg
Carbon disulfide	ND	5.7	ug/kg
1,1-Dichloroethene	ND	5.7	ug/kg
1,1-Dichloroethane	ND	5.7	ug/kg
1,2-Dichloroethene (total)	ND	5.7	ug/kg
Chloroform	ND	5.7	ug/kg
1,2-Dichloroethane	ND	5.7	ug/kg
2-Butanone	ND	23	ug/kg
1,1,1-Trichloroethane	ND	5.7	ug/kg
Carbon tetrachloride	ND	5.7	ug/kg
Bromodichloromethane	ND	5.7	ug/kg
1,2-Dichloropropane	ND	5.7	ug/kg
cis-1,3-Dichloropropene	ND	5.7	ug/kg
Trichloroethene	ND	5.7	ug/kg
Dibromochloromethane	ND	5.7	ug/kg
1,1,2-Trichloroethane	ND	5.7	ug/kg
Benzene	ND	5.7	ug/kg
trans-1,3-Dichloropropene	ND	5.7	ug/kg
Bromoform	ND	5.7	ug/kg
4-Methyl-2-pentanone	ND	23	ug/kg
2-Hexanone	ND	23	ug/kg
Tetrachloroethene	ND	5.7	ug/kg
1,1,2,2-Tetrachloroethane	ND	5.7	ug/kg
Toluene	ND	5.7	ug/kg
Chlorobenzene	ND	5.7	ug/kg
Ethylbenzene	ND	5.7	ug/kg
Styrene	ND	5.7	ug/kg
Xylenes (total)	**26**	**5.7**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	89	(59 - 138)
1,2-Dichloroethane-d4	83	(61 - 130)
Toluene-d8	102	(60 - 143)
4-Bromofluorobenzene	118	(47 - 158)

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HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

GC/MS Volatiles

Lot-Sample #...: A9L180492-007 Work Order #...: LRCRP1AK Matrix.....: SO

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-007 Work Order #...: LRCRP1AD Matrix.....: SO
Date Sampled...: 12/17/09 13:20 Date Received..: 12/18/09
Prep Date.....: 12/19/09 Analysis Date..: 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 10
% Moisture.....: 12 Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	2900	76	ug/kg
Benzo(b)fluoranthene	2500	76	ug/kg
Benzo(k)fluoranthene	940	76	ug/kg
Benzo(a)pyrene	2100	76	ug/kg
Chrysene	2600	76	ug/kg
Dibenz(a,h)anthracene	460	76	ug/kg
Indeno(1,2,3-cd)pyrene	1100	76	ug/kg
Naphthalene	230	76	ug/kg
Acenaphthene	190	76	ug/kg
Acenaphthylene	100	76	ug/kg
Anthracene	860	76	ug/kg
Benzo(ghi)perylene	1200	76	ug/kg
Fluoranthene	5100	76	ug/kg
Fluorene	210	76	ug/kg
2-Methylnaphthalene	180	76	ug/kg
Phenanthrene	2500	76	ug/kg
Pyrene	6100	76	ug/kg
1-Methylnaphthalene	150	76	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	99 DIL	(24 - 112)
2-Fluorobiphenyl	70 DIL	(34 - 110)
Terphenyl-d14	110 DIL	(41 - 119)
Phenol-d5	73 DIL	(28 - 110)
2-Fluorophenol	90 DIL	(26 - 110)
2,4,6-Tribromophenol	64 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

GC Volatiles

Lot-Sample #...: A9L180492-007	**Work Order #...:** LRCRP1AJ	**Matrix.....:** SO	
Date Sampled...: 12/17/09 13:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/23/09	**Analysis Date..:** 12/24/09		
Prep Batch #...: 9358085			
Dilution Factor: 5			
% Moisture.....: 12	**Method.....:** SW846 8015A MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	**780**	**570**	**ug/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	99	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

GC Semivolatiles

Lot-Sample #...: A9L180492-007	**Work Order #...:** LRCRP1AC	**Matrix.....:** SO	
Date Sampled...: 12/17/09 13:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/19/09	**Analysis Date..:** 12/23/09		
Prep Batch #...: 9353014			
Dilution Factor: 50			
% Moisture.....: 12	**Method.....:** SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**610**	**150**	**mg/kg**
C10-C20	**100 J**	**110**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	35 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

TOTAL Metals

Lot-Sample #...: A9L180492-007 Matrix.....: SO
Date Sampled...: 12/17/09 13:20 Date Received..: 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	4.7	1.1	mg/kg	SW846 6010B	12/21-12/23/09	LRCRP1AE
		Dilution Factor: 1				
Cadmium	0.23	0.23	mg/kg	SW846 6010B	12/21-12/23/09	LRCRP1AF
		Dilution Factor: 1				
Chromium	18.6	0.57	mg/kg	SW846 6010B	12/21-12/23/09	LRCRP1AG
		Dilution Factor: 1				
Lead	21.3	0.34	mg/kg	SW846 6010B	12/21-12/23/09	LRCRP1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(0-2')

General Chemistry

Lot-Sample #...: A9L180492-007 **Work Order #...:** LRCRP **Matrix.....:** SO
Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09
% Moisture.....: 12

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	**61.6**	**34.1**	**mg/kg**	**SW846 9030B/9034**	**12/23/09**	**9357096**
		Dilution Factor: 1				
Corrosivity	**11.5**		**No Units**	**SW846 9045A**	**12/19/09**	**9353120**
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.91	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	**87.9**	**10.0**	**%**	**MCAWW 160.3 MOD**	**12/22-12/23/09**	**9356363**
		Dilution Factor: 1				
Total Cyanide	ND	0.57	mg/kg	MCAWW 335.2 CLP-M	12/28/09	9362384
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

