SELF-IMPLEMENTING CLEANUP AND DISPOSAL NOTIFICATION: BUILDING DEMOLITION

(REVISED SEPTEMBER 18, 2018)

800 HIAWATHA BOULEVARD WEST
SYRACUSE, NEW YORK
(FORMER ROTH STEEL SITE)

NYSDEC BCP SITE C734083

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United States Environmental Protection Agency
Region 2

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Submitted: July 2018

Project No. 16-S0140N-001

TABLE OF CONTENTS

1.0 INTRODUCTION AND PURPOSE 1

1.1 INTRODUCTION 1

1.2 NOTIFICATION PURPOSE 2

1.3 SITE DESCRIPTION 2

2.0 SAMPLE RESULTS AND MATERIAL DISPOSITION SUMMARY 4

2.1 OVERVIEW OF DEMOLITION PROCEDURES 4

2.2 FUTURE USE CONSIDERATION 5

2.3 GENERAL SEGREGATION AND DISPOSITION OF DEMOLITION WASTE MATERIALS 6

2.3.1 Building 1 11

2.3.2 Building 2 11

2.3.3 Building 3 12

2.3.4 Building 4 12

2.3.5 Building 5 13

2.3.6 Building 6 13

2.3.7 Building 7 13

2.3.8 Building 8 14

2.3.9 Miscellaneous Items 14

2.3.9.1 Large Concrete Blocks 14

2.3.9.2 Drums and ASR Waste Bins 14

2.3.9.3 Lead Paint 15

2.4 DECONTAMINATION 15

2.5 SCHEDULE 16

REFERENCES 17

TABLES

Table 1 **Summary of Roth Steel Buildings and Samples**
Table 2 **Construction Materials Test Results - PCB and Lead**

FIGURES

Figure 1 **Site Location Map**
Figure 2 **Aerial Site Map**
Figure 3 **Building 1 PCB Sample Location Drawing**
Figure 4 **Building 2 PCB Sample Location Drawing**
Figure 5 **Building 3 PCB Sample Location Drawing**
Figure 6 **Building 4 PCB Sample Location Drawing**
Figure 7 **Building 5 PCB Sample Location Drawing**
Figure 8 **Building 6 PCB Sample Location Drawing**
Figure 9 **Building 7 PCB Sample Location Drawing**
Figure 10 **Building 8 PCB Sample Location Drawing**

APPENDICES

Appendix A **New York State Department of Labor Asbestos Submittal and Approval**
Appendix B **Analytical Results (on CD)**
Appendix C **General Demolition Procedures (ERSI)**
Appendix D **Health and Safety Plan (HASP)**
Appendix E **Community Air Monitoring Plan (CAMP)**

1.0 INTRODUCTION AND PURPOSE

1.1 INTRODUCTION

This Self-Implementing Cleanup and Disposal Notification (Notification) for the former Roth Steel Site has been prepared by JMT of New York, Inc. (formerly Spectra Engineering, Architecture and Surveying, P.C.) on behalf of Onondaga County Industrial Development Agency (OCIDA). The proposed activities pertinent to the Notification are related to building demolition.

The former Roth Steel site is located at 800 Hiawatha Boulevard West in the City of Syracuse, Onondaga County, New York and consists of approximately 24 acres of land. See Figure 1 for a site location and topographic map. Roth Steel previously operated a scrap-metal processing facility at the Site since 1967 and abandoned the property in 2014 during the bankruptcy process. OCIDA purchased the property from the bankruptcy trustee on October 27, 2015 with the ultimate goal of achieving site cleanup and allowing future re-development. On behalf of OCIDA, JMT submitted a Brownfield Cleanup Program (BCP) application to NYSDEC, which was accepted, and a Brownfield Cleanup Agreement (BCA) was executed for the Site on January 21, 2016. OCIDA has already conducted Interim Remedial Measures and a Remedial Investigation at the site as part of the Brownfield Cleanup Program.

JMT first initiated discussions with USEPA regarding Roth Building Demolition in December 2017. Subsequent communications with USEPA and NYSDEC (the "Agencies") resulted in plans for PCB sampling of the floors and walls of the Roth Buildings that were submitted to the Agencies on May 3 and May 8, 2018. The sampling plan was conditionally approved by the Agencies on May 9, 2018. The plan primarily included concrete core sampling, but wipe samples of aluminum and steel walls were also collected. PCBs samples were also collected from paint and other materials (e.g. tile mastic, putty, caulk). Lead paint and asbestos samples were also collected. This Revised Notification formally fulfills the federal regulatory requirements specified in 40 CFR 761.61(a) for self-implementing cleanup and disposal of PCB remediation waste. It also responds to comments provided by USEPA and NYSDEC on the first version of this Notification (submitted August 1, 2018).

1.2 NOTIFICATION PURPOSE

This Revised Notification is being submitted to allow demolition of eight remaining buildings on the remaining former Roth Steel site. The Revised Notification summarizes the PCB and lead sampling results of construction materials from the eight onsite buildings collected in April and June 2018. It also, responds to Agency comments and discusses general demolition procedures and material disposition. At this time, only the roofs and sidewalls of the buildings will be demolished. All floors and any foundation walls extending from the floor surface to the ground level will not be demolished at this time. However, all internal building contents will be removed, and the remaining foundations will be swept clean of loose debris.

The New York State Department of Labor (NYSDOL) has also received a similar proposal regarding the results of asbestos testing, demolition procedures, air monitoring and proposed disposal locations. This NYSDOL document and its approval is included in Appendix A of this Revised Notification.

1.3 SITE DESCRIPTION

The Site is a triangular property approximately 24 acres in size located at the southern end of Onondaga Lake that is bounded by: CSX Railroad Tracks to the northwest; Metro Plant owned by Onondaga County to the north/northeast; Hiawatha Boulevard West to the east/southeast; State Fair Boulevard to the south; and approximately 13 industrial businesses along State Fair Boulevard to the southwest (See Figures 1 and 2).

The former Roth Steel metal recycling facility operated at the Site from 1967 to 2014 in a commercial/industrial zoned area. Roth Steel has been the sole owner of the Site since 1967 until OCIDA's purchase from the bankruptcy trustee in October 2015.

The eight Site buildings subject to demolition are shown on Figure 2. A summary of the building size, construction materials, and past usage is provided in Table 1.

TABLE 1: SUMMARY OF ROTH STEEL BUILDINGS AND SAMPLES					
Building #	**Outside Size (ft^2)**	**Non-Office Space (ft^2)**	**Description**	**Samples Collected [5]**	
				Floor	**Wall**
1	8,798	4,000	Single-story block office and scale house building containing the main office and control rooms for the former onsite scales; also includes some storage space (OU2).	3	4
2	11,215	9,200	Single-story block building used for storage of materials and equipment used onsite; also includes a maintenance office (OU2).	6	5
3	4,768	3,500	Single-story block building used for storage (OU2).	3	4
4[1]	7,196	4,700	Single-story block building used for material processing and storage (OU2).	3	3
5	4,625	2,400	Single-story block building used for equipment maintenance; contained tools and welding supplies (OU2).	2	2
6[2]	7,169	5,620	Single-story block building containing storage and retail space (OU2).	4	3
7[3]	1,941	1,941	A storage pole barn made of large concrete blocks and steel siding, three-sided building (OU1).	3	6
8[4]	1,495	1,495	Two-story block building previously containing mechanical and electrical equipment, and control for the shredder, all of which have been removed from the site. Two-sided building (OU1).	2	2

Notes:
1. A composite sample of 2 ASR waste bins was collected in building 4.
2. A sediment sample was also collected from a sump in Building 6.
3. Building 7 is a three-sided structure made of metal sheeting and concrete block. The six sidewall samples included 3 metal wipe samples and 3 concrete block samples. The floor samples have been deferred until standing water recedes.
4. Floor samples deferred until water recedes.
5. The samples listed above exclude paint, caulk, and mastic samples.

2.0 SAMPLE RESULTS AND MATERIAL DISPOSITION SUMMARY

Construction materials, including concrete, floor tile, window caulk, window glaze, tile mastic, putty, and paint, in Buildings 1 through 8 were tested for PCBs, lead, and/or asbestos. The majority of the concrete sample locations were selected based upon the visual presence of oil staining. NYSDEC participated in the visual inspection and selection of PCB sample locations of concrete and metal siding. Concrete samples were collected by using a bit that pulverized materials to a depth of about 2-3 inches. The pulverized concrete was then placed in a jar for lab testing. This report will primarily discuss the PCB and lead paint results. The asbestos results are discussed in the NYSDOL proposal (Appendix A). Refer to Table 2 for a summary of laboratory results. Analytical lab reports for the concrete/wipe PCB samples and lead samples are provided in Appendix B.

2.1 OVERVIEW OF DEMOLITION PROCEDURES

Arctic Enterprises, a New York State Certified Asbestos Assessment firm, conducted asbestos sampling of the building materials and prepared a plan for the NYSDOL to allow controlled demolition of the buildings. That proposal and its NYSDOL approval is provided in Appendix A. Asbestos samples were collected by Arctic from 81 locations as shown on the figures in Appendix A. The majority of the asbestos containing material (ACM) is identified as non-friable. Limited friable material was identified (file cabinet on loading dock of building 3 and transite vents on the roofs of most units). These items would be removed, properly containerized, and sent to a solid waste landfill as friable ACM prior to commencing with controlled demolition with non-friable ACM in place. To the extent possible, the demolition contractor will minimize the co-mingling of non-friable ACM with other demolition debris. Debris mixed with non-friable ACM waste shall be disposed of in containers lined with 2 layers of 6 mil poly and wrapped to prevent air or water emissions from the container. These materials will be taken to a NY State licensed solid waste landfill. A full-time Asbestos-certified Project Monitor shall be on site for all the project activities to ensure compliance with the conditions of this variance.

Building demolition shall be conducted in accordance with ICR 56-Controlled Demolition Procedures as outlined in 56-11.5 (c). Environmental Remediation Services (ERSI), the demolition contractor, is a NYSDOL licensed abatement company. Wet methods shall be utilized. Waste shall

be continuously wetted, prior to, during and following removal. The project goal is to have no visible emissions. Evidence of visible emissions will require altering the means and methods in use to prevent potential offsite release. This may include adding additional water, stopping work due to wind, etc. Piles of waste staged on site, shall be wetted, covered with 6 mil poly and adequately wetted to avoid wind blowing the waste around and creating a safety hazard on site. Under no circumstances shall ACM remain on site for more than 8 hours. Weather conditions creating windy conditions shall result in work being stopped until conditions increase.

ERSI's general approach to building demolition is provided in in Appendix C. The intent will be to demolish the structures utilizing 50,000 – 75,000 class excavator(s) with grapple or bucket and thumb attachments. Materials such as block and concrete will be segregated along with any ferrous or non-ferrous recyclable metal. Buildings will be demolished via wet demolition methods to help mitigate dust migration. Prior to demolition activities, ERSI will identify, disconnect, isolate, and cap utility services. This work will be done in coordination with OCIDA and the utility companies. All identified inactive utility lines within the demolition limits including water, sewer and fire shall be capped and abandoned in place where they daylight. The work area will be cordoned off via orange snow fence with "Danger" signs or barrier tape. Workers will enter and exit the work area through the personnel decontamination unit that will be placed at the orange fence line of the building; workers entering this work zone will be required to sign in and out of the work area. Area will be properly wetted throughout demolition activities.

A general Health and Safety Plan for the Site and a Job Safety Analysis for demolition are provided in Appendix D. A Community Air Monitoring Plan is proved in Appendix E.

2.2 FUTURE USE CONSIDERATION

In March 2018, JMT submitted a Remedial Investigation Report (RIR) for the Roth Site, which presented four Operable Units for the site (See Figure 2). Operable Unit 1 is located in the central portion of the site and is composed of approximately 7.7 acres. As discussed in the RIR, the likely future use for this area is industrial/undeveloped with restricted access. However, a final remedial decision and site use has not yet been established.

The demolition of the buildings is expected to generate approximately 500-700 cubic yards of non-ACM containing debris. OCIDA anticipates keeping the majority of this material onsite, as discussed below.

2.3 GENERAL SEGREGATION AND DISPOSITION OF DEMOLITION WASTE MATERIALS

Based upon the nature of the waste materials and the analytical results, the building demolition debris will be separated into the following four waste streams:

- Materials subject to disposal at a NYSDEC permitted solid waste landfill - asbestos containing materials (ACM), non-concrete/brick demolition debris (e.g. wood, furniture, roofing material, paper waste, flooring, solid waste), concrete/brick mixed with ACM, and concrete/brick with PCB concentrations between 10-50 ppm. Floor tiles will be removed, and a flat bucket will be used to scrape the floor to remove floor-tile mastic to the extent possible. Floors will be swept to remove any loose materials. It is possible that some floor tile mastic will remain if adhered to the concrete slab.

- Materials for metal recycling - metal posts, support beams, and siding.

- Building demolition brick and concrete with PCBs less than 1 ppm will be crushed and placed within OU-1. The material will be crushed to a size of approximately 3 inches and less. It will be placed in an area just east and southeast of the former shredder. This area is generally bordered by borings B-39, B-44, and B-45. It primarily has an existing concrete pad and portions of the area commonly contains standing water. No material will be placed within 50 ft. of borings B-39 and B-44.

- Building demolition brick and concrete with PCBs of 1 ppm or greater, but less than 10 ppm, will be crushed and stored for disposal in OU-2. This material will be placed on a concrete pad, covered, and surrounded on three sides by large concrete blocks, just to the south of Building 1. The material will be stored for eventual disposal in either OU-2 or OU-3. Ou-2 is anticipated to be a Commercial Use Area that will require excavation to remove PCB impacted soil. The crushed concrete/brick may be disposed of within these remedial investigations and covered by a 1-ft. thick soil cap (meeting the specifications of 40 CFR 761.61 (a) (7 and 8) or 6 inches of concrete/asphalt.

  Alternatively, this material may be disposed of in OU-3 during the Onondaga Lake Trail construction. Similar to the OU-2 requirements, after the material is disposed of, it will require a 1-ft. soil cap (meeting TSCA requirements) or a 6-inch asphalt cover. A proposal for the Trail related work has previously been submitted to USEPA and NYSDEC, and

approved by both agencies. This area was designated as "Low-Occupancy" (TSCA) and "passive-recreational" (NYSDEC). Since final design for the Trail is not complete, the previously approved activities have not yet been implemented. Prior to disposing of any crushed concrete/brick in OU-3, OCIDA will amend its prior workplan/Self-Implementing Notification to incorporate disposal of these materials.

OCIDA estimates that the Trail construction will not occur until summer/fall 2019. Remedial construction in OU-2 is estimated to begin in 2020.

The following section summarizes the PCB and lead paint sampling results for each building. The analytical data and sample locations for each building are also shown on Figures 3 through 10. Those figures also have a color along each external wall that indicates the proposed deposition location for non-ACM concrete/brick demolition material. The color codes are:

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill

Interior concrete/brick walls that are not mixed with ACM will be disposed of based on any existing PCB tests of paint, or concrete/brick. If samples have not been collected on that wall, disposal will be consistent with the nearest adjacent external wall.

TABLE 2: CONSTRUCTION MATERIAL TEST RESULTS - PCBS AND LEAD			
Building 1			
Sample ID	**Location**	**PCBs**	**Material Description**
W1-1	Wall	7.2	Concrete Core
F1-3	Floor	24.9	Concrete Core
W1-4	Wall	10.7	Concrete Core
F1-5	Floor	20.4	Concrete Core
F1-6	Floor	ND	Concrete Core
W1-7	Wall	0.27	Concrete Core
WW1-2	Wall Wipe	1.95 J µg/wipe	Steel Wipe
CFTM-023P	Building 1 – North Entry Way	3.94	Black Ceramic Floor Tile Mastic
FTM-027P	Building 1 – North Corridor	2.84	Black Floor Tile Mastic Under 12” x 12” Floor Tile
FTM-034P	Building 1 – North Offices	46.9	Black Floor Tile Mastic Under 9” x 9” Floor Tile

Building 2			
Sample ID	**Location**	**PCBs**	**Material Description**
F2-2	Floor	2.3 [F1,F2]	Concrete Core
F2-3	Floor	6.4	Concrete Core
F2-4	Floor	2.7	Concrete Core
W2-5	Wall	1.41	Concrete Core
F2-6	Floor	4.2	Concrete Core
W2-7	Wall	1.71	Concrete Core
F2-8	Floor	2.8	Concrete Core
W2-9	Wall	1.63	Concrete Core
W2-10	Wall	0.4 J	Concrete Core
F2-11	Floor	2.8	Concrete Core
WW2-1	Wall Wipe	ND	Steel Wipe
FTM-001P	Building 2 – 1st Floor Offices	<0.788	Black Floor Tile Mastic Under 9” x 9” Floor Tile
WCLK-004P	Building 2 – East Storage Room	1.15	Gray Window Caulk
WGLAZE-005P	Building 2 – East Storage Room	2.55	Thick White Window Glaze
DCLK-006P	Building 2 – East Storage Room (Exterior)	0.51	White Exterior Door Caulk
WGLAZE-007P	Building 2 – East Storage Room	0.921	Thin Gray Window Glaze
CBM-009P	Building 2 – 1st Floor Offices	<0.899	Black Cove Base Mastic
PUTTY-010P	Building 2 – Exterior Penetrations	<4.59	Black Penetration Putty
PAINT-001P	Building 2 Interior	5.18	White Block Paint Chip

PAINT-002P	Building 2 Exterior	<0.410	Red Exterior Paint Chip
PAINT-003P	Building 2 Exterior	<0.487	Yellow Exterior Paint Chip
Sample ID	**Location**	**Lead**	**Material Description**
PAINT-001	Building 2 – Interior	0.01%	White Block Paint Chip
PAINT-002	Building 2 – Exterior	2.97%	Red Exterior Paint Chip
PAINT-003	Building 2 – Exterior	1.99%	Yellow Exterior Paint Chip

Building 3			
Sample ID	**Location**	**PCBs**	**Material Description**
F3-1	Floor	ND	Concrete Core
F3-2	Floor	ND	Concrete Core
W3-3	Wall	ND	Concrete Core
W3-4	Wall	ND	Concrete Core
W3-5	Wall	ND	Concrete Core
F3-6	Floor	ND	Concrete Core
W3-7	Wall	ND	Concrete Core
FTM-015P	Building 3 – East Offices	<0.981	Black Floor Tile Mastic Under 9” x 9” Floor Tile
CBM-017P	Building 3 – East Offices	<0.788	Brown Cove Base Mastic
PAINT-004P	Building 3 Interior	<0.465	Yellow Wall Paint Chip
PAINT-005P	Building 3 Interior	2.7	Brown Window Sill Paint Chip
Sample ID	**Location**	**Lead**	**Material Description**
PAINT-004	Building 3 – Interior	0.23%	Yellow Wall Paint Chip
PAINT-005	Building 3 – Interior	0.37%	Brown Window Sill Paint Chip

Building 4			
Sample ID	**Location**	**PCBs**	**Material Description**
F4-1	Floor	ND	Concrete Core
F4-2	Floor	0.52	Concrete Core
F4-3	Floor	0.71	Concrete Core
W4-4	Wall	ND	Concrete Core
W4-5	Wall	ND	Concrete Core
W4-6	Wall	ND	Concrete Core
FTM-041P	Building 4 – East Offices	<1.79	Black Floor Tile Mastic Under 9” x 9” Floor Tile
PAINT-006P	Building 4 Interior	4.110	Silver Wall Paint Chip
Sample ID	**Location**	**Lead**	**Material Description**
PAINT-006	Building 4 – Interior	0.03%	Silver Wall Paint Chip

Building 5			
Sample ID	**Location**	**PCBs**	**Material Description**
F5-1	Floor	0.9 J	Concrete Core
W5-2	Wall	ND	Concrete Core
W5-3	Wall	ND	Concrete Core
F5-4	Floor	0.27 J	Concrete Core
PAINT-007P	Building 5 Exterior	<0.439	Red Door Paint Chip
PAINT-008P	Building 5 Interior	1.31	Black Door Paint Chip
PAINT-009P	Building 5 Interior	1.68	Blue Door Paint (Peach) Chip
Sample ID	**Location**	**Lead**	**Material Description**
PAINT-007	Building 5 – Exterior	0.03%	Red Door Paint Chip
PAINT-008	Building 5 – Interior	0.33%	Black Door Paint Chip
PAINT-009	Building 5 – Interior	0.65%	Peach Door Paint Chip

Building 6			
Sample ID	**Location**	**PCBs**	**Material Description**
F6-1	Floor	5.6	Concrete Core
F6-2	Floor	6.8	Concrete Core
W6-3	Wall	6.7	Concrete Core
F6-4	Floor	2.4	Concrete Core
W6-5	Wall	2.4	Concrete Core
W6-6	Wall	2.5	Concrete Core
F6-7	Floor	12	Concrete Core
F6-8	Floor	0.82	Concrete Core
SB6	Sump bottom	6.8	Sediment
PAINT-010P	Building 6 Interior Video Store	<0.77	White Wall Paint Chip
Sample ID	**Location**	**Lead**	**Material Description**
PAINT-010	Building 6 – Interior Video Store	0.01%	White Wall Paint Chip

Building 7			
Sample ID	**Location**	**PCBs**	**Material Description**
W7-2	Wall	ND	Concrete Core
W7-4	Wall	ND	Concrete Core
W7-5	Wall	ND	Concrete Core
WW7-1	Wall Wipe	ND	Steel Wipe
WW7-6	Wall Wipe	ND	Steel Wipe
WW7-7	Wall Wipe	ND	Steel Wipe

Building 8			
Sample ID	**Location**	**PCBs**	**Material Description**
F8-1	Floor	1.3	Concrete Core
F8-2	Floor	0.3	Concrete Core
W8-3	Wall	0.43	Concrete Core
W8-4	Wall	ND	Concrete Core
PAINT-011P	Building 8 Exterior	4.71	Gray Paint Chip on Stucco

Notes: All results reported in mg/kg (ppm) unless otherwise shown.
All samples collected between April and June 2018.
ND - Not Detected
F1 - MS and/or MSD Recovery is outside acceptance limits.
F2 - MS/MSD RPD exceeds control limits
<0.765 - Below reporting limit shown

2.3.1 Building 1

Ten samples were analyzed for PCBs in Building 1. Six were from concrete, one was a wipe sample (steel wall), and three were from tile mastic. Concentrations ranged from non-detect in a floor concrete (F1-6) to 46.9 ppm in Black Floor Tile Mastic (FTM-034P). Two samples, both concrete, had PCB concentrations less than 1 ppm. A wipe sample from a steel plate along the north wall was less than 10 µg/wipe. Only one wall sample exceeded 10 ppm. Refer to Figure 3 for sample locations.