GC/MS Volatiles

Lot-Sample #...: A9L180492-008 **Work Order #...:** LRCRR1AK **Matrix.....:** SO
Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09
Prep Date.....: 12/21/09 **Analysis Date..:** 12/21/09
Prep Batch #...: 9356203
Dilution Factor: 1
% Moisture.....: 9.4 **Method.....:** SW846 8260A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Chloromethane	ND	11	ug/kg
Bromomethane	ND	11	ug/kg
Vinyl chloride	ND	2.2	ug/kg
Chloroethane	ND	11	ug/kg
Methylene chloride	ND	5.5	ug/kg
Acetone	ND	22	ug/kg
Carbon disulfide	ND	5.5	ug/kg
1,1-Dichloroethene	ND	5.5	ug/kg
1,1-Dichloroethane	ND	5.5	ug/kg
1,2-Dichloroethene (total)	ND	5.5	ug/kg
Chloroform	ND	5.5	ug/kg
1,2-Dichloroethane	ND	5.5	ug/kg
2-Butanone	ND	22	ug/kg
1,1,1-Trichloroethane	ND	5.5	ug/kg
Carbon tetrachloride	ND	5.5	ug/kg
Bromodichloromethane	ND	5.5	ug/kg
1,2-Dichloropropane	ND	5.5	ug/kg
cis-1,3-Dichloropropene	ND	5.5	ug/kg
Trichloroethene	ND	5.5	ug/kg
Dibromochloromethane	ND	5.5	ug/kg
1,1,2-Trichloroethane	ND	5.5	ug/kg
Benzene	ND	5.5	ug/kg
trans-1,3-Dichloropropene	ND	5.5	ug/kg
Bromoform	ND	5.5	ug/kg
4-Methyl-2-pentanone	ND	22	ug/kg
2-Hexanone	ND	22	ug/kg
Tetrachloroethene	ND	5.5	ug/kg
1,1,2,2-Tetrachloroethane	ND	5.5	ug/kg
Toluene	ND	5.5	ug/kg
Chlorobenzene	ND	5.5	ug/kg
Ethylbenzene	ND	5.5	ug/kg
Styrene	ND	5.5	ug/kg
Xylenes (total)	ND	5.5	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	102	(59 - 138)
1,2-Dichloroethane-d4	78	(61 - 130)
Toluene-d8	103	(60 - 143)
4-Bromofluorobenzene	111	(47 - 158)

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HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

GC/MS Volatiles

Lot-Sample #...: A9L180492-008 **Work Order #...:** LRCRR1AK **Matrix.....:** SO

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

GC/MS Semivolatiles

Lot-Sample #...: A9L180492-008	**Work Order #...:** LRCRR1AD	**Matrix.....:** SO	
Date Sampled...: 12/17/09 13:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/19/09	**Analysis Date..:** 12/24/09		
Prep Batch #...: 9353017			
Dilution Factor: 4			
% Moisture.....: 9.4	**Method.....:** SW846 8270C		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzo(a)anthracene	2900	29	ug/kg
Benzo(b)fluoranthene	3200	29	ug/kg
Benzo(k)fluoranthene	1200	29	ug/kg
Benzo(a)pyrene	2500	29	ug/kg
Chrysene	2600	29	ug/kg
Dibenz(a,h)anthracene	500	29	ug/kg
Indeno(1,2,3-cd)pyrene	1500	29	ug/kg
Naphthalene	820	29	ug/kg
Acenaphthene	570	29	ug/kg
Acenaphthylene	72	29	ug/kg
Anthracene	1300	29	ug/kg
Benzo(ghi)perylene	1600	29	ug/kg
Fluoranthene	5500	29	ug/kg
Fluorene	570	29	ug/kg
2-Methylnaphthalene	1000	29	ug/kg
Phenanthrene	4800	29	ug/kg
Pyrene	5400	29	ug/kg
1-Methylnaphthalene	610	29	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	68 DIL	(24 - 112)
2-Fluorobiphenyl	56 DIL	(34 - 110)
Terphenyl-d14	87 DIL	(41 - 119)
Phenol-d5	70 DIL	(28 - 110)
2-Fluorophenol	72 DIL	(26 - 110)
2,4,6-Tribromophenol	44 DIL	(10 - 118)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

GC Volatiles

Lot-Sample #...: A9L180492-008	**Work Order #...:** LRCRR1AJ	**Matrix.....:** SO	
Date Sampled...: 12/17/09 13:20	**Date Received..:** 12/18/09		
Prep Date.....: 12/23/09	**Analysis Date..:** 12/23/09		
Prep Batch #...: 9358085			
Dilution Factor: 1			
% Moisture.....: 9.4	**Method.....:** SW846 8015A MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Gasoline Range Organics (C6-C12)	ND	110	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	99	(10 - 150)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

GC Semivolatiles

Lot-Sample #...:	A9L180492-008	**Work Order #...:**	LRCRR1AC	**Matrix.....:**	SO
Date Sampled...:	12/17/09 13:20	**Date Received..:**	12/18/09		
Prep Date.....:	12/19/09	**Analysis Date..:**	12/23/09		
Prep Batch #...:	9353014				
Dilution Factor:	5				
% Moisture.....:	9.4	**Method.....:**	SW846 8015B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
C20-C34	**110**	**15**	**mg/kg**
C10-C20	**48**	**11**	**mg/kg**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	25 DIL	(10 - 110)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

TOTAL Metals

Lot-Sample #...: A9L180492-008 Matrix.....: SO
Date Sampled...: 12/17/09 13:20 Date Received..: 12/18/09
% Moisture.....: 9.4

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 9354052						
Arsenic	10.4	1.1	mg/kg	SW846 6010B	12/21-12/23/09	LRCRR1AE
		Dilution Factor: 1				
Cadmium	ND	0.22	mg/kg	SW846 6010B	12/21-12/23/09	LRCRR1AF
		Dilution Factor: 1				
Chromium	8.9	0.55	mg/kg	SW846 6010B	12/21-12/23/09	LRCRR1AG
		Dilution Factor: 1				
Lead	107	0.33	mg/kg	SW846 6010B	12/21-12/23/09	LRCRR1AH
		Dilution Factor: 1				

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

HZW Environmental Consultants

Client Sample ID: HB-075(2-4')

General Chemistry

Lot-Sample #...: A9L180492-008 **Work Order #...:** LRCRR **Matrix.....:** SO
Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09
% Moisture.....: 9.4

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide	ND	33.1	mg/kg	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1				
Corrosivity	**8.7**		**No Units**	**SW846 9045A**	**12/19/09**	**9353120**
		Dilution Factor: 1				
Hexavalent Chromium	ND	0.88	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids	**90.6**	**10.0**	**%**	**MCAWW 160.3 MOD**	**12/22-12/23/09**	**9356363**
		Dilution Factor: 1				
Total Cyanide	ND	0.55	mg/kg	MCAWW 335.2 CLP-M	12/28/09	9362384
		Dilution Factor: 1				

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

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QUALITY CONTROL SECTION

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRGQR1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L220000-203

Prep Date.....: 12/21/09
Analysis Date..: 12/21/09 **Prep Batch #...:** 9356203
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Chloromethane	ND	10	ug/kg	SW846 8260A
Bromomethane	ND	10	ug/kg	SW846 8260A
Vinyl chloride	ND	2.0	ug/kg	SW846 8260A
Chloroethane	ND	10	ug/kg	SW846 8260A
Methylene chloride	ND	5.0	ug/kg	SW846 8260A
Acetone	ND	20	ug/kg	SW846 8260A
Carbon disulfide	ND	5.0	ug/kg	SW846 8260A
1,1-Dichloroethene	ND	5.0	ug/kg	SW846 8260A
1,1-Dichloroethane	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloroethene (total)	ND	5.0	ug/kg	SW846 8260A
Chloroform	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloroethane	ND	5.0	ug/kg	SW846 8260A
2-Butanone	ND	20	ug/kg	SW846 8260A
1,1,1-Trichloroethane	ND	5.0	ug/kg	SW846 8260A
Carbon tetrachloride	ND	5.0	ug/kg	SW846 8260A
Bromodichloromethane	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloropropane	ND	5.0	ug/kg	SW846 8260A
cis-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260A
Trichloroethene	ND	5.0	ug/kg	SW846 8260A
Dibromochloromethane	ND	5.0	ug/kg	SW846 8260A
1,1,2-Trichloroethane	ND	5.0	ug/kg	SW846 8260A
Benzene	ND	5.0	ug/kg	SW846 8260A
trans-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260A
Bromoform	ND	5.0	ug/kg	SW846 8260A
4-Methyl-2-pentanone	ND	20	ug/kg	SW846 8260A
2-Hexanone	ND	20	ug/kg	SW846 8260A
Tetrachloroethene	ND	5.0	ug/kg	SW846 8260A
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	SW846 8260A
Toluene	ND	5.0	ug/kg	SW846 8260A
Chlorobenzene	ND	5.0	ug/kg	SW846 8260A
Ethylbenzene	ND	5.0	ug/kg	SW846 8260A
Styrene	ND	5.0	ug/kg	SW846 8260A
Xylenes (total)	ND	5.0	ug/kg	SW846 8260A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	99	(59 - 138)
1,2-Dichloroethane-d4	76	(61 - 130)
Toluene-d8	95	(60 - 143)
4-Bromofluorobenzene	91	(47 - 158)

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 Work Order #...: LRGQR1AA Matrix.....: SOLID

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRH4C1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L220000-563

Prep Date.....: 12/20/09
Analysis Date..: 12/22/09 **Prep Batch #...:** 9356563
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acetone	ND	1000	ug/kg	SW846 8260A
Benzene	ND	250	ug/kg	SW846 8260A
Bromodichloromethane	ND	250	ug/kg	SW846 8260A
Bromoform	ND	250	ug/kg	SW846 8260A
Bromomethane	ND	500	ug/kg	SW846 8260A
2-Butanone	ND	1000	ug/kg	SW846 8260A
Carbon disulfide	ND	250	ug/kg	SW846 8260A
Carbon tetrachloride	ND	250	ug/kg	SW846 8260A
Chlorobenzene	ND	250	ug/kg	SW846 8260A
Dibromochloromethane	ND	250	ug/kg	SW846 8260A
Chloroethane	ND	500	ug/kg	SW846 8260A
Chloroform	ND	250	ug/kg	SW846 8260A
Chloromethane	ND	500	ug/kg	SW846 8260A
1,1-Dichloroethane	ND	250	ug/kg	SW846 8260A
1,2-Dichloroethane	ND	250	ug/kg	SW846 8260A
1,1-Dichloroethene	ND	250	ug/kg	SW846 8260A
1,2-Dichloroethene (total)	ND	250	ug/kg	SW846 8260A
1,2-Dichloropropane	ND	250	ug/kg	SW846 8260A
cis-1,3-Dichloropropene	ND	250	ug/kg	SW846 8260A
trans-1,3-Dichloropropene	ND	250	ug/kg	SW846 8260A
Ethylbenzene	ND	250	ug/kg	SW846 8260A
2-Hexanone	ND	1000	ug/kg	SW846 8260A
Methylene chloride	ND	250	ug/kg	SW846 8260A
4-Methyl-2-pentanone	ND	1000	ug/kg	SW846 8260A
Styrene	ND	250	ug/kg	SW846 8260A
1,1,2,2-Tetrachloroethane	ND	250	ug/kg	SW846 8260A
Tetrachloroethene	ND	250	ug/kg	SW846 8260A
Toluene	ND	250	ug/kg	SW846 8260A
1,1,1-Trichloroethane	ND	250	ug/kg	SW846 8260A
1,1,2-Trichloroethane	ND	250	ug/kg	SW846 8260A
Trichloroethene	ND	250	ug/kg	SW846 8260A
Vinyl chloride	ND	100	ug/kg	SW846 8260A
Xylenes (total)	ND	250	ug/kg	SW846 8260A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	100	(59 - 138)
1,2-Dichloroethane-d4	105	(61 - 130)
Toluene-d8	97	(60 - 143)
4-Bromofluorobenzene	92	(47 - 158)