Based upon these sample results, the west wall will be taken to a solid waste landfill, the north and east walls without ACM will be crushed/placed in OU-2, and the south wall without ACM will be crushed and placed in OU-1. Since the section of steel along the north wall was less than 10 µg/wipe, it will be taken to metal recycling facility (most likely Metalico Syracuse), with the roof beams and metal support posts. As stated previously, efforts will be undertaken (physical scraping with a flat-edged bucket loader) to remove floor-tile mastic, with close inspection of the area near sample FTM-034P.

2.3.2 Building 2

Twenty-one samples were analyzed for PCBs in Building 2. Ten were concrete, seven were putty/mastic, three were paint, and one was a steel wipe sample. Concentrations ranged from non-detect in a steel wall wipe (WW2-1) to 6.4 ppm in a concrete floor sample (F2-3). Twelve samples

had PCB concentrations greater than 1 ppm. The exterior lead paint samples, which were paint chips, exceeded the UPSEPA threshold of 0.5%. Refer to Figure 4 for sample locations.

Based upon these results, the concrete/brick demolition debris (without ACM) from the south wall will be crushed and remain onsite in OU-1 and the debris from the west, north, and east walls will go to OU-2. Interior walls with paint represented by sample PAINT-001P will go to OU-2 or a landfill. The vertical steel plate located along the north wall will be recycled with the metal roof beams and support posts. Due to the lead paint results, additional samples were collected of the exterior paint to confirm that it is not hazardous (See Section 2.3.9.3). These samples passed TCLP, confirming that the crushed concrete (yellow paint) and wood/metal (red paint) are not hazardous waste.

2.3.3 Building 3

Eleven PCB samples were collected from Building 3. All samples were non-detect or below reporting limits, except for a brown window sill paint sample (PAINT-005P) where PCBs were detected at a concentration of 2.7 ppm. Exterior paint was not sampled but is presumed to exceed 0.5% lead (paint chip sample) since it appears to be the same paint as Building 2. Two interior lead paint chip samples contained lead at 0.23% and 0.37%. Refer to Figure 5 for sample locations.

Based upon these sampling results, demolished concrete/brick from exterior walls without ACM will be crushed and placed onsite for use as fill in OU-1. Metal building materials will be recycled. Any concrete with brown paint represented by sample PAINT-005P will either go to a landfill or OU-2. This brown paint was present around an interior windowsill.

2.3.4 Building 4

Eight PCB samples were collected from Building 4. Six were from concrete, one was tile mastic, and one was interior paint. All concrete and floor tile mastic samples were non-detect or below 1 ppm. PCBs and lead were detected in the silver wall paint (PAINT-006P) at a concentration of 4.11 ppm and 0.03%, respectively. A portion of the exterior contains yellow/red paint (similar to Building 2) and a portion is unpainted. Refer to Figure 6 for sample locations.

Based upon these sampling results, demolished concrete/brick from exterior walls without ACM will be crushed and placed onsite in OU-1. Metal building materials will be recycled. Interior walls with paints represented by sample PAINT-006P will either go to a landfill or placed in OU-2.

2.3.5 Building 5

Seven PCB samples were collected in Building 5. Four were from concrete and three were paint samples. Concentrations ranged from non-detect to 1.68 ppm. PCB exceedances (>1 ppm) were detected in Black Door Paint (PAINT-008P, 1.31 ppm) and Blue Door Paint (PAINT-009P, 1.68 ppm). Three interior lead paint samples (chips from doors) ranged from 0.03% to 0.65%. The exterior contains yellow/red paint similar to Building 2. It is presumed that these areas have similar lead concentrations as the paint chip samples collected on Building 2. Refer to Figure 7 for sample locations.

Non-ACM demolished concrete/brick from Building 5 exterior walls will be crushed and backfilled in OU-1. Metal building materials be recycled. Any interior concrete with paint represented by samples PAINT-008 and PAINT-009 (door areas) will either be landfilled or disposed of in OU-2.

2.3.6 Building 6

Ten samples from Building 6 were analyzed for PCBs. Eight were concrete, one was sediment from the sump, and one was from interior paint. Concentrations ranged from below reporting limits in white wall paint (PAINT-010P) to 12 ppm in a concrete floor sample (F6-7). An interior paint chip detected lead at 0.01%. The exterior contains yellow/red paint similar to Building 2. It is presumed that these areas have similar lead concentrations as the paint chip samples collected on Building 2. Refer to Figure 8 for sample locations.

It should be noted that two samples (SB 6-1 and SB 6-2) were collected at the sump, however, these samples were composited by the lab. The resulting composite sample is referred to as SB 6 in this report.

All non-ACM demolition materials will be crushed and placed in OU-2. The water and the sediment from the sump will be pumped out and taken offsite for disposal as non-hazardous waste. Metal roof beams and supports will be recycled.

2.3.7 Building 7

Six samples in Building 7 were collected from construction materials in direct contact with automotive shredder residue and analyzed for PCBs. Three were from concrete and three were

steel wall wipe samples. Refer to Figure 9 for sample locations. All samples collected in Building 7 were non-detect for PCBs. OCIDA will conduct additional sampling of the large concrete blocks at the site (see section 2.3.9.1). After obtaining those results, USEPA and NYSDEC will be contacted to discuss disposal of the concrete blocks. All metal associated with this building will be recycled.

2.3.8 Building 8

Five samples collected from Building 8 were analyzed for PCBs. Four were from concrete and one from exterior paint. Concentrations ranged from non-detect (W8-4) in wall concrete to 4.71 ppm in gray exterior paint (PAINT-011P). Refer to Figure 10 for sample locations.

Demolished concrete/brick from Building 8 will be crushed and left onsite in OU-2 due to the exterior paint sample. Metal materials will be recycled.

2.3.9 Miscellaneous Items

2.3.9.1 Large Concrete Blocks

As discussed with USEPA/NYSDEC, additional testing of the large concrete blocks will be conducted for PCBs. In addition to Building 7, the large concrete blocks primarily occur as part of "containment" structures at six locations. These structures typically have 2-3 walls. One concrete core will be collected from each interior wall and tested individually for PCBs. The structure behind Building 1 has multiple walls so seven samples will be collected. The proposed samples will include oil stained blocks, if observed. It is estimated that a total of 17-20 individual samples will be collected. After obtaining the sampling results, USEPA and NYSDEC will be contacted to discuss disposal of these materials.

2.3.9.2 Drums and ASR Waste Bins

Several drums that were previously located in Buildings 2 and 3 are now staged in Building 5. In addition, two ASR waste bins are present in Building 4. The drums will be sampled and eventually sent offsite for disposal. A composite sample of the ASR waste bins from Building 4 exceeded the TCLP threshold for cadmium (2.1 mg/L compared to the limit of 1.0 mg/L). Therefore, these bins will be removed during the demolition process and disposed of as hazardous waste.

2.3.9.3 Lead Paint

Two paint chip samples from Building 2 exterior (PAINT-002 and PAINT-003) tested greater than the lead paint threshold of 0.5% set by EPA. Lead concentrations were 2.97% and 1.99%. These samples were from the yellow and red exterior paint that is present on many of the buildings (2, 3, 4, 5, 6). Although the lead in these samples are relatively high, the paint later is very thin and would only make up a very minor component of any crushed concrete debris. To provide a more meaningful analysis of the lead in crushed concrete, two additional samples were collected from the building exteriors.

As discussed with NYSDEC, representative concrete blocks from Buildings 2, 3, 4, 5, and 6 were crushed with a sledge hammer and mixed in 5-gallon plastic buckets to produce two representative samples of crushed concrete with yellow paint. One sample included the material from Buildings 2 and 3, while the second samples contained materials from Buildings 4, 5, and 6. In addition, a sample of red painted wood from Building 2 was collected for further testing. No red paint was observed on any concrete blocks.

The collected samples were analyzed by Test America on August 25, 2018 and are provided in Appendix B. The TCLP leach results for lead ranged from non-detect (ND) to 0.05 mg/L, all less than the hazardous threshold of 5 mg/L. The total lead results for the crushed concrete were 60.9 ppm (Buildings 2 and 3) and 2.6 ppm (Building 4, 5, and 6). The wood sample was 22.5 ppm. The total lead sample results are less than the NYSDEC Part 375 Unrestricted lead concentration of 63 ppm.

It should be noted that the sample from Buildings 2 and 3, incorrectly included Building 1 in the sample identification name. Sample “Bldgs. 1,2,3-Block”, only contained material from Buildings 2 and 3, since Building 1 is not painted.

2.4 DECONTAMINATION

Following the demolition activities, ERSI will decontaminate equipment that has contacted PCB containing material. Initially, OCIDA is requesting an alternate decontamination method (as specified below) under 40 CFR 761.79 (h). this will include the physical removal/brushing (dry conditions) of any debris from excavator/buckets or grapple arms. Following this step, there will be a double wash/rinse step using potable water and a commercial detergent/cleaning agent such as Alconox. All liquids will be containerized for proper offsite disposal.

At the completion of these activities, representative portions of equipment that potentially contacted PCB-containing material (e.g. buck, grapple arm ends, treads, etc.) will have wipe tests performed for PCB analyses. Three wipe samples per equipment type will be tested. The equipment will be determined to be clean if the wipe tests are less than 10 µg per 100 cm^2. Materials that do not achieve this level will be decontaminated again until satisfactory results are obtained. If necessary, other decontamination fluids such as kerosene or terpene hydrocarbons may be used if a soap/detergent does not achieve the required results.

2.5 SCHEDULE

OCIDA's demolition contractor (ERSI) will mobilize to the site within 1 week, or less, of obtaining approval of this Notification. It is anticipated that building demolition will take about six weeks. Crushing operations will overlap building demolition but will likely extend about 1 week beyond demolition. During this week, site restoration (including fence installation), miscellaneous cleanup, and removal of the large concrete blocks will also occur.

REFERENCES

Clough, Harbor & Associates. "Investigative Work Plan: Soil and Contaminant Sampling – Onondaga Lake Canalways Trail Extension Project (PIN3750.49), 800 Hiawatha Boulevard West Brownfield Cleanup Program (BCP) Site." Syracuse, New York. February 23, 2016.

JMT of New York, Inc. "Revised IRM Investigation Work Plan – 800 Hiawatha Boulevard West (former Roth Steel) Site BCP C734083." Latham, New York. May 2016.

JMT of New York, Inc. "Revised IRM Work Plan – 800 Hiawatha Boulevard West (former Roth Steel) Site BCP C734083." Latham, New York. October, 2016.

JMT of New York, Inc. "Revised BCP Application – 800 Hiawatha Boulevard West (former Roth Steel) Site BCP C734083." Latham, New York. November 6, 2015.

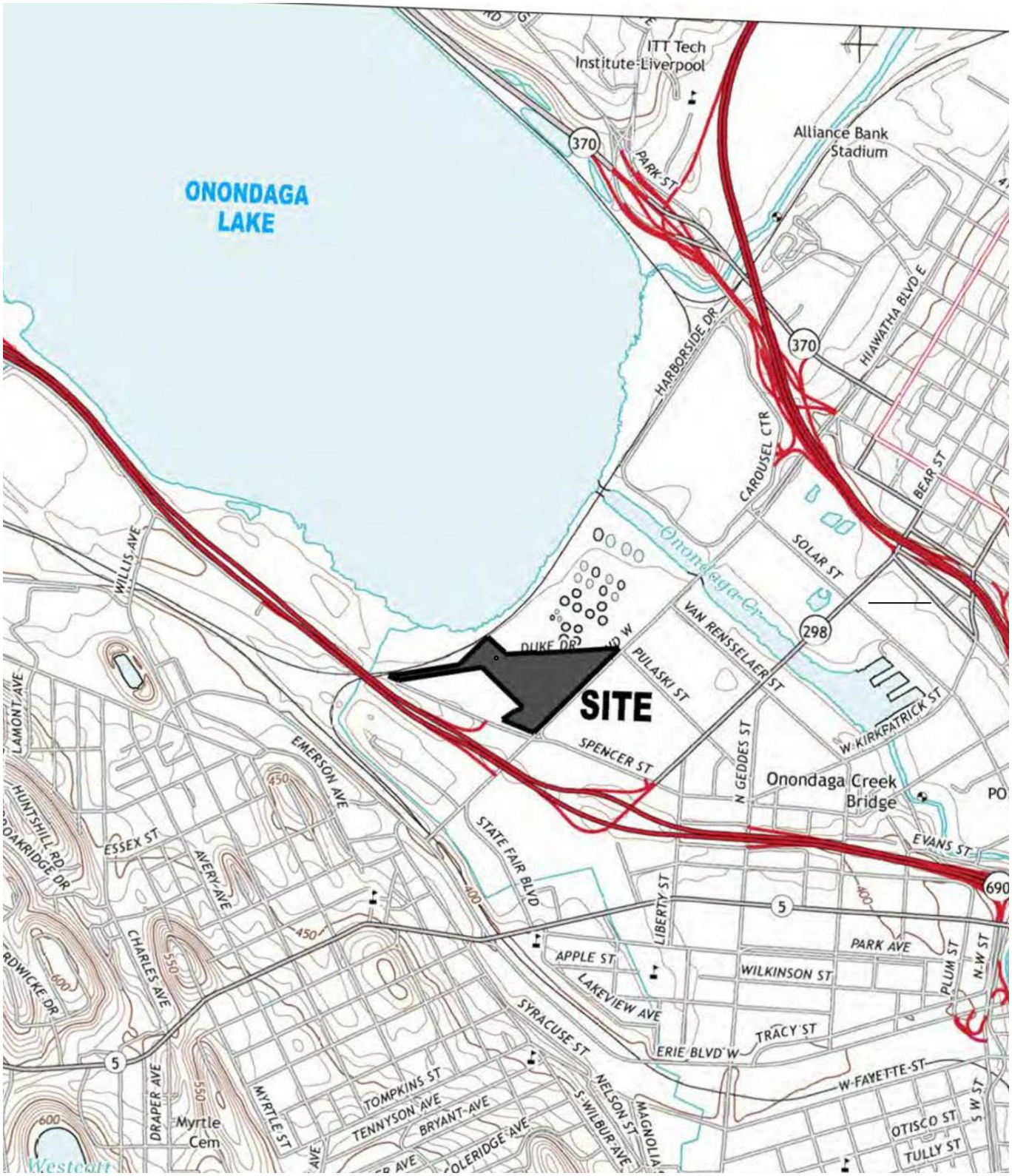
O'Brien & Gere Engineers, Inc. "Site Investigation Report: Roth Steel Facility – Syracuse, New York." June 2013.

New York State Department of Environmental Conservation. "DER-10 / Technical Guidance for Site Investigation and Remediation." Issued May 3, 2010.

Passero Associates. "Phase II Environmental Site Assessment, Roth Steel Corporation, 800 Hiawatha Boulevard West, Syracuse, New York 13204." Rochester, New York. November 2007.

W.Z. Baumgartner & Associates, Inc. "Residue Characterization Report." Brentwood, Tennessee. December 1993.

FIGURES



REF.: USGS - SYRACUSE WEST (NY) QUAD., 2013

19 British American Blvd.,Latham, New York 12110
P: (518) 782-0882 F: (518) 782-0973 www.jmt.com

Site Location Map
800 Hiawatha Boulevard Site
Syracuse, New York

CITY OF SYRACUSE ONONDAGA CO., NY

PROJ. #:	16140	DATE:	3/9/18	SCALE:	NTS	DWG. NO.	RIR	FIGURE	1

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- ELEVATED PORTION OF WALKING TRAIL (PROPOSED)
- GROUND LEVEL PORTION OF WALKING TRAIL (PROPOSED)
- BRIDGE PIERS
- POTENTIAL OPERABLE UNIT 1 (7.7 ACRES)
- POTENTIAL OPERABLE UNIT 2 (12.4 ACRES)
- POTENTIAL OPERABLE UNIT 3 (1.2 ACRE)
- POTENTIAL OPERABLE UNIT 4 (1.5 ACRES)

0 100' 200'

1"=200'

JMT
19 British American Blvd.,Latham, New York 12110
P: (518) 782-0882 F: (518) 782-0973 www.jmt.com

Map of Potential Operable Units
800 Hiawatha Blvd
Syracuse, New York

CITY OF SYRACUSE ONONDAGA CO., NY

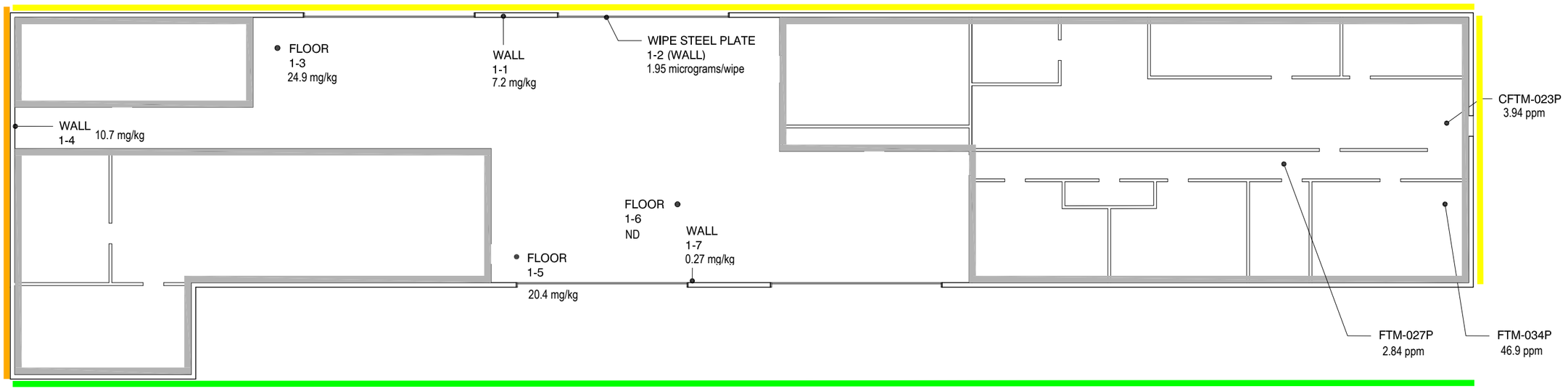
PROJ. No.:	16140	DATE:	7/31/18	SCALE:	1"=200'	DWG. NO.	RIR	FIGURE	2

LEGEND:

OFFICE AREA

SAMPLE ID	SAMPLE TIME
W1-1	14:18
WW1-2	14:22
F1-3	14:29
W1-4	14:37
F1-5	14:47
F1-6	14:56
W1-7	15:11

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill

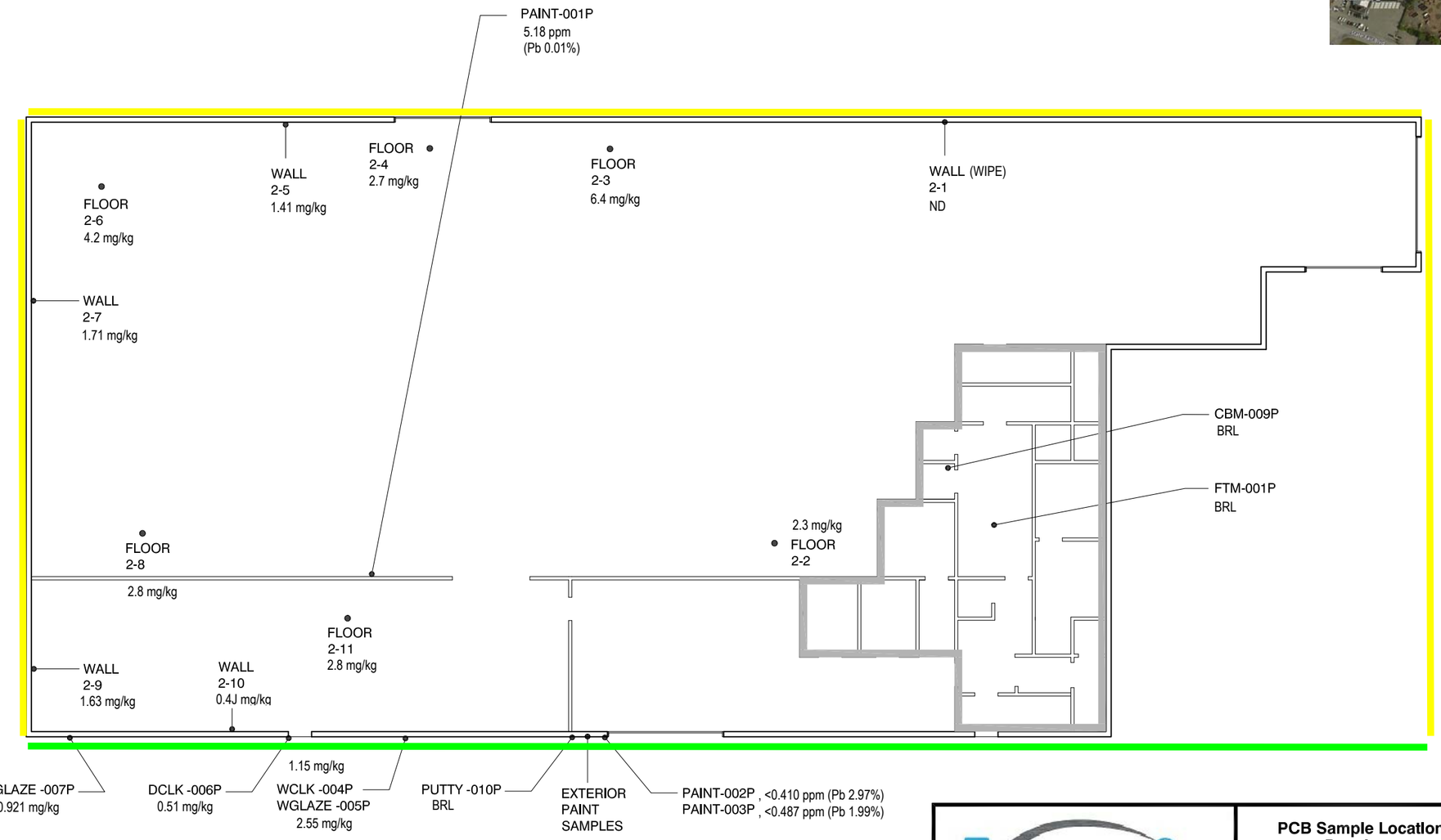


Arctic ENTERPRISES, INC.	**PCB Sample Location Drawings**	JMT
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204 — Building 1
	Date: June 12, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 3
	Scale: None	

LEGEND:

OFFICE AREA

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill



SAMPLE ID	SAMPLE TIME
WW2-1	11:18
F2-2	15:36
F2-3	11:49
F2-4	11:59
W2-5	12:10
F2-6	12:19
W2-7	12:29
F2-8	12:38
W2-9	12:48
W2-10	12:56
F2-11	13:06

Arctic ENTERPRISES, INC.

PCB Sample Location Drawings

Arctic Project No. 1800.085

Date: June 12, 2018

Scale: None

JMT

Former Roth Steel
800 Hiawatha Blvd.
Syracuse, NY 13204

Building 2

Arctic Enterprises Inc.
222 Teall Avenue, Suite 201, Syracuse, NY
Phone: (315) 476-1757, Fax: (315) 476-1764

FIGURE 4

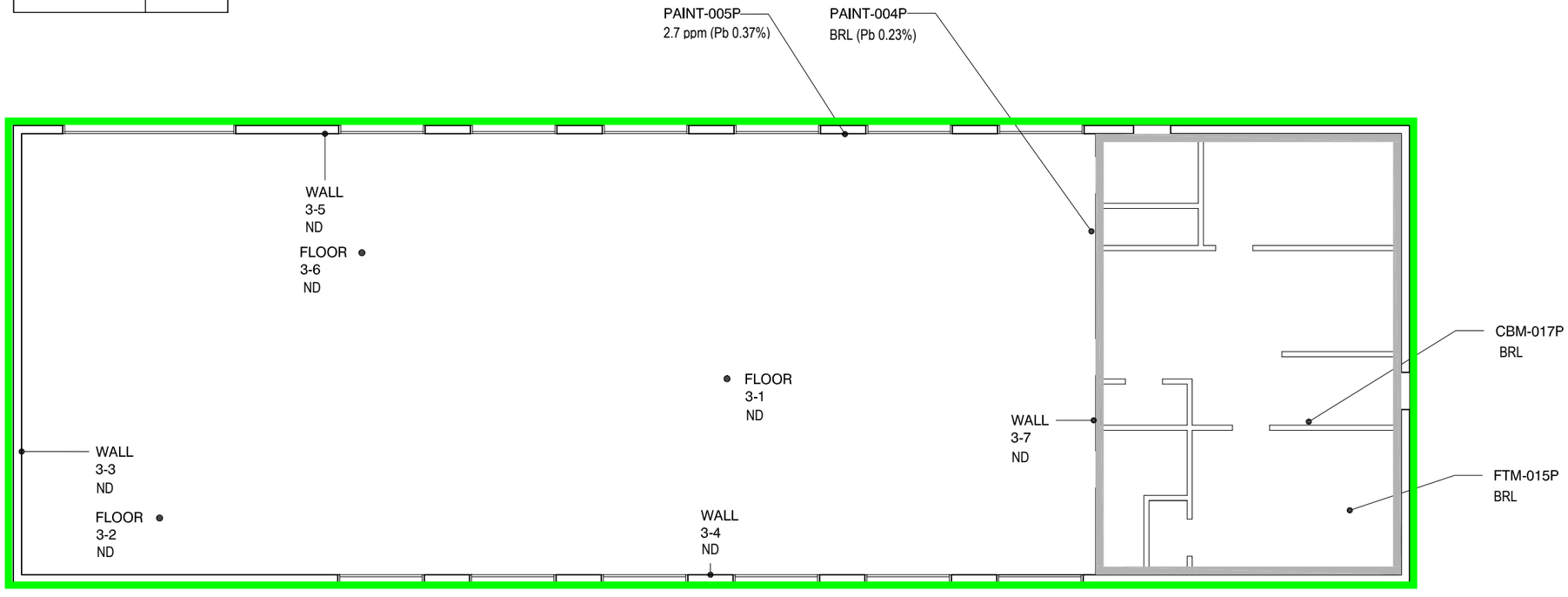
LEGEND:

OFFICE AREA

SAMPLE ID	SAMPLE TIME
F3-1	14:54
F3-2	15:00
W3-3	15:10
W3-4	15:15
W3-5	15:24
F3-6	15:32
W3-7	15:39

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill

BUILDING 3



Arctic ENTERPRISES, INC.

PCB Sample Location Drawings

Arctic Project No. 1800.085

Date: June 13, 2018

Scale: None

JMT

Former Roth Steel
800 Hiawatha Blvd.
Syracuse, NY 13204

Building 3

Arctic Enterprises Inc.
222 Teall Avenue, Suite 201, Syracuse, NY
Phone: (315) 476-1757, Fax: (315) 476-1764

FIGURE 5

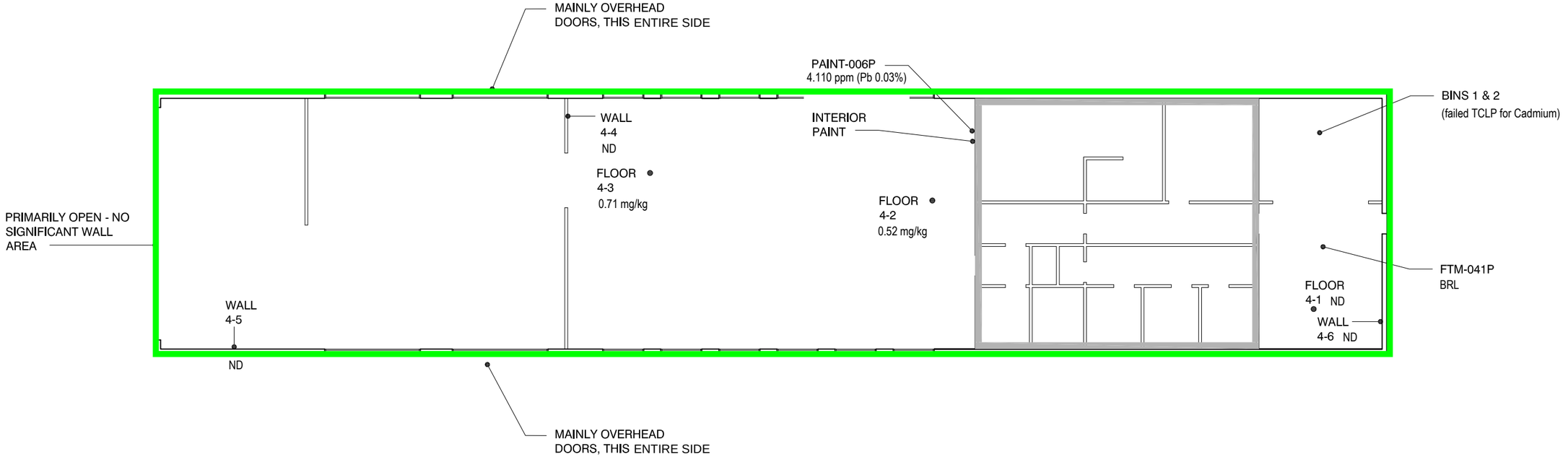
LEGEND:

OFFICE AREA

SAMPLE ID	SAMPLE TIME
F4-1	13:44
F4-2	13:54
F4-3	13:58
W4-4	14:07
W4-5	14:12
W4-6	14:21
BIN COMOSITE 1	13:28
BIN COMOSITE 2	13:28

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill

BUILDING 4



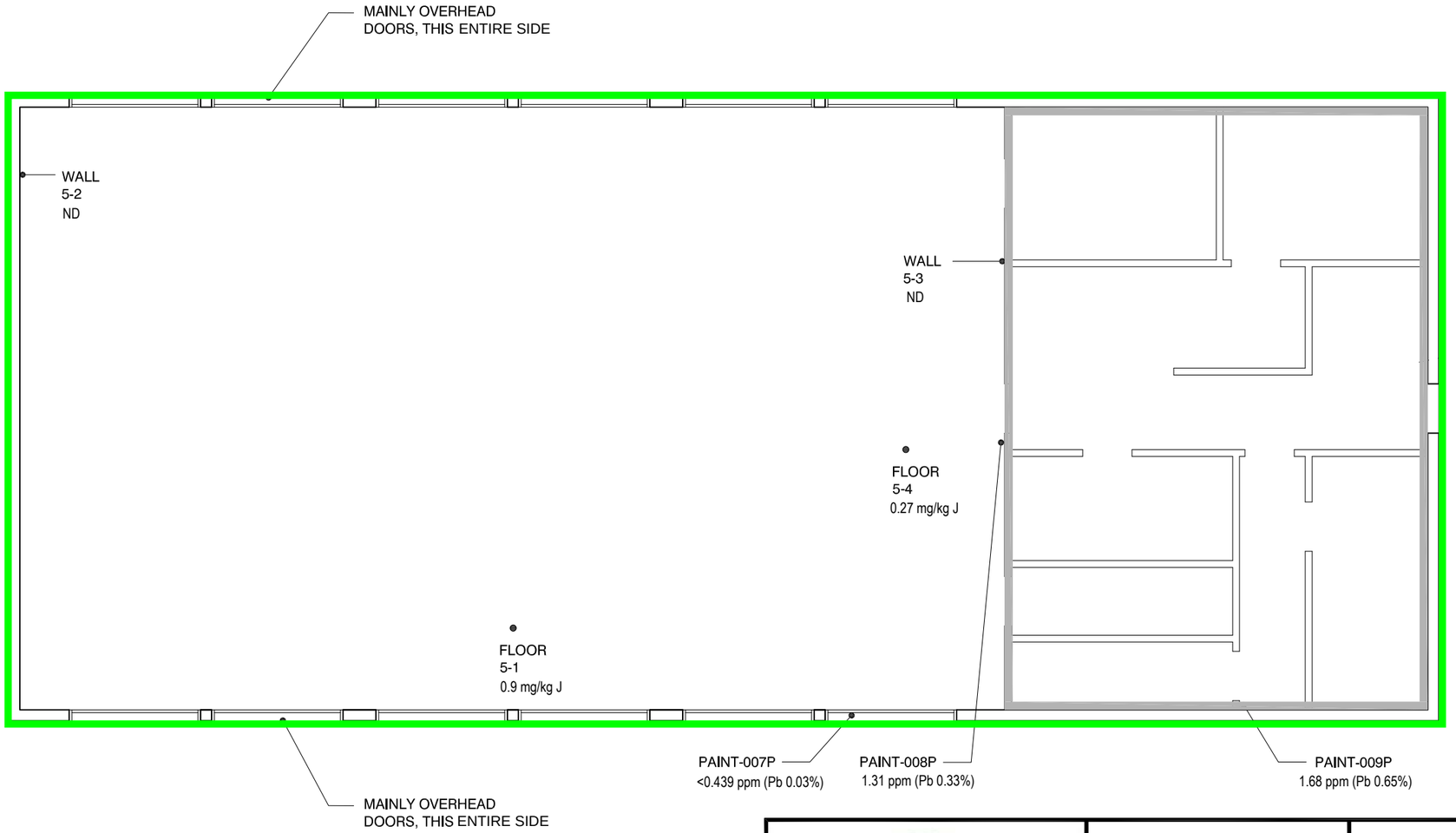
Arctic ENTERPRISES, INC.	**PCB Sample Location Drawings**	JMT
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204 — Building 4
	Date: June 13, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 6
	Scale: None	

LEGEND:

OFFICE AREA

SAMPLE ID	SAMPLE TIME
F5-1	12:11
W5-2	12:21
W5-3	12:25
F5-4	12:34

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill



Arctic ENTERPRISES, INC.

PCB Sample Location Drawings	JMT	
Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 5
Date: June 13, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 7
Scale: None		

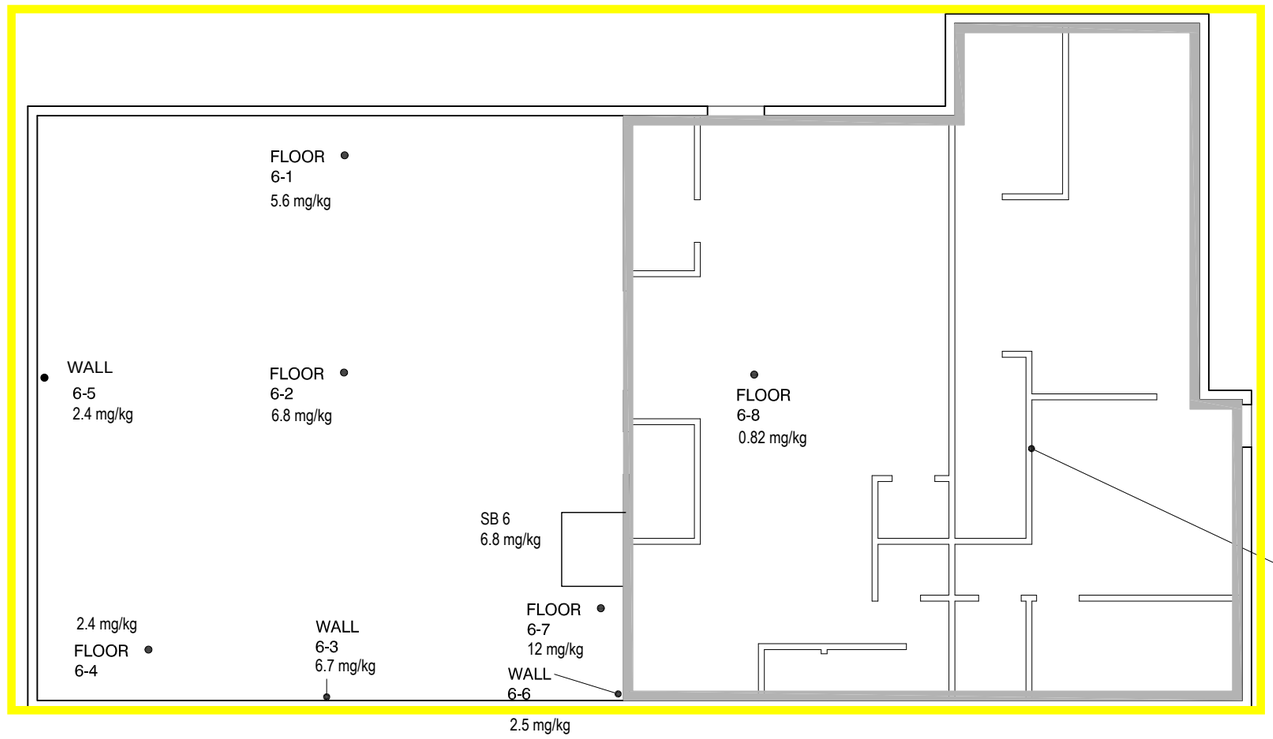
LEGEND:

OFFICE / RETAIL SPACE

SAMPLE ID	SAMPLE TIME
F6-1	10:08
F6-2	10:18
W6-3	10:26
F6-4	10:36
W6-5	10:45
W6-6	10:53
F6-7	11:34
F6-8	11:43
SB6-1	11:11
SB6-2	11:11

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill

BUILDING 6



Arctic ENTERPRISES, INC.	**PCB Sample Location Drawings**	JMT
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204 — Building 6
	Date: June 13, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 8
	Scale: None	

BUILDING 7

THIS SIDE PRIMARILY OPEN

WALL
7-5
ND

WIPE
WALL
7-7
ND

WALL
7-4
ND

WALL
7-6
ND

WALL
7-1
ND

WALL
7-2
ND

THIS SIDE PRIMARILY SIDING
WITH CONCRETE BLOCKS

SAMPLE ID	SAMPLE TIME
WW7-1	16:00
W7-2	16:07
W7-4	16:27
W7-5	16:41
WW7-6	16:55
WW7-7	17:02

Note: Concrete blocks from this building will be taken offsite by ERSI for industrial use. Metal siding/walls will be recycled.

Arctic ENTERPRISES, INC.

PCB Sample Location Drawings

Arctic Project No. 1800.085

Date: JUNE 13, 2018

Scale: None

JMT

Former Roth Steel
800 Hiawatha Blvd.
Syracuse, NY 13204

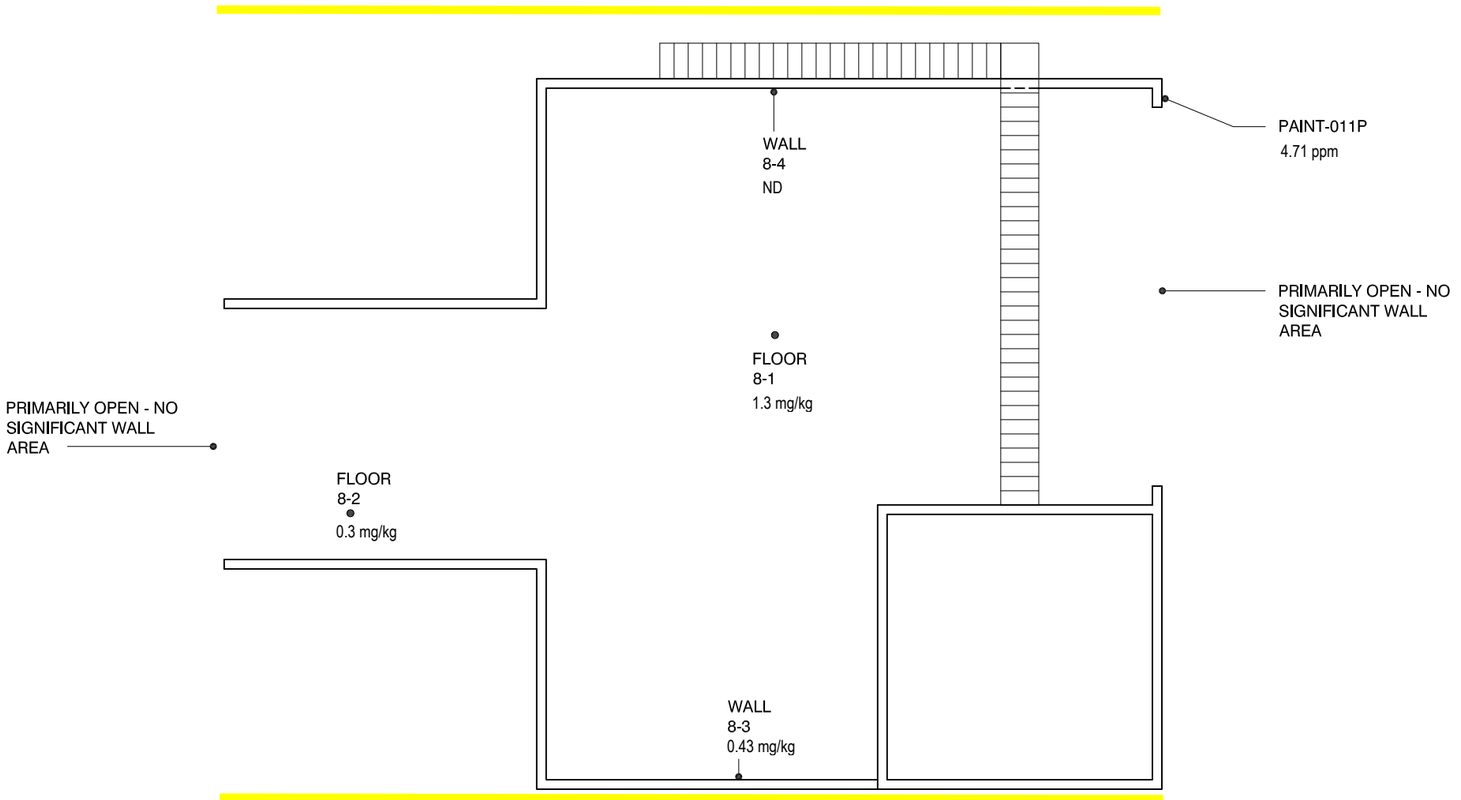
Building 7

Arctic Enterprises Inc.
222 Teall Avenue, Suite 201, Syracuse, NY
Phone: (315) 476-1757, Fax: (315) 476-1764

FIGURE
9

SAMPLE ID	SAMPLE TIME
F8-1	9:04
F8-2	9:14
W8-3	9:23
W8-4	9:31

Code	PCB Concentration	Proposed Deposition
Green	Less than 1 ppm	OU-1
Yellow	Greater than 1 ppm, less than 10 ppm	OU-2
Orange	Greater than 10 ppm	Offsite DEC permitted solid waste landfill



Arctic ENTERPRISES, INC.	**PCB Sample Location Drawings**	JMT
		Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204 — Building 8
	Arctic Project No. 1800.085	
	Date: June 13, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 10
	Scale: None	

APPENDIX A

NEW YORK STATE DEPARTMENT OF LABOR ASBESTOS SUBMITTAL AND APPROVAL

Division of Safety and Health
Engineering Services Unit

Department of Labor
W. Averell Harriman State Office Campus
Building 12, Room 154, Albany, NY 12240
www.labor.ny.gov
518-457-1536

August 22, 2018

Arctic Enterprises
222 Teall Ave
Syracuse, NY 13210

RE: File No. 18-1071

Dear Sir/Madam:

STATE OF NEW YORK
DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH

The attached is a copy of Decision, dated, 8/8/2018, which I have compared with the original filed in this office and which I DO HEREBY CERTIFY to be a correct transcript of the text of the said original.

If you are aggrieved by this decision you may appeal within 60 days from its issuance to the Industrial Board of Appeals as provided by Section 101 of the Labor Law. Your appeal should be addressed to the Industrial Board of Appeals, State Office Building Campus, Building 12, Room 116, Albany, New York, 12240 as prescribed by its Rules and Procedure, a copy of which may be obtained upon request.

WITNESS my hand and the seal of the
NYS Department of Labor, at the City of
Albany, on this day of 8/8/2018.

Edward A. Smith, P.E.
Professional Engineer 2 (Industrial)

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING CAMPUS
ALBANY, NEW YORK 12240-0100

Variance Petition

Of

Arctic Enterprises
Petitioner's Agent

On Behalf Of

Onondaga Co. Industrial
Petitioner

in re

Premises: Former Roth Steel – Buildings 1,2,3,4,6,7, &8
800 Hiawatha Blvd.
Syracuse, NY 13204

Controlled Demolition Asbestos Projects

File No. 18-1071

FACILITY WIDE DECISION

Cases 1-3

ICR 56

The Petitioner, pursuant to Section 30 of the Labor Law, having filed Petition No. 18-1071 on August 13, 2018 with the Commissioner of Labor for a variance from the provisions of Industrial Code Rule 56 as hereinafter cited on the grounds that there are practical difficulties or unnecessary hardship in carrying out the provisions of said Rule; and the Commissioner of Labor having reviewed the submission of the petitioner dated July 13, 2018; and

Upon considering the merits of the alleged practical difficulties or unnecessary hardship and upon the record herein, the Commissioner of Labor does hereby take the following actions:

Case 1	ICR 56 – 6.2(a)
Case 2	ICR 56 – 8.9(g)
Case 3	ICR 56 – 9.2(d)
Case 4	ICR 56 – 11.5(b)(1)
Case 5	ICR 56 – 11.5(c)(2)

VARIANCE GRANTED. The Petitioner's proposal for controlled demolition of unsound, unstable structures and is in imminent danger of collapse with friable and non-friable asbestos in place at the subject premises in accordance with the attached 17-page stamped copy of the Petitioner's submittal is accepted; subject to the Conditions noted below:

THE CONDITIONS

1. A full-time project monitor shall be on site and responsible for oversight of the abatement contractor during all abatement activities to ensure compliance with ICR 56 and variance conditions.

2. The Project Monitor shall perform the following functions during asbestos abatement projects in addition to functions already required by ICR-56:

   a. Inspect of the interior of the asbestos project work area made at least twice every work shift accompanied by the Asbestos Supervisor;
   b. Observe and monitor the activities of the asbestos abatement contractor to determine that proper work practices are used and are in compliance with all asbestos laws and regulations;
   c. Inform the asbestos abatement contractor of work practices that, in the Project Monitor's opinion, pose a threat to public health or the environment, and are not in compliance with ICR-56 and/or approved variances or other applicable rules and/or regulations;
   d. Document in the Project Monitor Log observations and recommendations made to the Asbestos Supervisor based upon the interior/exterior observations of the asbestos project made by the PM.

3. The PM shall alert the nearest District Office of the NYSDOL Asbestos Control Bureau whenever, after the PM has provided recommendations to the Asbestos Supervisor, unresolved conditions remain at the asbestos project which present significant potential to adversely human health or the environment.

4. All generated waste removed from the site must be documented, accounted for and disposed of in compliance with the requirements of NESHAPS and NYSDEC.

5. A separate asbestos project notification shall be submitted for each building/structure that is to be demolished as per ICR 56-3.4(b).

6. All friable ACM, non-friable transite/cement board (using intact methods as long as the matrix of transite material has not been disturbed in accordance with the submitted petition), and other non-friable ACM that will likely become crumbled, pulverized, or reduced to powder during controlled demolition at the subject premises shall be removed in accordance with ICR 56 and this variance decision, including obtaining satisfactory clearance air results for all regulated abatement work areas (as necessary), prior to the commencement of this controlled demolition asbestos project. **REMOVALS SHALL ONLY BE DONE IF WORKER SAFETY IS NOT ENDANGERED DOING SO. OTHERWISE, FULL COMPLIANCE WITH ICR 56-11.5 IS REQUIRED.**

7. The dumpster(s) used to transport the **non-friable** ACM waste does not need to be lined with two (2) layers of plastic, however all other requirements of ICR 56-8.9(g), including air, dust and water tightness, shall apply.

Secure the Work Site

8. The entire controlled demolition area and all surrounding portions of the site to be utilized for demolition cleanup, staging areas and regulated abatement work areas, shall be enclosed within a barrier or fence. The intent of this barrier is to define the restricted area at the work site, alert the public to the asbestos work and associated hazards, and to prevent unauthorized entry onto the work site.

9. Signage in accordance with the requirements of ICR 56-7.4(c) shall be posted on the exterior of the work site boundary fence/barrier, to warn the public of the asbestos hazard.

Establishment of Regulated Areas

10. The regulated work areas, decontamination units, airlocks, and dumpster areas shall be cordoned off at a distance of twenty-five feet (25') where possible, and shall remain vacated except for certified workers until satisfactory clearance air monitoring results have been achieved or the abatement project is complete. These areas shall have Signage posted in accordance with Subpart 56-7.4(c) of this Code Rule. For areas where twenty-five feet isn't possible, the areas shall be cordoned off as practical, and a daily abatement air sample shall be included in the vicinity of the barrier.

11. Entry/Exit of all persons and equipment shall be through one designated and secure "doorway" in the barrier or fence, which shall provide an adequate and appropriate means of egress from the work site.

12. All adjacent building openings within twenty-five (25) feet of the outermost limit of the disturbance shall be sealed with two (2) layers of six (6) mil fire retardant plastic sheeting. If the owner of an adjacent building does not allow openings to be sealed as required, the asbestos abatement contractor's supervisor must document the issue within the daily project log, and have the affected building

owner sign the log confirming that the owner will not allow the asbestos abatement contractor to seal the openings in the building as required. In addition, a daily abatement air sample shall be included within ten feet of the affected portion of the adjacent building

Controlled Demolition Removals

13. The provisions of 56-11.5 shall be followed for all controlled demolition removals, except as modified by this variance.

14. Uncertified personnel shall not be allowed to access any regulated abatement work area, with the exception of waste hauler truck drivers. These truck drivers will be restricted to their enclosed cab, while temporarily in the regulated work area for waste transfer activities only. All equipment operators utilized for demolition or removal activities within the regulated work area must be certified in compliance with ICR 56-3.2.

15. No dry disturbance or removal of asbestos material shall be permitted.

16. All decontamination areas shall be within the regulated abatement work area. An equipment decontamination area shall be cordoned off within the worksite for cleaning of heavy equipment, i.e., backhoes, excavators, loaders, etc. The ground surface in this decontamination area shall be banked on the sides to confine the contaminated wastewater.

17. All demolition debris, structural members, barrier components, used filters and similar items shall be considered to be asbestos containing materials/asbestos contaminated waste and shall be transported and disposed of by appropriate legal method. Structural members, steel components and similar non-ACM components shall be fully decontaminated as per ICR 56, prior to being treated as salvage.

18. All material shall be treated as RACM including soil around and beneath the demolition abatement area, except for structural members, steel components and similar non-porous and non-suspect items that can be fully decontaminated.

19. Except for non-ACM containing concrete foundation walls that can be adequately cleaned; all demolition debris, structural members, barrier components, used filters and similar items shall be considered to regulated asbestos containing material (RACM) and managed accordingly. The Project Monitor shall confirm that the foundation can be adequately decontaminated. The structure and/or building remains (foundation) shall be maintained in a safe manner in accordance with local and state building codes.

20. Non-porous cleanable objects/materials, non-ACM material (concrete, structural steel members, metal components and similar non-suspect materials) may be fully decontaminated for disposal by appropriate legal

methods. Prior to disposal, the Project Monitor shall verify that the material has been properly cleaned/decontaminated.

21. In addition to the requirement of Subpart 56-4.9(b-c), air monitoring within the work area shall be conducted daily during demolition and decontamination activities. Two (2) additional daily air samples shall be collected within the work area in the immediate vicinity of potential disturbance activities. The inside work area air samples shall be collected for each entire workshift with the samples locations being distributed both upwind and downwind of the daily abatement activity.

22. Daily abatement air monitoring is required only on days when abatement or support activities such as ACM disturbance or cleaning activities are performed.

23. In lieu of post-abatement clearance air monitoring in compliance with ICR-56-9.2(d), the most recent daily abatement air samples collected during removal and cleaning operations in the regulated work area, shall be used for comparison with ICR 56-4.11 clearance criteria. All other applicable provisions of ICR 56-4 shall be followed for the duration of the abatement project.

24. After removal and cleanings are complete and a minimum drying period has elapsed, the Project Monitor shall determine if the area is dry and free of visible asbestos debris/residue. If the area is determined to be acceptable and the most recent daily abatement air sample results meet 56-4.11 clearance criteria, the final dismantling of the site may begin.

25. Usage of this variance is limited to those asbestos removals identified in this variance or as outlined in the Petitioner's proposal.

. In addition to the conditions required by the above specific variances, the Petitioner shall also comply with the following general conditions:

GENERAL CONDITIONS

1. A copy of this DECISION and the Petitioner's proposals shall be conspicuously displayed at the entrance to the personal decontamination enclosure.

2. This DECISION shall apply only to the removal of asbestos-containing materials from the aforementioned areas of the subject premises.

3. The Petitioner shall comply with all other applicable provisions of Industrial Code Rule 56-1 through 56-12.

4. The NYS Department of Labor Engineering Service Unit retains full authority to interpret this variance for compliance herewith and for compliance with

Labor Law Article 30. Any deviation to the conditions leading to this variance shall render this variance Null and Void pursuant to 12NYCRR 56-12.2. Any questions regarding the conditions supporting the need for this variance and/or regarding compliance hereto must be directed to the Engineering Services Unit for clarification.

5. This DECISION shall terminate on **August 31, 2020.**

Date: August 17, 2018

ROBERTA L. REARDON
COMMISSIONER OF LABOR

By

Edward A. Smith, P.E.
Professional Engineer 2 (Industrial)

PREPARED BY: Mark G. Wykes, P.E.
Professional Engineer 1 (Industrial)

REVIEWED BY: Edward A. Smith, P.E.
Professional Engineer 2 (Industrial)

181071

Arctic
ENTERPRISES, INC.

July 13, 2018

New York Department of Labor
Department of Safety and Health – Engineering Services Unit
Building 12, Room 159
State Office Campus
Albany, New York 12240

RE: Facility-Wide Site-Specific Variance Request
Controlled Demolition with Non-Friable In-Place
Former Roth Steel Site, 800 Hiawatha Blvd., Syracuse, New York 13204 (8 bldgs.)
Arctic Project Number: 1800.085

Dear NYSDOL Engineer:

Onondaga County Development Agency (OCIDA) has purchased the former Roth Steel Site located at 800 Hiawatha Boulevard, Syracuse, NY. The site was operating as a scrap yard and includes eight buildings which have been abandoned since early 2014. As a result, the buildings are in poor condition, roofing systems have been compromised, and exposed to vandals. The combination of vandalism on-site and condition of the buildings, render them unsafe to abate with workers entering the building.

Limited abatement has been conducted on site, work was limited to an asbestos abatement incidental disturbance cleanup project conducted in Building # 4. The Site-Specific Variance petition was prepared and submitted by Ambient Environmental. Abatement work was conducted by AES, a licensed asbestos abatement contractor in Syracuse, New York. The NYSDOL approved site-specific variance (SSV) addressed methods for the contractor to enter the area containing damaged acm floor tile and perform hazardous materials cleanup of capacitors (under abatement conditions), the area remains sealed. The site owner, OCIDA has since contracted with Environmental Remediation Services, Inc. (ERSI) & Arctic since then to conduct Limited Hazardous Pre-Demolition Surveys in preparation for demolition.

The Codes Enforcement Office with jurisdiction has provided "letters of condemnation" for buildings 1,2,3,4, 6, 7 & 8 on site, building 5 remains. The owner acknowledges that in the future if work associated with the slabs containing ACM mastic is scheduled, abatement will be required at that time.

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The survey summary has been included below for reference, most of the ACM identified is non-friable, limited friable material was identified (file cabinet on loading dock of building 3, transite vents @ roof of most units, and exterior galbestos siding). Based on the findings, Environmental Remediation Services Inc., the licensed abatement contractor is proposing the following project approach:

- abatement of friable materials & transite (galbestos siding and exhaust pipes) which are all accessible from exterior.
- Following removal of friable and transite, the contractor proposes to proceed with "Controlled Demolition with Non-Friable Asbestos In Place methods be utilized as outlined in 11.5.
- Following the completion of building demolition, the concrete floor pads will remain on site, including those with ACM mastic, for other project-related purposes, relative to the brownfield work.

Table 2.2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
• **Building # 1-Office/Garage**			
Various Floor Tile and Associated Floor Tile Mastics	Building 1-NE Offices (under ceramic floor tile)	1172 SF	NF, Intact
Wood Panel Mastic	Building 1-NE Offices	850 SF	NF, Intact
Galbestos Siding	Building 1-Exterior-South Side	1600 SF	NF, Intact
Transite Piping and Associated Heat Stacks	Building 1	45 LF	NF, Intact
Roof Flashing (Curbs & Penetrations)	Building 1 – Roof	8 SF	NF, Intact
• **Building # 2-Office/Garage**			
Window Caulk	Building 2-Exterior	600 LF	NF, Intact
Window Glaze	Building 2-Exterior	620 LF	NF, Intact
Putty	Building 2-Exterior South Side	1 SF	NF, Intact

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Table 2.2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
Cove Base	Building 2-SE Offices	100 LF	NF, Intact
Presumed 9" Floor Tile	Building 2- SE Offices	1,100 SF	NF, Intact
Transite Piping	Building 2	135 LF	F, Intact
Curbing	Building 2 – Roof	9 SF	NF, Intact
Flashing	Building 2 – Roof	464 LF	NF, Intact
• Building # 3-Office/Garage			
Floor Tile and Mastic	Building 3	771 SF	NF, Intact
Filing Cabinet Insulation	Building 3	6 SF	F, Intact
Cove Base	Building 3	18 LF	NF, Intact
Window Caulk	Building 3	200 LF	NF, Intact
Window Glaze	Building 3	576 LF	NF, Intact
Transite Piping	Building 3	30 LF	NF, Intact
Flashing	Building 3 – Roof	302 LF	NF, Intact
• Building # 4-Office/Garage			
Ceiling Pin Mastic	Building 4-Interior West	1,520 SF	NF, Intact
Window Glaze	Building 4	728 SF	NF, Intact

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Table 2.2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
9" x 9" Presumed Floor Tile	Building 4	2,249 SF	NF, Damaged
Flashing Around Coop and East Side Roofs	Building 4 – Roof	211 LF	NF, Intact
Flashing from Block to Metal	Building 4 – Roof (East Side and Hiawatha Blvd. Side)	76 LF	NF, Intact
Silver Coat	Building 4 – Roof	3,900 SF	NF, Intact
Shingle	Building 4 – Front Awning	20 SF	NF, Intact
Shingle Flashing	Building 4 – Front Awning	12 LF	NF, Intact
• Building # 5-Office/Garage			
9" x 9" Floor Tile	Building 5	808 SF	NF, Damaged
Transite Piping	Building 5	60 LF	NF, Intact
Gray Flashing	Building 5 – Roof	119 LF	NF, Intact
Curbing	Building 5 – Roof	8 SF	NF, Intact
Shingle	Building 5 – Front Awning	20 SF	NF, Intact
Shingle Flashing	Building 5 – Front Awning	12 LF	NF, Intact
• Building # 6-Video Store			
Presumed 9" x 9" Floor Tile	Building 6	310 SF	NF, Intact
Transite Piping	Building 6	105 LF	NF, Intact

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Table 2.2 – Approximate Quantity of ACMs & PACMs

BUILDING MATERIAL	MATERIAL LOCATION	ESTIMATED QUANTITY	MATERIAL CONDITION
Second Layer of Roof	Building 6 – Lower Roof	1,820 SF	NF, Intact
Flashing	Building 6 – Lower Roof	180 LF	NF, Intact
• Building # 7-Eddie Sorter (Eliminated, no suspect ACM, LBP or PCB Sealants)			
• Building # 8-Shredder			
12" x 12" Tan Floor Tile	Building 8 – 2nd Floor Office	150 SF	NF, Intact
Roofing PLY	Building 8 – Roof	880 SF	NF, Intact
Silver Coat	Building 8 – Roof	500 SF	NF, Intact
Flashing	Building 8 – Roof	226 LF	NF, Intact
Foundation Mastic	All	TBD	Presumed
Electrical Components	All	TBD	Presumed

F = Friable, NF= Non-Friable, Presumed ACM = assumed asbestos-containing material

SECTION 9 – ICR 56 RELIEF SOUGHT

- 56-6.2(a) Relief from Backgrounds
- 56-8.9(g) Plasticizing Dumpsters Receiving Non-Friable VAT & Roofing Debris (disposed of as C & D)
- 56-9.2(d) – Most Recent Set of Phase IIB (Daily) Air Samples as Phase IIC (Finals)
- 56-11.5(b)(1) - Utilize Controlled Demolition Procedures (segregating Non-Porous)
- 56-11.5(2) Reduction of Critical Barrier/Regulated Work Area Perimeter

SECTION 10 – HARDSHIP DESCRIPTIONS

Relief from Background Air Samples-Based on the condition of the buildings, and for safety purposes, relief from background air samples is requested. Instead clearance air samples will be considered satisfactory when they meet NYSDOL clearance criterial of less than 0.01 f/cc.