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 Work Order #...: LRH4C1AA Matrix.....: SOLID

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRNH41AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L280000-414

Prep Date.....: 12/23/09
Analysis Date..: 12/23/09 **Prep Batch #...:** 9362414
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Chloromethane	ND	10	ug/kg	SW846 8260A
Bromomethane	ND	10	ug/kg	SW846 8260A
Vinyl chloride	ND	2.0	ug/kg	SW846 8260A
Chloroethane	ND	10	ug/kg	SW846 8260A
Methylene chloride	ND	5.0	ug/kg	SW846 8260A
Acetone	ND	20	ug/kg	SW846 8260A
Carbon disulfide	ND	5.0	ug/kg	SW846 8260A
1,1-Dichloroethene	ND	5.0	ug/kg	SW846 8260A
1,1-Dichloroethane	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloroethene (total)	ND	5.0	ug/kg	SW846 8260A
Chloroform	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloroethane	ND	5.0	ug/kg	SW846 8260A
2-Butanone	ND	20	ug/kg	SW846 8260A
1,1,1-Trichloroethane	ND	5.0	ug/kg	SW846 8260A
Carbon tetrachloride	ND	5.0	ug/kg	SW846 8260A
Bromodichloromethane	ND	5.0	ug/kg	SW846 8260A
1,2-Dichloropropane	ND	5.0	ug/kg	SW846 8260A
cis-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260A
Trichloroethene	ND	5.0	ug/kg	SW846 8260A
Dibromochloromethane	ND	5.0	ug/kg	SW846 8260A
1,1,2-Trichloroethane	ND	5.0	ug/kg	SW846 8260A
Benzene	ND	5.0	ug/kg	SW846 8260A
trans-1,3-Dichloropropene	ND	5.0	ug/kg	SW846 8260A
Bromoform	ND	5.0	ug/kg	SW846 8260A
4-Methyl-2-pentanone	ND	20	ug/kg	SW846 8260A
2-Hexanone	ND	20	ug/kg	SW846 8260A
Tetrachloroethene	ND	5.0	ug/kg	SW846 8260A
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	SW846 8260A
Toluene	ND	5.0	ug/kg	SW846 8260A
Chlorobenzene	ND	5.0	ug/kg	SW846 8260A
Ethylbenzene	ND	5.0	ug/kg	SW846 8260A
Styrene	ND	5.0	ug/kg	SW846 8260A
Xylenes (total)	ND	5.0	ug/kg	SW846 8260A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	95	(59 - 138)
1,2-Dichloroethane-d4	89	(61 - 130)
Toluene-d8	96	(60 - 143)
4-Bromofluorobenzene	88	(47 - 158)

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRNH41AA **Matrix.....:** SOLID

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC/MS Semivolatiles

Client Lot #...: A9L180492 **Work Order #...:** LRDRM1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L190000-017

Prep Date.....: 12/19/09
Analysis Date..: 12/24/09 **Prep Batch #...:** 9353017
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acenaphthene	ND	6.7	ug/kg	SW846 8270C
Acenaphthylene	ND	6.7	ug/kg	SW846 8270C
Anthracene	ND	6.7	ug/kg	SW846 8270C
Benzo(a)anthracene	ND	6.7	ug/kg	SW846 8270C
Benzo(b)fluoranthene	ND	6.7	ug/kg	SW846 8270C
Benzo(k)fluoranthene	ND	6.7	ug/kg	SW846 8270C
Benzo(ghi)perylene	ND	6.7	ug/kg	SW846 8270C
Benzo(a)pyrene	ND	6.7	ug/kg	SW846 8270C
Chrysene	ND	6.7	ug/kg	SW846 8270C
Dibenz(a,h)anthracene	ND	6.7	ug/kg	SW846 8270C
Fluoranthene	ND	6.7	ug/kg	SW846 8270C
Fluorene	ND	6.7	ug/kg	SW846 8270C
Indeno(1,2,3-cd)pyrene	ND	6.7	ug/kg	SW846 8270C
2-Methylnaphthalene	ND	6.7	ug/kg	SW846 8270C
Naphthalene	ND	6.7	ug/kg	SW846 8270C
Phenanthrene	ND	6.7	ug/kg	SW846 8270C
Pyrene	ND	6.7	ug/kg	SW846 8270C

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	82	(24 - 112)
2-Fluorobiphenyl	74	(34 - 110)
Terphenyl-d14	117	(41 - 119)
Phenol-d5	87	(28 - 110)
2-Fluorophenol	92	(26 - 110)
2,4,6-Tribromophenol	51	(10 - 118)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRE0V1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L200000-104

Prep Date.....: 12/19/09
Analysis Date..: 12/19/09 **Prep Batch #...:** 9354104
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Gasoline Range Organics (C6-C12)	ND	100	ug/kg	SW846 8015A MOD

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	99	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRMPJ1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L240000-085