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Daily Air Samples as Finals – Due to the nature of the buildings, the site, and limited power available, it is anticipated that air sampling will be difficult, and we will need to clear areas of the site as available to allow for staging of equipment to conduct remainder of the abatement activities while protecting the adjacent occupied building. Therefore, Arctic proposes the most recent set of "large-project" daily air samples be used as clearance air sampling in combination with a successful Project Monitor visual inspection. Work shall be considered complete when air sample results indicate NYSDOL clearance criteria has been achieved. The areas shall be recleaned and samples collected until the required clearance criteria has been achieved.

Segregating Non-Porous Materials –The general construction of the buildings are poured concrete slabs, block walls with limited steel wall construction. In locations, where feasible, the contractor is requesting that these non-acm building materials which are also Non-Porous materials (listed above) be segregated, cleaned/decontaminated and subject to project monitor visual inspection to confirm they are clean. Upon satisfactory visual inspection, these materials will be passed out of the work area for disposal ~~as "non-asbestos containing fill".~~ by appropriate legal methods. known

Reduction of Barriers (in locations where 25 ft. is not feasible)- the barrier will be established to the extent feasible and an additional air sample collected in this location. Maintaining 25 ft. barrier and shutting down driveways creates a significant safety hazard for all heavy equipment entering site and the roadway. As such, additional sampling along the perimeter of this side of the regulated work area is proposed, at one per 25' ft. along the barrier tape.

SECTION 11 – PROPOSED ABATEMENT METHODS

General Conditions

1. A full-time Project Monitor shall be on site for all the project activities to ensure compliance with the conditions of this variance.

2. An appropriate project-sized & centrally located personal & waste decontamination unit shall be established and remain active for the duration of the project at each regulated work area.

3. Work on site shall be conducted in accordance with NESHAPS, no visible emissions shall be observed during this project.

4. Workers shall don PPE during all work-related activities, including personnel operating heaving equipment. All such personnel shall possess valid asbestos certification and work for a NYSDOL licensed abatement company.

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5. At no time, shall uncertified workers be allowed in the regulated work areas, except for waste hauler personnel, who must remain in their vehicles with the windows up always while being loaded.

6. Barrier tape and signage shall be installed at required distances, in locations where 25 feet cannot be accomplished, barrier tape and signage shall be installed at a maximum distance feasible.

7. Critical barriers shall be installed as required by ICR 56, in locations that can't have critical barriers installed or owner refuses, these locations shall be documented in the project log, and an additional air sample shall be collected in these locations.

8. Building demolition shall be conducted in accordance with ICR 56-Controlled Demolition Procedures as outlined in 56-11.5 (c). Wet methods shall be utilized, waste shall be continuously wetted, prior to, during and following removal. Under no circumstances shall visible emissions be observed. Evidence of visible emissions will require altering the means and methods in use to prevent any release. This may include adding water sources, stopping work due to wind, etc.

9. Wastewater generated as part of the project shall be confined to the regulated work area as required by berm, trenching or piling non-acm materials to keep the wastewater confined to the project area. Staging areas, waste water holding areas shall be scraped clean at the completion of each shift to prevent drying and release of ACM.

10. Non-Friable ACM waste generated shall be disposed of in containers lined with 2 layers of 6 mil poly and wrapped to prevent air or water emissions from the container.

11. **NO WALKING FLOOR DUMPSTERS** shall be utilized to receive waste on this project.

12. Non-Porous materials, able to be segregated on site, if any, shall be segregated and may be cleaned, decontaminated and inspected. All loads are subject to project monitor visual inspection for conformance with requirements.

13. Wetted Piles of Waste staged on site, shall be thoroughly wetted, covered with 6 mil poly and adequately wetted to avoid wind blowing the poly around and creating a safety hazard on site. Under no circumstances shall waste remain on site for more than 8 hours. Weather conditions creating windy conditions shall result in work being stopped until conditions increase.

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14. The last set of phase IIB, large-project sized daily air samples, shall be utilized clearance air samples in lieu of collection of clearance air samples following the completion of all work on site. All samples must meet the NYSDOL clearance criteria and the area must meet final visual inspection performed by the project monitor and supervisor of record on site. All findings shall be recorded in project log books for both parties.

15. Post receipt of the last set of satisfactory dailies as clearance air samples, the Contractor will demobilize and all RWA waste used for critical barriers, etc. shall be disposed of as RACM.

If you have any questions pertaining to this report, please contact me directly at (315) 476-1757. We thank you for the opportunity to work with you on this project.

Bridget Ruane

Sincerely,
Bridget C. Ruane
Asbestos Project Designer

Attachment A: Variance Petition Application
Attachment B: Copy of Check #2347
Attachment C: Limited Hazardous Materials Sample Location Drawings (Figures 1-8)
Attachment D: City of Syracuse-Letter of Condemnation

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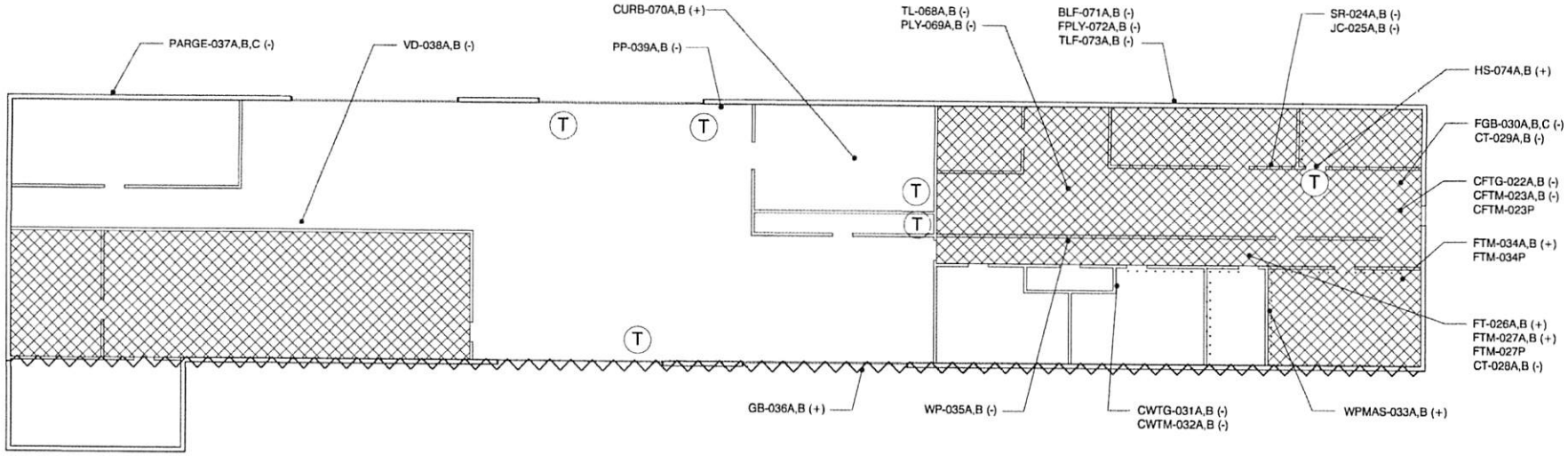
LEGEND:

- (T) ACM TRANSITE PIPING & ASSOCIATED HEAT STACKS (45 LF)
- ACM FLOOR TILE (VARIOUS SIZES) AND MASTIC (1,612 SF) (MULTIPLE LAYERS)
- ACM BROWN WOOD PANEL MASTIC (850 SF)
- ACM GALBESTOS (1600 SF)
- * ROOF FLASHING (CURBS AND PENETRATIONS) (8 SF)
- * FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
- * ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

SF = SQUARE FEET
LF = LINEAL FEET

BUILDING 1



Arctic ENTERPRISES, INC.

Limited Haz. Material Pre-Demolition Survey Drawings	ERSI, Inc.	
Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 1
Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 1
Scale: None		

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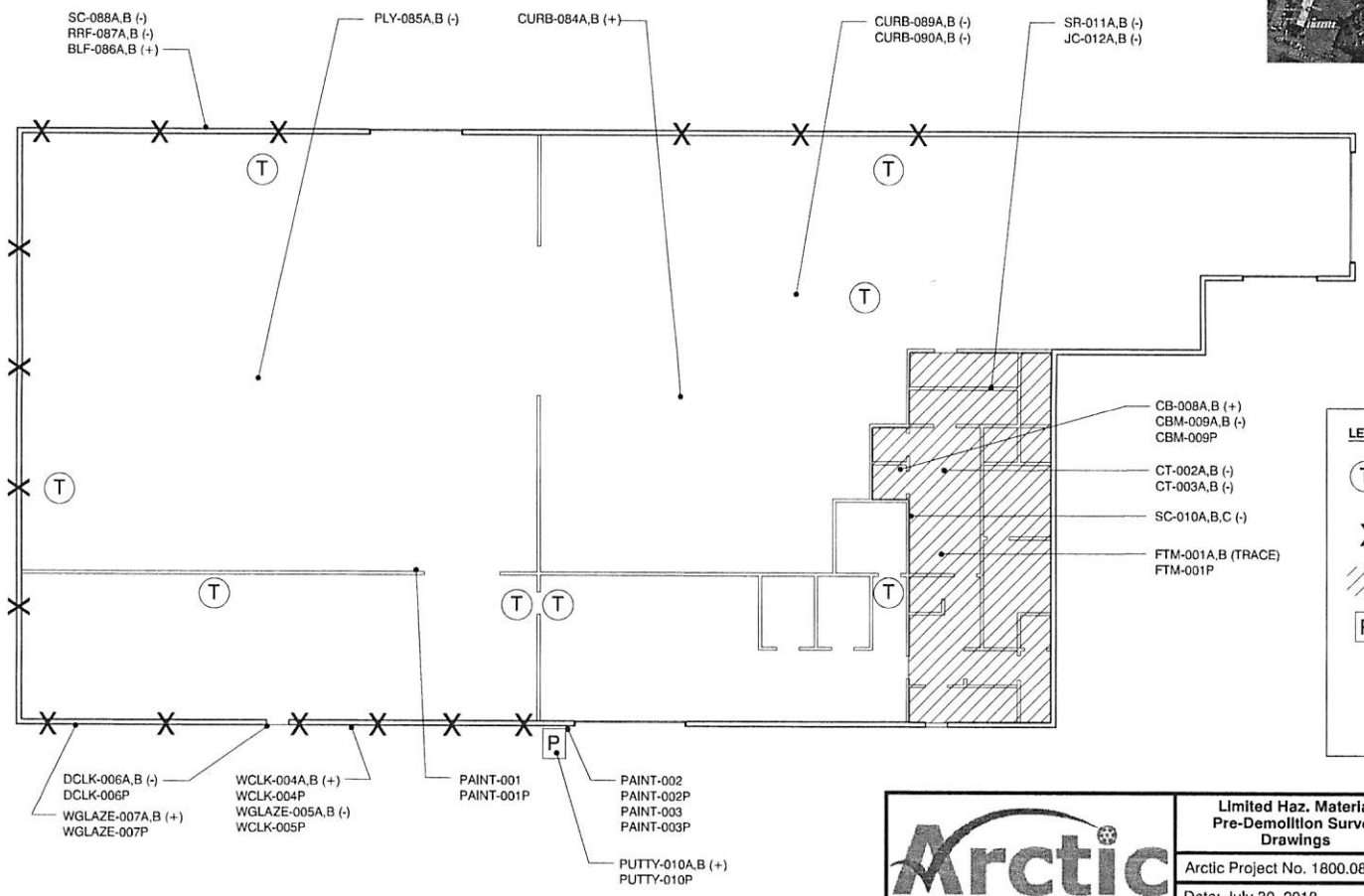

LEGEND:

- (T) ACM - TRANSITE PIPING & ASSOCIATED HEAT STACKS (135 LF)
- X ACM - WINDOW CAULK & WINDOW GLAZE (1,220 LF)
- ACM - FLOOR TILE (1,100 SF) APPLIED TO WALLS AS COVE BASE (100 LF)
- [P] ACM - PUTTY (1SF)
- * ROOF FLASHING & CURBING (464 LF + 9 SF)
- * FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
- * ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

Arctic ENTERPRISES, INC.

Limited Haz. Material Pre-Demolition Survey Drawings	ERSI, Inc.
Arctic Project No. 1800.085	Former Roth Steel, 800 Hiawatha Blvd., Syracuse, NY 13204 — Building 2
Date: July 30, 2018	Arctic Enterprises Inc., 222 Teall Avenue, Suite 201, Syracuse, NY, Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 2
Scale: None	

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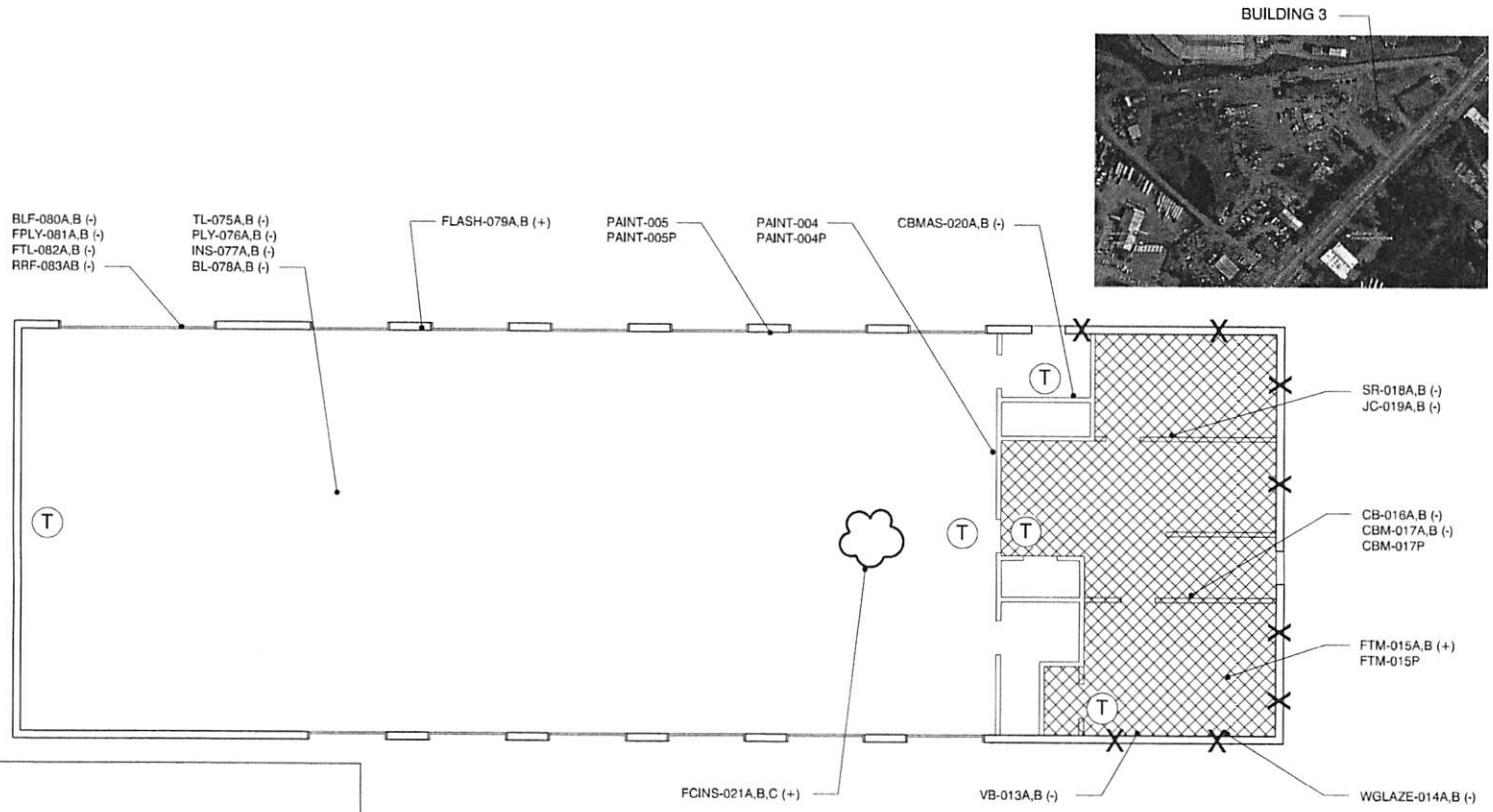

LEGEND:

- (T) ACM - TRANSITE PIPING & ASSOCIATED HEAT STACK (30 LF)
- ACM - FLOOR TILE AND FLOOR TILE MASTIC (771 SF) APPLIED TO WALLS AS COVE BASE (20 LF)
- ACM - FILE CABINET INSULATION (6 SF)
- X ACM - WINDOW CAULK AND WINDOW GLAZE (776 LF)
- * ACM ROOF FLASHING (302 LF)
- * FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
- * ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

Arctic ENTERPRISES, INC.