Prep Date.....: 12/23/09
Analysis Date..: 12/23/09 **Prep Batch #...:** 9358085
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Gasoline Range Organics (C6-C12)	ND	100	ug/kg	SW846 8015A MOD

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	99	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRNPP1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L290000-092

Prep Date.....: 12/28/09
Analysis Date..: 12/28/09 **Prep Batch #...:** 9363092
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Gasoline Range Organics (C6-C12)	ND	100	ug/kg	SW846 8015A MOD

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	101	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: A9L180492 **Work Order #...:** LRDRJ1AA **Matrix.....:** SOLID
MB Lot-Sample #: A9L190000-014

Prep Date.....: 12/19/09
Analysis Date..: 12/23/09 **Prep Batch #...:** 9353014
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
C20-C34	ND	2.7	mg/kg	SW846 8015B
C10-C20	ND	2.0	mg/kg	SW846 8015B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	33	(10 - 110)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A9L180492 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A9L200000-052 **Prep Batch #...:** 9354052						
Arsenic	ND	1.0	mg/kg	SW846 6010B	12/21-12/23/09	LREWX1AA
		Dilution Factor: 1				
Cadmium	ND	0.20	mg/kg	SW846 6010B	12/21-12/23/09	LREWX1AC
		Dilution Factor: 1				
Chromium	ND	0.50	mg/kg	SW846 6010B	12/21-12/23/09	LREWX1AD
		Dilution Factor: 1				
Lead	ND	0.30	mg/kg	SW846 6010B	12/21-12/23/09	LREWX1AE
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A9L180492 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide		Work Order #: LRKCN1AA		MB Lot-Sample #:	A9L230000-096	
	ND	30.0	mg/kg	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1				
Hexavalent Chromium		Work Order #: LRJPH1AA		MB Lot-Sample #:	A9L230000-236	
	ND	0.80	mg/kg	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1				
Percent Solids		Work Order #: LRG831AA		MB Lot-Sample #:	A9L220000-363	
	ND	10.0	%	MCAWW 160.3 MOD	12/22-12/23/09	9356363
		Dilution Factor: 1				
Total Cyanide		Work Order #: LRKK41AA		MB Lot-Sample #:	A9L230000-388	
	ND	0.50	mg/kg	MCAWW 335.2 CLP-M	12/23/09	9357388
		Dilution Factor: 1				
Total Cyanide		Work Order #: LRNER1AA		MB Lot-Sample #:	A9L280000-384	
	ND	0.50	mg/kg	MCAWW 335.2 CLP-M	12/28/09	9362384
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRGQR1AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L220000-203 LRGQR1AD-LCSD
Prep Date.....: 12/21/09 **Analysis Date..:** 12/21/09
Prep Batch #...: 9356203
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,1-Dichloroethene	**107**	**(55 - 142)**			**SW846 8260A**
	105	**(55 - 142)**	**2.5**	**(0-27)**	**SW846 8260A**
Trichloroethene	**104**	**(70 - 131)**			**SW846 8260A**
	102	**(70 - 131)**	**1.7**	**(0-23)**	**SW846 8260A**
Benzene	**99**	**(75 - 129)**			**SW846 8260A**
	100	**(75 - 129)**	**1.3**	**(0-20)**	**SW846 8260A**
Toluene	**99**	**(71 - 130)**			**SW846 8260A**
	101	**(71 - 130)**	**2.5**	**(0-24)**	**SW846 8260A**
Chlorobenzene	**96**	**(75 - 127)**			**SW846 8260A**
	97	**(75 - 127)**	**1.6**	**(0-22)**	**SW846 8260A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	100	(59 - 138)
	104	(59 - 138)
1,2-Dichloroethane-d4	78	(61 - 130)
	78	(61 - 130)
Toluene-d8	97	(60 - 143)
	101	(60 - 143)
4-Bromofluorobenzene	96	(47 - 158)
	95	(47 - 158)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRH4C1AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L220000-563 LRH4C1AD-LCSD
Prep Date.....: 12/20/09 **Analysis Date..:** 12/22/09
Prep Batch #...: 9356563
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Benzene	**100**	**(75 - 129)**			**SW846 8260A**
	92	**(75 - 129)**	**7.9**	**(0-20)**	**SW846 8260A**
Chlorobenzene	**96**	**(75 - 127)**			**SW846 8260A**
	91	**(75 - 127)**	**5.4**	**(0-22)**	**SW846 8260A**
1,1-Dichloroethene	**100**	**(55 - 142)**			**SW846 8260A**
	91	**(55 - 142)**	**9.4**	**(0-27)**	**SW846 8260A**
Toluene	**93**	**(71 - 130)**			**SW846 8260A**
	88	**(71 - 130)**	**5.2**	**(0-24)**	**SW846 8260A**
Trichloroethene	**96**	**(70 - 131)**			**SW846 8260A**
	92	**(70 - 131)**	**4.5**	**(0-23)**	**SW846 8260A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	111	(59 - 138)
	104	(59 - 138)
1,2-Dichloroethane-d4	111	(61 - 130)
	106	(61 - 130)
Toluene-d8	101	(60 - 143)
	95	(60 - 143)
4-Bromofluorobenzene	100	(47 - 158)
	95	(47 - 158)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRNH41AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L280000-414 LRNH41AD-LCSD
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9362414
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,1-Dichloroethene	**118**	**(55 - 142)**			**SW846 8260A**
	124	**(55 - 142)**	**4.9**	**(0-27)**	**SW846 8260A**
Trichloroethene	**107**	**(70 - 131)**			**SW846 8260A**
	102	**(70 - 131)**	**4.2**	**(0-23)**	**SW846 8260A**
Benzene	**103**	**(75 - 129)**			**SW846 8260A**
	99	**(75 - 129)**	**3.8**	**(0-20)**	**SW846 8260A**
Toluene	**100**	**(71 - 130)**			**SW846 8260A**
	91	**(71 - 130)**	**9.6**	**(0-24)**	**SW846 8260A**
Chlorobenzene	**99**	**(75 - 127)**			**SW846 8260A**
	94	**(75 - 127)**	**5.3**	**(0-22)**	**SW846 8260A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	96	(59 - 138)
	98	(59 - 138)
1,2-Dichloroethane-d4	87	(61 - 130)
	87	(61 - 130)
Toluene-d8	100	(60 - 143)
	96	(60 - 143)
4-Bromofluorobenzene	93	(47 - 158)
	92	(47 - 158)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Semivolatiles