Limited Haz. Material Pre-Demolition Survey Drawings	ERSI, Inc.	
Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 3
Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 3
Scale: None		

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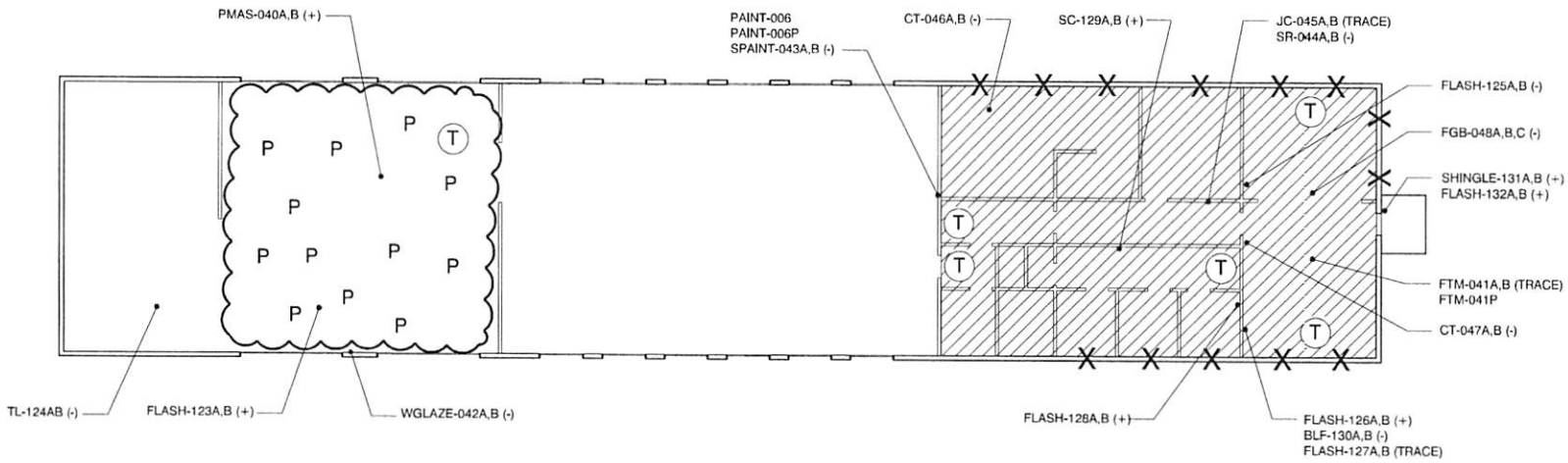
LEGEND:

- (T) ACM - TRANSITE PIPING & ASSOCIATED HEAT STACK (40 LF)
- (P) ACM - PIN MASTIC ABOVE FIBERGLASS (1,520 SF)
- ACM - FLOOR TILE (2,249 SF)
- X ACM - WINDOW GLAZE. (728 LF)
- * ACM - LOOP FLASHING & EAST SIDE ROOFS (211 LF)
- * ACM - BLOCK TO METAL ROOF FLASHING (76 LF)
- * ACM - SILVER ROOF COAT (3,900 SF)
- * ACM - SHINGLE ON FRONT AWNING (20 LF)
- * ACM - SHINGLE FLASHING ON FRONT AWNING (12 LF)
- * FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
- * ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

BUILDING 4



Arctic ENTERPRISES, INC.	**Limited Haz. Material Pre-Demolition Survey Drawings**	ERSI, Inc.	
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 4
	Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 4
	Scale: None		

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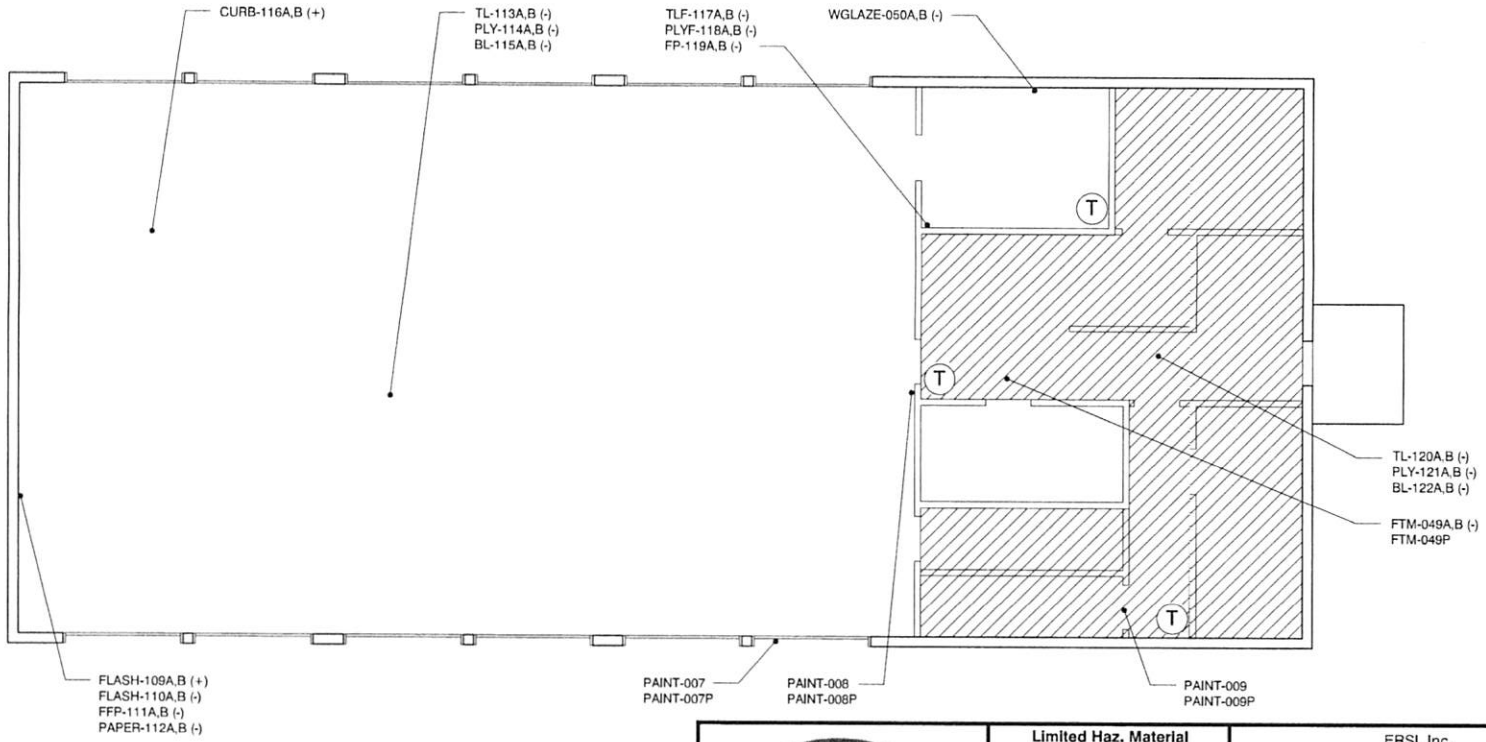
LEGEND:

- (T) ACM - TRANSITE PIPING & ASSOCIATED HEAT STACK (60 LF)
- ACM - FLOOR TILE (808 SF)
- ★ ACM - GRAY ROOF FLASHING (119 LF)
- ★ ACM - CURB PENETRATION FLASHING (8 LF)
- ★ ACM - SHINGLES ON FRONT AWNING (20 LF)
- ★ ACM - SHINGLE FLASHING ON FRONT AWNING (12 LF)
- ★ FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
- ★ ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

BUILDING 5



Arctic ENTERPRISES, INC.

Limited Haz. Material Pre-Demolition Survey Drawings	ERSI, Inc.	
Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 5
Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 5
Scale: None		

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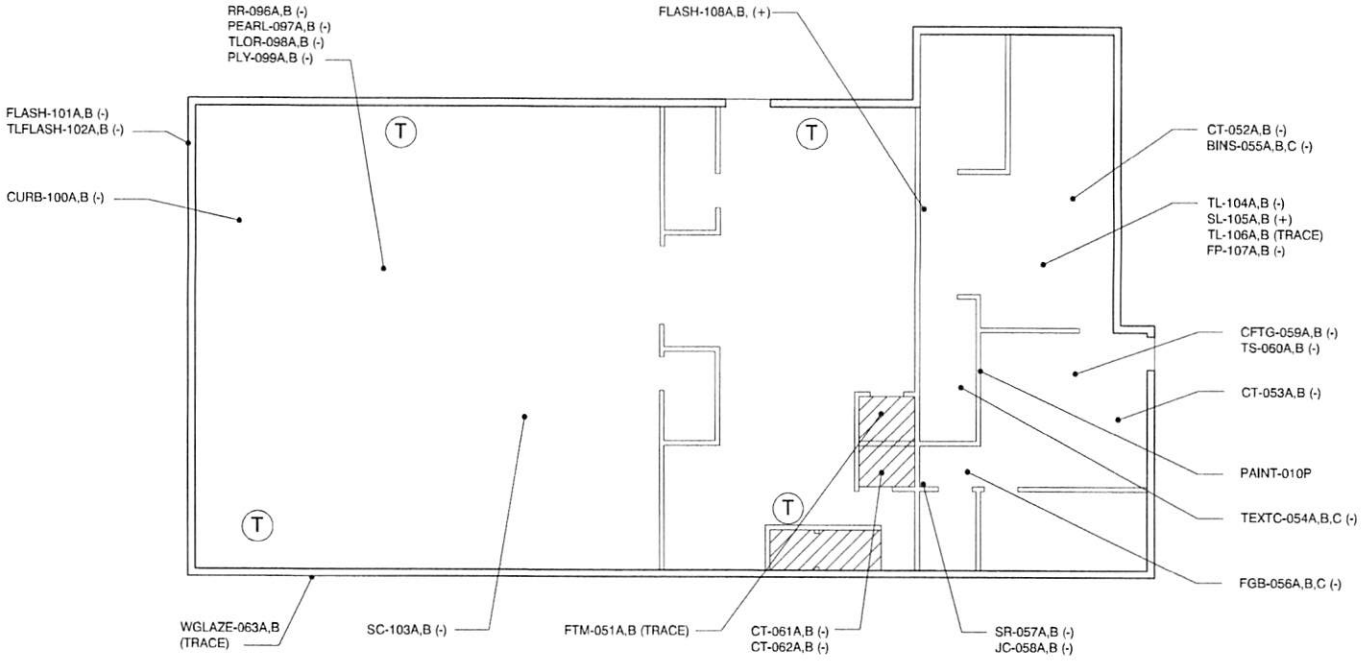
LEGEND:

(T) ACM - TRANSITE PIPING & ASSOCIATED HEAT STACK (105 LF)

ACM - FLOOR TILE (310 SF)

* ACM - ROOFING FIELD (1,820 SF) & FLASHING (180 LF)
* FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)
* ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)

BUILDING 6



Arctic ENTERPRISES, INC.	**Limited Haz. Material Pre-Demolition Survey Drawings**	ERSI, Inc.
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204 — Building 6
	Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764 — FIGURE 6
	Scale: None	

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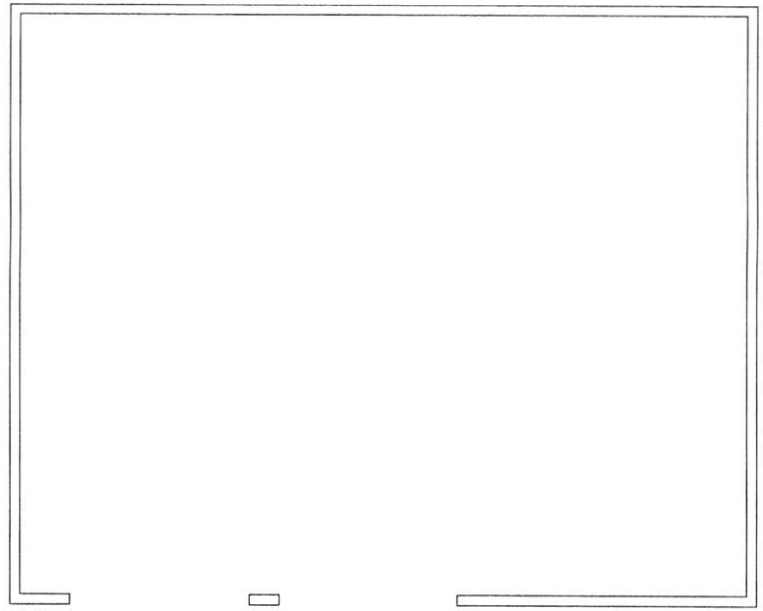
BUILDING 7

* STEEL BUILDING, NO SUSPECT ASBESTOS OR LEAD-BASED PAINT IDENTIFIED



Arctic ENTERPRISES, INC.	**Limited Haz. Material Pre-Demolition Survey Drawings**	ERSI, Inc.	
	Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building7
	Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 7
	Scale: None		

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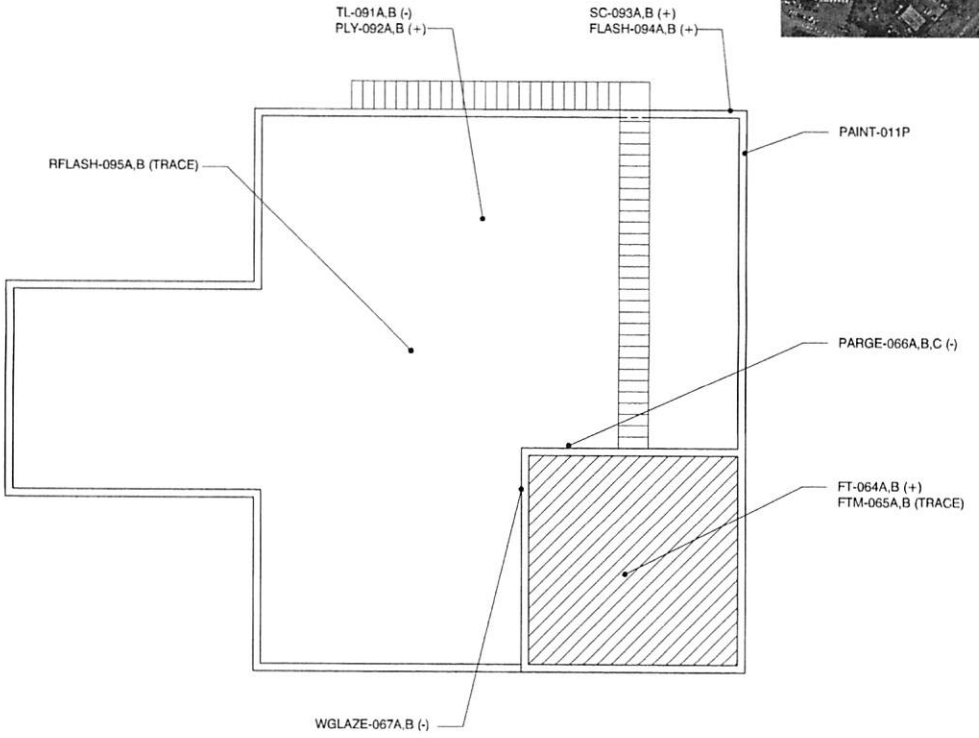
LEGEND:

ACM - FLOOR TILE (150 SF)

★ ACM - ROOF (FIELD & FLASHINGS) (880 SF & 226 LF)

★ FOUNDATION MASTIC (PRESUMED ON ALL BUILDINGS)

★ ELECTRICAL COMPONENTS (PRESUMED ON ALL BUILDINGS)



Arctic ENTERPRISES, INC.

Limited Haz. Material Pre-Demolition Survey Drawings	ERSI, Inc.	
Arctic Project No. 1800.085	Former Roth Steel 800 Hiawatha Blvd. Syracuse, NY 13204	Building 8
Date: July 30, 2018	Arctic Enterprises Inc. 222 Teall Avenue, Suite 201, Syracuse, NY Phone: (315) 476-1757, Fax: (315) 476-1764	FIGURE 8
Scale: None		

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181071

Ken Towsley
Director

Tom Steinberg
Assistant Director

Sam Perry
Assistant Director

DEPARTMENT OF NEIGHBORHOOD AND BUSINESS DEVELOPMENT

DIVISION OF CODE ENFORCEMENT

Ben Walsh, Mayor
Stephanie Pasquale, Commissioner

August 3, 2018

ERSI
5857 Fisher Rd.
East Syracuse, NY 13057
POC: Chad Parks

Re: **Condemnation Letter for 7 buildings at 800 Hiawatha Blvd.**

Chad:

As you know, the structures located at **800 Hiawatha Boulevard,** Syracuse, New York, have been released to you for demolition.

These properties are all vacant and have severe structural problems due to the deterioration that has taken place on these structures over the years. We consider the following structures to be unsound and unsafe for entry.

- **Building 1**
  - **Condemned / Unsafe For Entry**
- **Building 2**
  - **Condemned/Unsafe for Entry**
- **Building 3**
  - **Condemned / Unsafe For Entry**
- **Building 4**
  - **Condemned / Unsafe For Entry**
- **Building 6**
  - **Condemned / Unsafe For Entry**
- **Building 7**
  - **Condemned / Unsafe For Entry**
- **Building 8**
  - **Condemned / Unsafe For Entry**

The City of Syracuse and Syracuse Fire Department inspected these structures listed above and have deemed these structures to be unsound and unsafe for entry. The city of Syracuse is recommending these demolitions be performed under a NYS Variance.

If you have any questions, please call me at (315)448-8689.

Sincerely,

Brian P. Eisenberg
AD/Blighted Structure Supervisor

APPENDIX B

ANALYTICAL RESULTS (ON CD)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137331-1
Client Project/Site: Roth Bro's

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/28/2018 11:44:58 AM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 9
QC Sample Results 10
QC Association Summary 12
Lab Chronicle 14
Certification Summary 17
Method Summary 18
Sample Summary 19
Chain of Custody 20
Receipt Checklists 21

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-137331-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137331-1

Receipt
The samples were received on 6/13/2018 1:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

Receipt Exceptions
Sample W1-7 (480-137731-9) was submitted for analyses but not listed on the COC. Log in information was taken from container label.

GC Semi VOA
Method(s) 8082A: Surrogate recovery for the following samples were outside control limits: W1-1 (480-137331-1), F1-3 (480-137331-2), F1-5 (480-137331-4), F1-6 (480-137331-5) and W7-5 (480-137331-8). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 8082A: The following samples were diluted to bring the concentration of target analytes within the calibration range: F1-3 (480-137331-2), W1-4 (480-137331-3) and F1-5 (480-137331-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Client Sample ID: W1-1 — Lab Sample ID: 480-137331-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	5.4		0.22	0.043	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	1.8		0.22	0.10	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F1-3 — Lab Sample ID: 480-137331-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	17		0.42	0.083	mg/Kg	2	☼	8082A	Total/NA
PCB-1254	7.9		0.42	0.20	mg/Kg	2	☼	8082A	Total/NA

Client Sample ID: W1-4 — Lab Sample ID: 480-137331-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	8.6		0.48	0.095	mg/Kg	2	☼	8082A	Total/NA
PCB-1254	2.1		0.48	0.23	mg/Kg	2	☼	8082A	Total/NA

Client Sample ID: F1-5 — Lab Sample ID: 480-137331-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	13		0.45	0.088	mg/Kg	2	☼	8082A	Total/NA
PCB-1254	7.4		0.45	0.21	mg/Kg	2	☼	8082A	Total/NA

Client Sample ID: F1-6 — Lab Sample ID: 480-137331-5

No Detections.

Client Sample ID: W7-2 — Lab Sample ID: 480-137331-6

No Detections.

Client Sample ID: W7-4 — Lab Sample ID: 480-137331-7

No Detections.

Client Sample ID: W7-5 — Lab Sample ID: 480-137331-8

No Detections.

Client Sample ID: W1-7 — Lab Sample ID: 480-137331-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	0.27		0.21	0.042	mg/Kg	1	☼	8082A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: W1-1

Lab Sample ID: 480-137331-1

Date Collected: 06/12/18 14:18
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 98.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1221	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1232	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1242	**5.4**		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1248	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1254	**1.8**		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1
PCB-1260	ND		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 18:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*69*		*60 - 154*	*06/14/18 06:22*	*06/18/18 18:16*	*1*
DCB Decachlorobiphenyl	*64*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 18:16*	*1*

Client Sample ID: F1-3

Lab Sample ID: 480-137331-2

Date Collected: 06/12/18 14:29
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.42	0.083	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1221	ND		0.42	0.083	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1232	ND		0.42	0.083	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1242	**17**		0.42	0.083	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1248	ND		0.42	0.083	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1254	**7.9**		0.42	0.20	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2
PCB-1260	ND		0.42	0.20	mg/Kg	☼	06/14/18 06:22	06/18/18 18:32	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*52*	*X*	*60 - 154*	*06/14/18 06:22*	*06/18/18 18:32*	*2*
DCB Decachlorobiphenyl	*47*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 18:32*	*2*

Client Sample ID: W1-4

Lab Sample ID: 480-137331-3

Date Collected: 06/12/18 14:37
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 98.6

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.48	0.095	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1221	ND		0.48	0.095	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1232	ND		0.48	0.095	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1242	**8.6**		0.48	0.095	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1248	ND		0.48	0.095	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1254	**2.1**		0.48	0.23	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2
PCB-1260	ND		0.48	0.23	mg/Kg	☼	06/14/18 06:22	06/18/18 18:48	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*60 - 154*	*06/14/18 06:22*	*06/18/18 18:48*	*2*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*06/14/18 06:22*	*06/18/18 18:48*	*2*

Client Sample ID: F1-5

Lab Sample ID: 480-137331-4

Date Collected: 06/12/18 14:47
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.4

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.45	0.088	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1221	ND		0.45	0.088	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1232	ND		0.45	0.088	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1242	**13**		0.45	0.088	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1248	ND		0.45	0.088	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1254	**7.4**		0.45	0.21	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2
PCB-1260	ND		0.45	0.21	mg/Kg	☼	06/14/18 06:22	06/18/18 19:04	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*74*		*60 - 154*	*06/14/18 06:22*	*06/18/18 19:04*	*2*
DCB Decachlorobiphenyl	*64*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 19:04*	*2*

Client Sample ID: F1-6

Lab Sample ID: 480-137331-5

Date Collected: 06/12/18 14:56
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 96.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1221	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1232	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1242	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1248	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1254	ND		0.21	0.099	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1
PCB-1260	ND		0.21	0.099	mg/Kg	☼	06/14/18 06:22	06/18/18 19:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*75*		*60 - 154*	*06/14/18 06:22*	*06/18/18 19:20*	*1*
DCB Decachlorobiphenyl	*60*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 19:20*	*1*

Client Sample ID: W7-2

Lab Sample ID: 480-137331-6

Date Collected: 06/12/18 16:07
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 72.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1221	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1232	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1242	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1248	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1254	ND		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*99*		*60 - 154*	*06/14/18 06:22*	*06/18/18 19:36*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*06/14/18 06:22*	*06/18/18 19:36*	*1*

Client Sample ID: W7-4

Lab Sample ID: 480-137331-7

Date Collected: 06/12/18 16:26
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 74.6

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.23	0.044	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1221	ND		0.23	0.044	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1232	ND		0.23	0.044	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1242	ND		0.23	0.044	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1248	ND		0.23	0.044	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1254	ND		0.23	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1
PCB-1260	ND		0.23	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 20:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*84*		*60 - 154*	*06/14/18 06:22*	*06/18/18 20:24*	*1*
DCB Decachlorobiphenyl	*69*		*65 - 174*	*06/14/18 06:22*	*06/18/18 20:24*	*1*