Client Lot #...: A9L180492 **Work Order #...:** LRDRM1AC **Matrix.....:** SOLID
LCS Lot-Sample#: A9L190000-017
Prep Date.....: 12/19/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9353017
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,2,4-Trichloro-benzene	**63**	**(43 - 110)**	**SW846 8270C**
2,4-Dinitrotoluene	**83**	**(55 - 116)**	**SW846 8270C**
N-Nitrosodi-n-propyl-amine	**75**	**(40 - 114)**	**SW846 8270C**
1,4-Dichlorobenzene	**64**	**(38 - 110)**	**SW846 8270C**
Pentachlorophenol	**56**	**(10 - 110)**	**SW846 8270C**
Phenol	**77**	**(39 - 110)**	**SW846 8270C**
2-Chlorophenol	**70**	**(39 - 110)**	**SW846 8270C**
4-Chloro-3-methylphenol	**84**	**(42 - 110)**	**SW846 8270C**
4-Nitrophenol	**85**	**(24 - 117)**	**SW846 8270C**
Acenaphthene	**71**	**(46 - 110)**	**SW846 8270C**
Pyrene	**89**	**(58 - 113)**	**SW846 8270C**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	72	(24 - 112)
2-Fluorobiphenyl	64	(34 - 110)
Terphenyl-d14	97	(41 - 119)
Phenol-d5	75	(28 - 110)
2-Fluorophenol	80	(26 - 110)
2,4,6-Tribromophenol	57	(10 - 118)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRE0V1AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L200000-104 LRE0V1AD-LCSD
Prep Date.....: 12/19/09 **Analysis Date..:** 12/19/09
Prep Batch #...: 9354104
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics (C6-C12)	111	(60 - 142)			**SW846 8015A MOD**
	109	**(60 - 142)**	**1.8**	**(0-27)**	**SW846 8015A MOD**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	104	(10 - 150)
	101	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRMPJ1AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L240000-085 LRMPJ1AD-LCSD
Prep Date.....: 12/23/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9358085
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics (C6-C12)	**98**	**(60 - 142)**			**SW846 8015A MOD**
	112	**(60 - 142)**	**13**	**(0-27)**	**SW846 8015A MOD**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	102	(10 - 150)
	104	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRNPP1AC-LCS **Matrix.....:** SOLID
LCS Lot-Sample#: A9L290000-092 LRNPP1AD-LCSD
Prep Date.....: 12/28/09 **Analysis Date..:** 12/29/09
Prep Batch #...: 9363092
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics (C6-C12)	**106**	**(60 - 142)**			**SW846 8015A MOD**
	108	**(60 - 142)**	**2.3**	**(0-27)**	**SW846 8015A MOD**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	102	(10 - 150)
	101	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: A9L180492 **Work Order #...:** LRDRJ1AC **Matrix.....:** SOLID
LCS Lot-Sample#: A9L190000-014
Prep Date.....: 12/19/09 **Analysis Date..:** 12/23/09
Prep Batch #...: 9353014
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
TPH (as Diesel)	**79**	**(47 - 138)**	**SW846 8015B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
C9 (nonane)	34	(10 - 110)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A9L180492 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A9L200000-052 **Prep Batch #...:** 9354052					
Arsenic	95	(80 - 120)	SW846 6010B	12/21-12/23/09	LREWX1AF
		Dilution Factor: 1			
Cadmium	97	(80 - 120)	SW846 6010B	12/21-12/23/09	LREWX1AG
		Dilution Factor: 1			
Chromium	95	(80 - 120)	SW846 6010B	12/21-12/23/09	LREWX1AH
		Dilution Factor: 1			
Lead	99	(80 - 120)	SW846 6010B	12/21-12/23/09	LREWX1AJ
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A9L180492 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Acid-soluble sulfide		Work Order #: LRKCN1AC	LCS Lot-Sample#: A9L230000-096		
	87	(70 - 130)	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1			
Corrosivity		Work Order #: LREE21AA	LCS Lot-Sample#: A9L190000-120		
	99	(97 - 103)	SW846 9045A	12/19/09	9353120
		Dilution Factor: 1			
Hexavalent Chromium		Work Order #: LRJPH1AC	LCS Lot-Sample#: A9L230000-236		
	110	(80 - 120)	SW846 7196A	12/23-12/24/09	9357236
		Dilution Factor: 1			
Total Cyanide		Work Order #: LRKK41AC	LCS Lot-Sample#: A9L230000-388		
	102	(68 - 123)	MCAWW 335.2 CLP-M	12/23/09	9357388
		Dilution Factor: 1			
Total Cyanide		Work Order #: LRNER1AC	LCS Lot-Sample#: A9L280000-384		
	107	(68 - 123)	MCAWW 335.2 CLP-M	12/28/09	9362384
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRD521AF-MS **Matrix.....:** SOLID
MS Lot-Sample #: A9L190450-001 LRD521AG-MSD
Date Sampled...: 12/18/09 11:45 **Date Received..:** 12/19/09
Prep Date.....: 12/21/09 **Analysis Date..:** 12/21/09
Prep Batch #...: 9356203
Dilution Factor: 0.92 **% Moisture.....:** 19