Client Sample ID: W7-5

Lab Sample ID: 480-137331-8

Date Collected: 06/12/18 16:41
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 94.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.041	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1221	ND		0.21	0.041	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1232	ND		0.21	0.041	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1242	ND		0.21	0.041	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1248	ND		0.21	0.041	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1254	ND		0.21	0.098	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1
PCB-1260	ND		0.21	0.098	mg/Kg	☼	06/14/18 06:22	06/18/18 20:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*73*		*60 - 154*	*06/14/18 06:22*	*06/18/18 20:40*	*1*
DCB Decachlorobiphenyl	*60*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 20:40*	*1*

Client Sample ID: W1-7

Lab Sample ID: 480-137331-9

Date Collected: 06/12/18 15:11
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 99.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.042	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1221	ND		0.21	0.042	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1232	ND		0.21	0.042	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1242	**0.27**		0.21	0.042	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1248	ND		0.21	0.042	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1254	ND		0.21	0.10	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1
PCB-1260	ND		0.21	0.10	mg/Kg	☼	06/21/18 07:45	06/22/18 17:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*60 - 154*	*06/21/18 07:45*	*06/22/18 17:35*	*1*
DCB Decachlorobiphenyl	*84*		*65 - 174*	*06/21/18 07:45*	*06/22/18 17:35*	*1*

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)											
		TCX1	DCBP1										
Lab Sample ID	Client Sample ID	(60-154)	(65-174)										
480-137331-1	W1-1	69	64 X										
480-137331-2	F1-3	52 X	47 X										
480-137331-3	W1-4	92	79										
480-137331-4	F1-5	74	64 X										
480-137331-5	F1-6	75	60 X										
480-137331-6	W7-2	99	79										
480-137331-7	W7-4	84	69										
480-137331-8	W7-5	73	60 X										
480-137331-9	W1-7	92	84										
LCS 480-419519/2-A	Lab Control Sample	114	90										
LCS 480-420543/2-A	Lab Control Sample	107	91										
MB 480-419519/1-A	Method Blank	97	79										
MB 480-420543/1-A	Method Blank	94	82										

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCBP = DCB Decachlorobiphenyl

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419519/1-A
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419519

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1221	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1232	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1242	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1248	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1254	ND		0.18	0.084	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1260	ND		0.18	0.084	mg/Kg		06/14/18 06:22	06/18/18 14:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*97*		*60 - 154*	*06/14/18 06:22*	*06/18/18 14:32*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*06/14/18 06:22*	*06/18/18 14:32*	*1*

Lab Sample ID: LCS 480-419519/2-A
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419519

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	1.71	2.20		mg/Kg		129	51 - 185
PCB-1260	1.71	2.19		mg/Kg		128	61 - 184

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*114*		*60 - 154*
DCB Decachlorobiphenyl	*90*		*65 - 174*

Lab Sample ID: MB 480-420543/1-A
Matrix: Solid
Analysis Batch: 421026

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420543

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.041	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1221	ND		0.21	0.041	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1232	ND		0.21	0.041	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1242	ND		0.21	0.041	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1248	ND		0.21	0.041	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1254	ND		0.21	0.097	mg/Kg		06/21/18 07:45	06/22/18 10:55	1
PCB-1260	ND		0.21	0.097	mg/Kg		06/21/18 07:45	06/22/18 10:55	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*94*		*60 - 154*	*06/21/18 07:45*	*06/22/18 10:55*	*1*
DCB Decachlorobiphenyl	*82*		*65 - 174*	*06/21/18 07:45*	*06/22/18 10:55*	*1*

Lab Sample ID: LCS 480-420543/2-A
Matrix: Solid
Analysis Batch: 421026

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420543

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	2.34	2.73		mg/Kg		117	51 - 185

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 480-420543/2-A
Matrix: Solid
Analysis Batch: 421026

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420543

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1260			2.34	2.87		mg/Kg		123	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*107*		*60 - 154*
DCB Decachlorobiphenyl	*91*		*65 - 174*

QC Association Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

GC Semi VOA

Prep Batch: 419519

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-1	W1-1	Total/NA	Solid	3550C	
480-137331-2	F1-3	Total/NA	Solid	3550C	
480-137331-3	W1-4	Total/NA	Solid	3550C	
480-137331-4	F1-5	Total/NA	Solid	3550C	
480-137331-5	F1-6	Total/NA	Solid	3550C	
480-137331-6	W7-2	Total/NA	Solid	3550C	
480-137331-7	W7-4	Total/NA	Solid	3550C	
480-137331-8	W7-5	Total/NA	Solid	3550C	
MB 480-419519/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419519/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 420192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-1	W1-1	Total/NA	Solid	8082A	419519
480-137331-2	F1-3	Total/NA	Solid	8082A	419519
480-137331-3	W1-4	Total/NA	Solid	8082A	419519
480-137331-4	F1-5	Total/NA	Solid	8082A	419519
480-137331-5	F1-6	Total/NA	Solid	8082A	419519
480-137331-6	W7-2	Total/NA	Solid	8082A	419519
480-137331-7	W7-4	Total/NA	Solid	8082A	419519
480-137331-8	W7-5	Total/NA	Solid	8082A	419519
MB 480-419519/1-A	Method Blank	Total/NA	Solid	8082A	419519
LCS 480-419519/2-A	Lab Control Sample	Total/NA	Solid	8082A	419519

Prep Batch: 420543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-9	W1-7	Total/NA	Solid	3550C	
MB 480-420543/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-420543/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 421026

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-9	W1-7	Total/NA	Solid	8082A	420543
MB 480-420543/1-A	Method Blank	Total/NA	Solid	8082A	420543
LCS 480-420543/2-A	Lab Control Sample	Total/NA	Solid	8082A	420543

General Chemistry

Analysis Batch: 419523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-1	W1-1	Total/NA	Solid	Moisture	
480-137331-2	F1-3	Total/NA	Solid	Moisture	
480-137331-3	W1-4	Total/NA	Solid	Moisture	
480-137331-4	F1-5	Total/NA	Solid	Moisture	
480-137331-5	F1-6	Total/NA	Solid	Moisture	
480-137331-6	W7-2	Total/NA	Solid	Moisture	
480-137331-7	W7-4	Total/NA	Solid	Moisture	
480-137331-8	W7-5	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 421523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137331-9	W1-7	Total/NA	Solid	Moisture	

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Client Sample ID: W1-1 — **Lab Sample ID: 480-137331-1**
Date Collected: 06/12/18 14:18 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W1-1 — **Lab Sample ID: 480-137331-1**
Date Collected: 06/12/18 14:18 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 98.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 18:16	W1T	TAL BUF

Client Sample ID: F1-3 — **Lab Sample ID: 480-137331-2**
Date Collected: 06/12/18 14:29 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F1-3 — **Lab Sample ID: 480-137331-2**
Date Collected: 06/12/18 14:29 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		2	420192	06/18/18 18:32	W1T	TAL BUF

Client Sample ID: W1-4 — **Lab Sample ID: 480-137331-3**
Date Collected: 06/12/18 14:37 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W1-4 — **Lab Sample ID: 480-137331-3**
Date Collected: 06/12/18 14:37 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 98.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		2	420192	06/18/18 18:48	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Client Sample ID: F1-5 — **Lab Sample ID: 480-137331-4**
Date Collected: 06/12/18 14:47 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F1-5 — **Lab Sample ID: 480-137331-4**
Date Collected: 06/12/18 14:47 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		2	420192	06/18/18 19:04	W1T	TAL BUF

Client Sample ID: F1-6 — **Lab Sample ID: 480-137331-5**
Date Collected: 06/12/18 14:56 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F1-6 — **Lab Sample ID: 480-137331-5**
Date Collected: 06/12/18 14:56 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 96.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 19:20	W1T	TAL BUF

Client Sample ID: W7-2 — **Lab Sample ID: 480-137331-6**
Date Collected: 06/12/18 16:07 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W7-2 — **Lab Sample ID: 480-137331-6**
Date Collected: 06/12/18 16:07 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 72.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 19:36	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Client Sample ID: W7-4 — **Lab Sample ID: 480-137331-7**
Date Collected: 06/12/18 16:26 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W7-4 — **Lab Sample ID: 480-137331-7**
Date Collected: 06/12/18 16:26 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 74.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 20:24	W1T	TAL BUF

Client Sample ID: W7-5 — **Lab Sample ID: 480-137331-8**
Date Collected: 06/12/18 16:41 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W7-5 — **Lab Sample ID: 480-137331-8**
Date Collected: 06/12/18 16:41 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 94.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 20:40	W1T	TAL BUF

Client Sample ID: W1-7 — **Lab Sample ID: 480-137331-9**
Date Collected: 06/12/18 15:11 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	421523	06/26/18 03:15	CSW	TAL BUF

Client Sample ID: W1-7 — **Lab Sample ID: 480-137331-9**
Date Collected: 06/12/18 15:11 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 99.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			420543	06/21/18 07:45	RLT	TAL BUF
Total/NA	Analysis	8082A		1	421026	06/22/18 17:35	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137331-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137331-1	W1-1	Solid	06/12/18 14:18	06/13/18 01:15
480-137331-2	F1-3	Solid	06/12/18 14:29	06/13/18 01:15
480-137331-3	W1-4	Solid	06/12/18 14:37	06/13/18 01:15
480-137331-4	F1-5	Solid	06/12/18 14:47	06/13/18 01:15
480-137331-5	F1-6	Solid	06/12/18 14:56	06/13/18 01:15
480-137331-6	W7-2	Solid	06/12/18 16:07	06/13/18 01:15
480-137331-7	W7-4	Solid	06/12/18 16:26	06/13/18 01:15
480-137331-8	W7-5	Solid	06/12/18 16:41	06/13/18 01:15
480-137331-9	W1-7	Solid	06/12/18 15:11	06/13/18 01:15

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-137331 COC

Client Information	Sampler: Dan Peacock	Lab PM: Stone, Judy L	Carr	COC No: 480-114396-26482.1
Client Contact: Ms. Julia Braunmueller	Phone: 315-800-1807	E-Mail: judy.stone@testamericainc.com		Page: Page 1 of 6
Company: GZA GeoEnvironmental, Inc.				Job #:
Address: 6296 Fly Road	Due Date Requested:			
City: East Syracuse	TAT Requested (days): Standard			
State, Zip: NY, 13057	PO #: Purchase Order not required			
Phone: 315-800-1807(Tel)	WO #:			
Email: julia.braunmueller@gza.com	Project #: 48018260			
Project Name: Bulk Waste Samples	SSOW#:			
Site: Both Bros				

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
~~WW-2~~ ~~WT-1~~ W1-1	6/12/18	14:18	G	Solid				X				
~~WT-3~~ ~~W1-3~~ FI-3		14:29	G	Solid				X				
~~WT-4~~ W1-4		14:37	G	Solid				X				
~~WT-5~~ FI-5		14:43	G	Solid				X				
FI-6		14:56	G	Solid				X				
~~WW-2~~ W7-2		16:07	C	Solid				X				
W7-4		16:26	G	Solid				X				
W7-5		16:41	G	Solid				X				
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	~~Dan Peacock~~	6/12/18/17:37	GZA		6/12/18 1727	SVL
2	~~Dan Peacock~~ RLS	6-12-18, 19:02	SVL		6-13-18 0115	DHS
3						

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.4 #1

Ver: 08/04/2016

6/28/2018

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137331-1

Login Number: 137331

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GZA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137416-1
Client Project/Site: Roth Bro's

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/18/2018 5:27:51 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

LINKS

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Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 10
QC Sample Results 11
QC Association Summary 13
Lab Chronicle 15
Certification Summary 19
Method Summary 20
Sample Summary 21
Chain of Custody 22
Receipt Checklists 23

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
E	Result exceeded calibration range.
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-137416-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137416-1

Receipt
The samples were received on 6/14/2018 1:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.8º C.

GC Semi VOA
Method(s) 8082A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 480-419649 and analytical batch 480-419769 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 8082A: The following sample was diluted to bring the concentration of target analytes within the calibration range: F6-7 (480-137416-11). Elevated reporting limits (RLs) are provided.

Method(s) 8082A: Surrogate recovery for the following sample was outside control limits: F6-4 (480-137416-8). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 8082A: The continuing calibration verification (CCV) associated with batch 480-419973 recovered above the upper control limit for PCB-1260 and Decachlorobiphenyl. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: F6-2 (480-137416-6).

Method(s) 8082A: The continuing calibration verification (CCV) associated with batch 480-419973 recovered above the upper control limit for PCB-1221 and PCB-1254. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: F8-1 (480-137416-1), F8-2 (480-137416-2), W8-3 (480-137416-3), W8-4 (480-137416-4) and F6-1 (480-137416-5).

Method(s) 8082A: The following sample was diluted to bring the concentration of target analytes within the calibration range: F6-2 (480-137416-6). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Client Sample ID: F8-1 — Lab Sample ID: 480-137416-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	1.3		0.25	0.049	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F8-2 — Lab Sample ID: 480-137416-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	0.30		0.24	0.048	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W8-3 — Lab Sample ID: 480-137416-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	0.43		0.19	0.037	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W8-4 — Lab Sample ID: 480-137416-4

No Detections.

Client Sample ID: F6-1 — Lab Sample ID: 480-137416-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	5.6		0.25	0.048	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F6-2 — Lab Sample ID: 480-137416-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	6.8		0.42	0.082	mg/Kg	2	☼	8082A	Total/NA

Client Sample ID: W6-3 — Lab Sample ID: 480-137416-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	6.7		0.25	0.049	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F6-4 — Lab Sample ID: 480-137416-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	2.4		0.20	0.039	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W6-5 — Lab Sample ID: 480-137416-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	2.4		0.22	0.043	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W6-6 — Lab Sample ID: 480-137416-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	2.5		0.24	0.047	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F6-7 — Lab Sample ID: 480-137416-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1248	12		0.46	0.089	mg/Kg	2	☼	8082A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: F8-1

Lab Sample ID: 480-137416-1

Date Collected: 06/13/18 09:04
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 97.3

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.049	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1221	ND		0.25	0.049	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1232	ND		0.25	0.049	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1242	ND		0.25	0.049	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1248	**1.3**		0.25	0.049	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1254	ND		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/16/18 14:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*85*		*60 - 154*	*06/14/18 14:56*	*06/16/18 14:29*	*1*
DCB Decachlorobiphenyl	*89*		*65 - 174*	*06/14/18 14:56*	*06/16/18 14:29*	*1*

Client Sample ID: F8-2

Lab Sample ID: 480-137416-2

Date Collected: 06/13/18 09:14
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 95.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1221	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1232	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1242	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1248	**0.30**		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1254	ND		0.24	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1
PCB-1260	ND		0.24	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 14:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*72*		*60 - 154*	*06/14/18 14:56*	*06/16/18 14:44*	*1*
DCB Decachlorobiphenyl	*77*		*65 - 174*	*06/14/18 14:56*	*06/16/18 14:44*	*1*

Client Sample ID: W8-3

Lab Sample ID: 480-137416-3

Date Collected: 06/13/18 09:23
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.19	0.037	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1221	ND		0.19	0.037	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1232	ND		0.19	0.037	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1242	ND		0.19	0.037	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1248	**0.43**		0.19	0.037	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1254	ND		0.19	0.088	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1
PCB-1260	ND		0.19	0.088	mg/Kg	☼	06/14/18 14:56	06/16/18 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*103*		*60 - 154*	*06/14/18 14:56*	*06/16/18 14:59*	*1*
DCB Decachlorobiphenyl	*113*		*65 - 174*	*06/14/18 14:56*	*06/16/18 14:59*	*1*

Client Sample ID: W8-4

Lab Sample ID: 480-137416-4

Date Collected: 06/13/18 09:31
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.6

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.20	0.038	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1221	ND		0.20	0.038	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1232	ND		0.20	0.038	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1242	ND		0.20	0.038	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1248	ND		0.20	0.038	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1254	ND		0.20	0.091	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1
PCB-1260	ND		0.20	0.091	mg/Kg	☼	06/14/18 14:56	06/16/18 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*108*		*60 - 154*	*06/14/18 14:56*	*06/16/18 15:15*	*1*
DCB Decachlorobiphenyl	*147*		*65 - 174*	*06/14/18 14:56*	*06/16/18 15:15*	*1*

Client Sample ID: F6-1

Lab Sample ID: 480-137416-5

Date Collected: 06/13/18 10:08
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 95.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1221	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1232	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1242	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1248	**5.6**		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1254	ND		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/16/18 15:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*71*		*60 - 154*	*06/14/18 14:56*	*06/16/18 15:30*	*1*
DCB Decachlorobiphenyl	*140*		*65 - 174*	*06/14/18 14:56*	*06/16/18 15:30*	*1*

Client Sample ID: F6-2

Lab Sample ID: 480-137416-6

Date Collected: 06/13/18 10:18
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 96.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.42	0.082	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1221	ND		0.42	0.082	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1232	ND		0.42	0.082	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1242	ND		0.42	0.082	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1248	**6.8**		0.42	0.082	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1254	ND		0.42	0.20	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2
PCB-1260	ND		0.42	0.20	mg/Kg	☼	06/14/18 15:05	06/16/18 16:16	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*65*		*60 - 154*	*06/14/18 15:05*	*06/16/18 16:16*	*2*
DCB Decachlorobiphenyl	*108*		*65 - 174*	*06/14/18 15:05*	*06/16/18 16:16*	*2*

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Client Sample ID: W6-3

Lab Sample ID: 480-137416-7

Date Collected: 06/13/18 10:26
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 97.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	F1	0.25	0.049	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1221	ND		0.25	0.049	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1232	ND		0.25	0.049	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1242	ND		0.25	0.049	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1248	**6.7**		0.25	0.049	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1254	ND		0.25	0.12	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 15:12	06/15/18 14:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*78*		*60 - 154*	*06/14/18 15:12*	*06/15/18 14:27*	*1*
DCB Decachlorobiphenyl	*76*		*65 - 174*	*06/14/18 15:12*	*06/15/18 14:27*	*1*

Client Sample ID: F6-4

Lab Sample ID: 480-137416-8

Date Collected: 06/13/18 10:36
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 95.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.20	0.039	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1221	ND		0.20	0.039	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1232	ND		0.20	0.039	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1242	ND		0.20	0.039	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1248	**2.4**		0.20	0.039	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1254	ND		0.20	0.093	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1
PCB-1260	ND		0.20	0.093	mg/Kg	☼	06/14/18 15:12	06/15/18 14:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*62*		*60 - 154*	*06/14/18 15:12*	*06/15/18 14:43*	*1*
DCB Decachlorobiphenyl	*63*	*X*	*65 - 174*	*06/14/18 15:12*	*06/15/18 14:43*	*1*

Client Sample ID: W6-5

Lab Sample ID: 480-137416-9

Date Collected: 06/13/18 10:45
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.043	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1221	ND		0.22	0.043	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1232	ND		0.22	0.043	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1242	ND		0.22	0.043	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1248	**2.4**		0.22	0.043	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1254	ND		0.22	0.10	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1
PCB-1260	ND		0.22	0.10	mg/Kg	☼	06/14/18 15:12	06/15/18 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*79*		*60 - 154*	*06/14/18 15:12*	*06/15/18 14:58*	*1*
DCB Decachlorobiphenyl	*95*		*65 - 174*	*06/14/18 15:12*	*06/15/18 14:58*	*1*

Client Sample ID: W6-6

Lab Sample ID: 480-137416-10

Date Collected: 06/13/18 10:53
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.047	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1221	ND		0.24	0.047	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1232	ND		0.24	0.047	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1242	ND		0.24	0.047	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1248	**2.5**		0.24	0.047	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1254	ND		0.24	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1
PCB-1260	ND		0.24	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 15:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*71*		*60 - 154*	*06/14/18 15:12*	*06/15/18 15:13*	*1*
DCB Decachlorobiphenyl	*107*		*65 - 174*	*06/14/18 15:12*	*06/15/18 15:13*	*1*

Client Sample ID: F6-7

Lab Sample ID: 480-137416-11

Date Collected: 06/13/18 11:34
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 96.3

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.46	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1221	ND		0.46	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1232	ND		0.46	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1242	ND		0.46	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1248	**12**		0.46	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1254	ND		0.46	0.21	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2
PCB-1260	ND		0.46	0.21	mg/Kg	☼	06/14/18 15:12	06/15/18 15:29	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*83*		*60 - 154*	*06/14/18 15:12*	*06/15/18 15:29*	*2*
DCB Decachlorobiphenyl	*113*		*65 - 174*	*06/14/18 15:12*	*06/15/18 15:29*	*2*