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,1-Dichloroethene	97	(43 - 147)			SW846 8260A
	88	(43 - 147)	16	(0-27)	SW846 8260A
Trichloroethene	73	(46 - 143)			SW846 8260A
	66	(46 - 143)	17	(0-23)	SW846 8260A
Benzene	82	(55 - 138)			SW846 8260A
	73	(55 - 138)	19	(0-20)	SW846 8260A
Toluene	87	(46 - 147)			SW846 8260A
	57 p	(46 - 147)	45	(0-24)	SW846 8260A
Chlorobenzene	65	(49 - 139)			SW846 8260A
	47 a,p	(49 - 139)	40	(0-22)	SW846 8260A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	107	(59 - 138)
	104	(59 - 138)
1,2-Dichloroethane-d4	83	(61 - 130)
	82	(61 - 130)
Toluene-d8	113	(60 - 143)
	100	(60 - 143)
4-Bromofluorobenzene	174 *	(47 - 158)
	107	(47 - 158)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

p Relative percent difference (RPD) is outside stated control limits.

a Spiked analyte recovery is outside stated control limits.

* Surrogate recovery is outside stated control limits.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRKXH1AG-MS **Matrix.....:** SOLID
MS Lot-Sample #: A9L230573-001 LRKXH1AH-MSD
Date Sampled...: 12/23/09 10:30 **Date Received..:** 12/23/09
Prep Date.....: 12/24/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9362414
Dilution Factor: 1 **% Moisture.....:** 18

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,1-Dichloroethene	**108**	**(43 - 147)**			**SW846 8260A**
	108	**(43 - 147)**	**0.06**	**(0-27)**	**SW846 8260A**
Trichloroethene	**93**	**(46 - 143)**			**SW846 8260A**
	90	**(46 - 143)**	**3.0**	**(0-23)**	**SW846 8260A**
Benzene	**93**	**(55 - 138)**			**SW846 8260A**
	89	**(55 - 138)**	**4.2**	**(0-20)**	**SW846 8260A**
Toluene	**88**	**(46 - 147)**			**SW846 8260A**
	83	**(46 - 147)**	**6.4**	**(0-24)**	**SW846 8260A**
Chlorobenzene	**83**	**(49 - 139)**			**SW846 8260A**
	81	**(49 - 139)**	**2.4**	**(0-22)**	**SW846 8260A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	96	(59 - 138)
	98	(59 - 138)
1,2-Dichloroethane-d4	84	(61 - 130)
	86	(61 - 130)
Toluene-d8	97	(60 - 143)
	100	(60 - 143)
4-Bromofluorobenzene	88	(47 - 158)
	93	(47 - 158)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LRCRP1AQ-MS **Matrix.....:** SO
MS Lot-Sample #: A9L180492-007 LRCRP1AR-MSD
Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09
Prep Date.....: 12/23/09 **Analysis Date..:** 12/24/09
Prep Batch #...: 9358085
Dilution Factor: 5

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics (C6-C12)	**45**	**(10 - 142)**			**SW846 8015A MOD**
	21	**(10 - 142)**	**24**	**(0-94)**	**SW846 8015A MOD**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	100	(10 - 150)
	98	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #...: A9L180492 **Work Order #...:** LQ8TD1AJ-MS **Matrix.....:** SOLID
MS Lot-Sample #: A9L170476-009 LQ8TD1AK-MSD
Date Sampled...: 12/16/09 15:40 **Date Received..:** 12/17/09
Prep Date.....: 12/29/09 **Analysis Date..:** 12/29/09
Prep Batch #...: 9363092
Dilution Factor: 10 **% Moisture.....:** 18

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Gasoline Range Organics (C6-C12)	112	(10 - 142)			SW846 8015A MOD
	178 a	**(10 - 142)**	**25**	**(0-94)**	**SW846 8015A MOD**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Trifluorotoluene	101	(10 - 150)
	101	(10 - 150)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A9L180492 **Matrix.....:** SO
Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A9L180492-001 **Prep Batch #...:** 9354052							
Arsenic	90	(75 - 125)			SW846 6010B	12/21-12/23/09	LRCET1AQ
	89	(75 - 125)	0.73	(0-20)	SW846 6010B	12/21-12/23/09	LRCET1AR
		Dilution Factor: 1					
Cadmium	86	(75 - 125)			SW846 6010B	12/21-12/23/09	LRCET1AT
	85	(75 - 125)	1.1	(0-20)	SW846 6010B	12/21-12/23/09	LRCET1AU
		Dilution Factor: 1					
Chromium	89	(75 - 125)			SW846 6010B	12/21-12/23/09	LRCET1AV
	93	(75 - 125)	2.8	(0-20)	SW846 6010B	12/21-12/23/09	LRCET1AW
		Dilution Factor: 1					
Lead	87	(75 - 125)			SW846 6010B	12/21-12/23/09	LRCET1AX
	92	(75 - 125)	3.5	(0-20)	SW846 6010B	12/21-12/23/09	LRCET1A0
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: A9L180492 **Matrix.....:** SOLID
Date Sampled...: 12/14/09 13:10 **Date Received..:** 12/15/09

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
						% Moisture.....: 13	
Acid-soluble sulfide		WO#: LQ8JA1AX-MS/LQ8JA1A0-MSD			MS Lot-Sample #: A9L170448-001		
	102	(10 - 154)			SW846 9030B/9034	12/23/09	9357096
	107	(10 - 154)	3.3	(0-20)	SW846 9030B/9034	12/23/09	9357096
		Dilution Factor: 1					
						% Moisture.....: 13	
Cyanide, Total		WO#: LQ4981AC-MS/LQ4981AD-MSD			MS Lot-Sample #: A9L150490-003		
	78	(50 - 134)			MCAWW 335.2 CLP-M	12/28/09	9362383
	64	(50 - 134)	19	(0-20)	MCAWW 335.2 CLP-M	12/28/09	9362383
		Dilution Factor: 1					
						% Moisture.....: 13	
Total Cyanide		WO#: LRG481AK-MS/LRG481AL-MSD			MS Lot-Sample #: A9L220458-004		
	72	(50 - 134)			MCAWW 335.2 CLP-M	12/23/09	9357388
	61	(50 - 134)	12	(0-20)	MCAWW 335.2 CLP-M	12/23/09	9357388
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9L180492 **Work Order #...:** LRCRR-SMP LRCRR-DUP **Matrix.....:** SO

Date Sampled...: 12/17/09 13:20 **Date Received..:** 12/18/09

% Moisture.....: 9.4

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Corrosivity						SD Lot-Sample #:	A9L180492-008	
	8.7	8.5	No Units	1.9	(0-20)	SW846 9045A	12/19/09	9353120
			Dilution Factor: 1					

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9L180492 **Work Order #...:** LQ1E4-SMP **Matrix.....:** SOLID
LQ1E4-DUP

Date Sampled...: 12/10/09 09:55 **Date Received..:** 12/11/09

% Moisture.....: 19

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Solids						SD Lot-Sample #: A9L110613-010		
	81.1	79.6	%	1.8	(0-20)	MCAWW 160.3 MOD	12/22-12/23/09	9356363

Dilution Factor: 1

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9L180492 **Work Order #...:** LRCRE-SMP **Matrix.....:** SO
LRCRE-DUP

Date Sampled...: 12/17/09 11:40 **Date Received..:** 12/18/09

% Moisture.....: 12

PARAM	RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Percent Solids						SD Lot-Sample #:	A9L180492-003	
	87.9	88.7	%	0.94	(0-20)	MCAWW 160.3 MOD	12/22-12/23/09	9356363

Dilution Factor: 1

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratory location: North Canton
Regulatory program: ☐ DW ☐ NPDES ☐ RCRA ☒ Other Off VAP

TestAmerica Laboratories, Inc.

Client Contact				
Company Name: HZW Environmental	Client Project Manager: Doug Wetzel	Site Contact:	Lab Contact: Nate Pietras	COC No:
Address: 6105 Heisley Road	Telephone: (440) 357-1260	Telephone:	Telephone: (330) 966-8296	1 of 1 COCs
City/State/Zip: Mentor, Ohio 44060	Email: dwetzel@hzwenv.com			
Phone: (440) 357-1260		TAT if different from below: ☐ 3 weeks ☒ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		
Project Name: Commercial Rd.	Method of Shipment/Carrier:			
Project Number: H09004-14	Shipping/Tracking No:			
PO #				

Sample Identification	Sample Date	Sample Time	Air	Aqueous	Sediment	Solid	Other:	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Unpres	Other:		Corrosivity (pH)	VOCs - 8260	SVOCs - 8270	TPH - All 3 fracs 8015	Hexavalent Cr	Total Sulfide	Total Cyanide	Metals * - 6010			Sample Specific Notes / Special Instructions:
HB-071 (8-10')	12/17/09	11:46				X							X		G	X	X	X	X	X	X	X	X			*Metals to
HB-071 (10-12')		11:40				X							X		G	X	X	X	X	X	X	X	X			include: As,
HB-071 (16-18')		11:40				X							X		G	X	X	X	X	X	X	X	X			Cd, Cr, Pb
HB-072 (2-4')		12:20				X							X		G	X	X	X	X	X	X	X	X			only
HB-072 (4-6')		12:20				X							X		G	X	X	X	X	X	X	X	X			
HB-073 (0-2')		12:50				X							X		G	X	X	X	X	X	X	X	X			
HB-075 (0-2')		13:20				X							X		G	X	X	X	X	X	X	X	X			
HB-075 (2-4')	↓	13:20				X							X		G	X	X	X	X	X	X	X	X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☒ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company: HZW	Date/Time: 12-18-09/11:00	Received in Laboratory by:	Company: TA NC	Date/Time: 12/18/09 1100

TAL-0018 (1008)

TestAmerica Cooler Receipt Form/Narrative **Lot Number:** 490L180492
North Canton Facility

Client HZW Project _____ By: Deana Mangus
Cooler Received on 12/18/09 Opened on 12/18/09 (Signature)
FedEx ☐ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☒ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☐ Foam Box ☐ Client Cooler ☒ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☐ No ☒ Intact? Yes ☐ No ☐ NA ☒
   If YES, Quantity _____ Quantity Unsalvageable _____
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☐ No ☐ NA ☒
   Were custody seals on the bottle(s)? Yes ☐ No ☒
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☐ No ☒
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☐ Foam ☐ None ☒ Other _____
6. Cooler temperature upon receipt 0.0 °C See back of form for multiple coolers/temps ☐
   METHOD: IR ☒ Other ☐ _____
   COOLANT: Wet Ice ☒ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☒ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☐ No ☐ NA ☒
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☒ No ☒ 12/18/09

Contacted PM _____ Date _____ by _____ via Verbal ☐ Voice Mail ☐ Other ☐
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in Sample Receiving to meet recommended pH level(s). *Nitric Acid Lot#* 082509-HNO_3; *Sulfuric Acid Lot#* 082509-H_2SO_4; *Sodium Hydroxide Lot#* 100108 -*NaOH; Hydrochloric Acid Lot#* 092006-*HCl; Sodium Hydroxide and Zinc Acetate Lot#* 100108-$(CH_3COO)_2ZN/NaOH$. What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant

Discrepancies Cont'd:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

END OF REPORT