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)											
		TCX1	DCBP1										
Lab Sample ID	Client Sample ID	(60-154)	(65-174)										
480-137416-1	F8-1	85	89										
480-137416-2	F8-2	72	77										
480-137416-3	W8-3	103	113										
480-137416-4	W8-4	108	147										
480-137416-5	F6-1	71	140										
480-137416-6	F6-2	65	108										
480-137416-7	W6-3	78	76										
480-137416-7 MS	W6-3	103	106										
480-137416-7 MSD	W6-3	124	109										
480-137416-8	F6-4	62	63 X										
480-137416-9	W6-5	79	95										
480-137416-10	W6-6	71	107										
480-137416-11	F6-7	83	113										
LCS 480-419642/2-A	Lab Control Sample	127	125										
LCS 480-419649/2-A	Lab Control Sample	131	130										
MB 480-419642/1-A	Method Blank	106	108										
MB 480-419649/1-A	Method Blank	108	116										

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCBP = DCB Decachlorobiphenyl

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419642/1-A
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419642

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1221	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1232	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1242	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1248	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1254	ND		0.24	0.11	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1260	ND		0.24	0.11	mg/Kg		06/14/18 14:56	06/16/18 10:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*106*		*60 - 154*	*06/14/18 14:56*	*06/16/18 10:39*	*1*
DCB Decachlorobiphenyl	*108*		*65 - 174*	*06/14/18 14:56*	*06/16/18 10:39*	*1*

Lab Sample ID: LCS 480-419642/2-A
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419642

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	2.15	3.10		mg/Kg		145	51 - 185
PCB-1260	2.15	3.52		mg/Kg		164	61 - 184

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*127*		*60 - 154*
DCB Decachlorobiphenyl	*125*		*65 - 174*

Lab Sample ID: MB 480-419649/1-A
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419649

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1221	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1232	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1242	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1248	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1254	ND		0.24	0.11	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1260	ND		0.24	0.11	mg/Kg		06/14/18 15:12	06/15/18 13:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*108*		*60 - 154*	*06/14/18 15:12*	*06/15/18 13:26*	*1*
DCB Decachlorobiphenyl	*116*		*65 - 174*	*06/14/18 15:12*	*06/15/18 13:26*	*1*

Lab Sample ID: LCS 480-419649/2-A
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419649

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	2.45	3.47		mg/Kg		142	51 - 185

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 480-419649/2-A
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419649

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1260			2.45	4.01		mg/Kg		164	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*131*		*60 - 154*
DCB Decachlorobiphenyl	*130*		*65 - 174*

Lab Sample ID: 480-137416-7 MS
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: W6-3
Prep Type: Total/NA
Prep Batch: 419649

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016	ND	F1	2.15	9.37	E F1	mg/Kg	☼	437	50 - 177		
PCB-1260	ND		2.15	3.39		mg/Kg	☼	158	33 - 200		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*103*		*60 - 154*
DCB Decachlorobiphenyl	*106*		*65 - 174*

Lab Sample ID: 480-137416-7 MSD
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: W6-3
Prep Type: Total/NA
Prep Batch: 419649

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016	ND	F1	1.86	7.97	E F1	mg/Kg	☼	429	50 - 177	16	50
PCB-1260	ND		1.86	2.58		mg/Kg	☼	139	33 - 200	27	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*124*		*60 - 154*
DCB Decachlorobiphenyl	*109*		*65 - 174*

GC Semi VOA

Prep Batch: 419642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-1	F8-1	Total/NA	Solid	3550C	
480-137416-2	F8-2	Total/NA	Solid	3550C	
480-137416-3	W8-3	Total/NA	Solid	3550C	
480-137416-4	W8-4	Total/NA	Solid	3550C	
480-137416-5	F6-1	Total/NA	Solid	3550C	
480-137416-6	F6-2	Total/NA	Solid	3550C	
MB 480-419642/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419642/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Prep Batch: 419649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-7	W6-3	Total/NA	Solid	3550C	
480-137416-8	F6-4	Total/NA	Solid	3550C	
480-137416-9	W6-5	Total/NA	Solid	3550C	
480-137416-10	W6-6	Total/NA	Solid	3550C	
480-137416-11	F6-7	Total/NA	Solid	3550C	
MB 480-419649/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419649/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-137416-7 MS	W6-3	Total/NA	Solid	3550C	
480-137416-7 MSD	W6-3	Total/NA	Solid	3550C	

Analysis Batch: 419769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-7	W6-3	Total/NA	Solid	8082A	419649
480-137416-8	F6-4	Total/NA	Solid	8082A	419649
480-137416-9	W6-5	Total/NA	Solid	8082A	419649
480-137416-10	W6-6	Total/NA	Solid	8082A	419649
480-137416-11	F6-7	Total/NA	Solid	8082A	419649
MB 480-419649/1-A	Method Blank	Total/NA	Solid	8082A	419649
LCS 480-419649/2-A	Lab Control Sample	Total/NA	Solid	8082A	419649
480-137416-7 MS	W6-3	Total/NA	Solid	8082A	419649
480-137416-7 MSD	W6-3	Total/NA	Solid	8082A	419649

Analysis Batch: 419973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-1	F8-1	Total/NA	Solid	8082A	419642
480-137416-2	F8-2	Total/NA	Solid	8082A	419642
480-137416-3	W8-3	Total/NA	Solid	8082A	419642
480-137416-4	W8-4	Total/NA	Solid	8082A	419642
480-137416-5	F6-1	Total/NA	Solid	8082A	419642
480-137416-6	F6-2	Total/NA	Solid	8082A	419642
MB 480-419642/1-A	Method Blank	Total/NA	Solid	8082A	419642
LCS 480-419642/2-A	Lab Control Sample	Total/NA	Solid	8082A	419642

General Chemistry

Analysis Batch: 419535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-1	F8-1	Total/NA	Solid	Moisture	
480-137416-2	F8-2	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 419535 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137416-3	W8-3	Total/NA	Solid	Moisture	
480-137416-4	W8-4	Total/NA	Solid	Moisture	
480-137416-5	F6-1	Total/NA	Solid	Moisture	
480-137416-6	F6-2	Total/NA	Solid	Moisture	
480-137416-7	W6-3	Total/NA	Solid	Moisture	
480-137416-8	F6-4	Total/NA	Solid	Moisture	
480-137416-9	W6-5	Total/NA	Solid	Moisture	
480-137416-10	W6-6	Total/NA	Solid	Moisture	
480-137416-11	F6-7	Total/NA	Solid	Moisture	

Client Sample ID: F8-1 — **Lab Sample ID: 480-137416-1**
Date Collected: 06/13/18 09:04 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F8-1 — **Lab Sample ID: 480-137416-1**
Date Collected: 06/13/18 09:04 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 97.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 14:29	W1T	TAL BUF

Client Sample ID: F8-2 — **Lab Sample ID: 480-137416-2**
Date Collected: 06/13/18 09:14 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F8-2 — **Lab Sample ID: 480-137416-2**
Date Collected: 06/13/18 09:14 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 95.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 14:44	W1T	TAL BUF

Client Sample ID: W8-3 — **Lab Sample ID: 480-137416-3**
Date Collected: 06/13/18 09:23 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W8-3 — **Lab Sample ID: 480-137416-3**
Date Collected: 06/13/18 09:23 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 14:59	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Client Sample ID: W8-4 — **Lab Sample ID: 480-137416-4**
Date Collected: 06/13/18 09:31 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W8-4 — **Lab Sample ID: 480-137416-4**
Date Collected: 06/13/18 09:31 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 15:15	W1T	TAL BUF

Client Sample ID: F6-1 — **Lab Sample ID: 480-137416-5**
Date Collected: 06/13/18 10:08 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F6-1 — **Lab Sample ID: 480-137416-5**
Date Collected: 06/13/18 10:08 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 95.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 15:30	W1T	TAL BUF

Client Sample ID: F6-2 — **Lab Sample ID: 480-137416-6**
Date Collected: 06/13/18 10:18 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F6-2 — **Lab Sample ID: 480-137416-6**
Date Collected: 06/13/18 10:18 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 96.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 15:05	SGD	TAL BUF
Total/NA	Analysis	8082A		2	419973	06/16/18 16:16	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Client Sample ID: W6-3 — **Lab Sample ID: 480-137416-7**
Date Collected: 06/13/18 10:26 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W6-3 — **Lab Sample ID: 480-137416-7**
Date Collected: 06/13/18 10:26 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 97.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 14:27	W1T	TAL BUF

Client Sample ID: F6-4 — **Lab Sample ID: 480-137416-8**
Date Collected: 06/13/18 10:36 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F6-4 — **Lab Sample ID: 480-137416-8**
Date Collected: 06/13/18 10:36 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 95.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 14:43	W1T	TAL BUF

Client Sample ID: W6-5 — **Lab Sample ID: 480-137416-9**
Date Collected: 06/13/18 10:45 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W6-5 — **Lab Sample ID: 480-137416-9**
Date Collected: 06/13/18 10:45 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 14:58	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Client Sample ID: W6-6
Lab Sample ID: 480-137416-10

Date Collected: 06/13/18 10:53
Matrix: Solid
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W6-6
Lab Sample ID: 480-137416-10

Date Collected: 06/13/18 10:53
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 15:13	W1T	TAL BUF

Client Sample ID: F6-7
Lab Sample ID: 480-137416-11

Date Collected: 06/13/18 11:34
Matrix: Solid
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F6-7
Lab Sample ID: 480-137416-11

Date Collected: 06/13/18 11:34
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 96.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		2	419769	06/15/18 15:29	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137416-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137416-1	F8-1	Solid	06/13/18 09:04	06/14/18 01:00
480-137416-2	F8-2	Solid	06/13/18 09:14	06/14/18 01:00
480-137416-3	W8-3	Solid	06/13/18 09:23	06/14/18 01:00
480-137416-4	W8-4	Solid	06/13/18 09:31	06/14/18 01:00
480-137416-5	F6-1	Solid	06/13/18 10:08	06/14/18 01:00
480-137416-6	F6-2	Solid	06/13/18 10:18	06/14/18 01:00
480-137416-7	W6-3	Solid	06/13/18 10:26	06/14/18 01:00
480-137416-8	F6-4	Solid	06/13/18 10:36	06/14/18 01:00
480-137416-9	W6-5	Solid	06/13/18 10:45	06/14/18 01:00
480-137416-10	W6-6	Solid	06/13/18 10:53	06/14/18 01:00
480-137416-11	F6-7	Solid	06/13/18 11:34	06/14/18 01:00

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-137416 COC

Client Information	Sampler:	Lab PM: Stone, Judy L	Carrier	COC No: 480-114396-26482.3
Client Contact: Ms. Julia Braunmueller	Phone:	E-Mail: judy.stone@testamericainc.com		Page: Page 1 of
Company: GZA GeoEnvironmental, Inc.		Analysis Requested		Job #:
Address: 6296 Fly Road	Due Date Requested:			
City: East Syracuse	TAT Requested (days): Standard			
State, Zip: NY, 13057	PO #: Purchase Order not required			
Phone: 315-800-1807(Tel)	WO #:			
Email: julia.braunmueller@gza.com	Project #: 48018260			
Project Name: Bulk Waste Samples	SSOW#:			
Site: Roth Bros				

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	N	N	N	X	
F8-1	6/13/18	909	G	Solid				X				
F8-2	6/13/18	914	G	Solid				X				
W8-3	6/13/18	923	G	Solid				X				
W8-4	6/13/18	931	G	Solid				X				
F6-1	6/13/18	1008	G	Solid				X				
F6-2	6/13/18	1018	G	Solid				X				
W6-3	6/13/18	1026	G	Solid				X				
DUP ~~F6-3~~ F6-4	6/13/18	1036	G	Solid				X				
W6-5	6/13/18	1045	G	Solid				X				
W6-6	6/13/18	1053	G	Solid				X				
F6-7	6/13/18	1134	G	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	[signature]	6/13/18/16:40	GZA	[signature]	6-15-18, 16:40	TA
2	[signature]	6-13-18, 19:00	TA	[signature]	6-14-18 0160	TA
3						

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.8 #1

Ver: 08/04/2016

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137416-1

Login Number: 137416

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GZA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137329-1
Client Project/Site: Roth Bro's.

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/18/2018 5:32:37 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 8
QC Sample Results 9
QC Association Summary 10
Lab Chronicle 11
Certification Summary 12
Method Summary 13
Sample Summary 14
Chain of Custody 15
Receipt Checklists 16

Definitions/Glossary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Job ID: 480-137329-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137329-1

Receipt
The samples were received on 6/13/2018 1:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

Receipt Exceptions
Buffalo did not receive a wipe kit for Sample Point WW7-2.

Buffalo received a wipe kit for Sample Point WW7-1, not listed on the COC.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Client Sample ID: WW2-1 — Lab Sample ID: 480-137329-1

No Detections.

Client Sample ID: WW1-2 — Lab Sample ID: 480-137329-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1254	1.5		1.0	0.25	ug/Wipe	1		8082A	Total/NA
PCB-1260	0.45	J	1.0	0.25	ug/Wipe	1		8082A	Total/NA

Client Sample ID: WW7-6 — Lab Sample ID: 480-137329-3

No Detections.

Client Sample ID: WW7-7 — Lab Sample ID: 480-137329-4

No Detections.

Client Sample ID: WW7-1 — Lab Sample ID: 480-137329-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: WW2-1

Date Collected: 06/12/18 11:18
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-1
Matrix: Wipe

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1254	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1
PCB-1260	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*108*		*57 - 173*	*06/14/18 06:48*	*06/15/18 20:04*	*1*
DCB Decachlorobiphenyl	*117*		*59 - 171*	*06/14/18 06:48*	*06/15/18 20:04*	*1*

Client Sample ID: WW1-2

Date Collected: 06/12/18 14:22
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-2
Matrix: Wipe

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1254	**1.5**		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1
PCB-1260	**0.45**	**J**	1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*112*		*57 - 173*	*06/14/18 06:48*	*06/15/18 20:20*	*1*
DCB Decachlorobiphenyl	*115*		*59 - 171*	*06/14/18 06:48*	*06/15/18 20:20*	*1*

Client Sample ID: WW7-6

Date Collected: 06/12/18 16:55
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-3
Matrix: Wipe

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1254	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1
PCB-1260	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*139*		*57 - 173*	*06/14/18 06:48*	*06/15/18 20:35*	*1*
DCB Decachlorobiphenyl	*135*		*59 - 171*	*06/14/18 06:48*	*06/15/18 20:35*	*1*

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Client Sample ID: WW7-7

Lab Sample ID: 480-137329-4

Date Collected: 06/12/18 17:02

Matrix: Wipe

Date Received: 06/13/18 01:10

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1254	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1
PCB-1260	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 20:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*112*		*57 - 173*	*06/14/18 06:48*	*06/15/18 20:50*	*1*
DCB Decachlorobiphenyl	*106*		*59 - 171*	*06/14/18 06:48*	*06/15/18 20:50*	*1*

Client Sample ID: WW7-1

Lab Sample ID: 480-137329-5

Date Collected: 06/12/18 16:00

Matrix: Wipe

Date Received: 06/13/18 01:10

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1254	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1
PCB-1260	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 21:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*98*		*57 - 173*	*06/14/18 06:48*	*06/15/18 21:06*	*1*
DCB Decachlorobiphenyl	*109*		*59 - 171*	*06/14/18 06:48*	*06/15/18 21:06*	*1*

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Wipe **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	TCX1 (57-173)	DCBP1 (59-171)								
480-137329-1	WW2-1	108	117								
480-137329-2	WW1-2	112	115								
480-137329-3	WW7-6	139	135								
480-137329-4	WW7-7	112	106								
480-137329-5	WW7-1	98	109								
LCS 480-419521/2-A	Lab Control Sample	122	118								
LCSD 480-419521/3-A	Lab Control Sample Dup	128	129								
MB 480-419521/1-A	Method Blank	101	114								

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419521/1-A
Matrix: Wipe
Analysis Batch: 419769

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419521

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1221	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1232	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1242	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1248	ND		1.0	0.18	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1254	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1
PCB-1260	ND		1.0	0.25	ug/Wipe		06/14/18 06:48	06/15/18 19:19	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*101*		*57 - 173*	*06/14/18 06:48*	*06/15/18 19:19*	*1*
DCB Decachlorobiphenyl	*114*		*59 - 171*	*06/14/18 06:48*	*06/15/18 19:19*	*1*

Lab Sample ID: LCS 480-419521/2-A
Matrix: Wipe
Analysis Batch: 419769

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419521

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016			20.0	29.2		ug/Wipe		146	54 - 182		
PCB-1260			20.0	30.8		ug/Wipe		154	53 - 187		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*122*		*57 - 173*
DCB Decachlorobiphenyl	*118*		*59 - 171*

Lab Sample ID: LCSD 480-419521/3-A
Matrix: Wipe
Analysis Batch: 419769

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 419521

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016			20.0	25.5		ug/Wipe		128	54 - 182	13	50
PCB-1260			20.0	28.5		ug/Wipe		142	53 - 187	8	50

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*128*		*57 - 173*
DCB Decachlorobiphenyl	*129*		*59 - 171*

QC Association Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

GC Semi VOA

Prep Batch: 419521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137329-1	WW2-1	Total/NA	Wipe	3550C	
480-137329-2	WW1-2	Total/NA	Wipe	3550C	
480-137329-3	WW7-6	Total/NA	Wipe	3550C	
480-137329-4	WW7-7	Total/NA	Wipe	3550C	
480-137329-5	WW7-1	Total/NA	Wipe	3550C	
MB 480-419521/1-A	Method Blank	Total/NA	Wipe	3550C	
LCS 480-419521/2-A	Lab Control Sample	Total/NA	Wipe	3550C	
LCSD 480-419521/3-A	Lab Control Sample Dup	Total/NA	Wipe	3550C	

Analysis Batch: 419769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137329-1	WW2-1	Total/NA	Wipe	8082A	419521
480-137329-2	WW1-2	Total/NA	Wipe	8082A	419521
480-137329-3	WW7-6	Total/NA	Wipe	8082A	419521
480-137329-4	WW7-7	Total/NA	Wipe	8082A	419521
480-137329-5	WW7-1	Total/NA	Wipe	8082A	419521
MB 480-419521/1-A	Method Blank	Total/NA	Wipe	8082A	419521
LCS 480-419521/2-A	Lab Control Sample	Total/NA	Wipe	8082A	419521
LCSD 480-419521/3-A	Lab Control Sample Dup	Total/NA	Wipe	8082A	419521

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Client Sample ID: WW2-1
Date Collected: 06/12/18 11:18
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-1
Matrix: Wipe

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419521	06/14/18 06:48	SMP	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 20:04	W1T	TAL BUF

Client Sample ID: WW1-2
Date Collected: 06/12/18 14:22
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-2
Matrix: Wipe

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419521	06/14/18 06:48	SMP	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 20:20	W1T	TAL BUF

Client Sample ID: WW7-6
Date Collected: 06/12/18 16:55
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-3
Matrix: Wipe

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419521	06/14/18 06:48	SMP	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 20:35	W1T	TAL BUF

Client Sample ID: WW7-7
Date Collected: 06/12/18 17:02
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-4
Matrix: Wipe

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419521	06/14/18 06:48	SMP	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 20:50	W1T	TAL BUF

Client Sample ID: WW7-1
Date Collected: 06/12/18 16:00
Date Received: 06/13/18 01:10

Lab Sample ID: 480-137329-5
Matrix: Wipe

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419521	06/14/18 06:48	SMP	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 21:06	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc. TestAmerica Job ID: 480-137329-1
Project/Site: Roth Bro's.

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8082A	3550C	Wipe	PCB-1016
8082A	3550C	Wipe	PCB-1221
8082A	3550C	Wipe	PCB-1232
8082A	3550C	Wipe	PCB-1242
8082A	3550C	Wipe	PCB-1248
8082A	3550C	Wipe	PCB-1254
8082A	3550C	Wipe	PCB-1260

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's.

TestAmerica Job ID: 480-137329-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137329-1	WW2-1	Wipe	06/12/18 11:18	06/13/18 01:10
480-137329-2	WW1-2	Wipe	06/12/18 14:22	06/13/18 01:10
480-137329-3	WW7-6	Wipe	06/12/18 16:55	06/13/18 01:10
480-137329-4	WW7-7	Wipe	06/12/18 17:02	06/13/18 01:10
480-137329-5	WW7-1	Wipe	06/12/18 16:00	06/13/18 01:10

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-137329 COC

Client Information	Sampler: D. Peacock	Lab PM: Stone, Judy L	Carri	COC No: 480-114396-26482.6
Client Contact: Ms. Julia Braunmueller	Phone: 315-800-1807	E-Mail: judy.stone@testamericainc.com		Page: Page 6 of 6
Company: GZA GeoEnvironmental, Inc.				Job #:
Address: 6296 Fly Road	Due Date Requested:			
City: East Syracuse	TAT Requested (days): Standard			
State, Zip: NY, 13057				
Phone: 315-800-1807(Tel)	PO #: Purchase Order not required			
Email: julia.braunmueller@gza.com	WO #:			
Project Name: Bulk Waste Samples	Project #: 48018260			
Site: Roth Bros	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	N	N	N	X	
WW2-1	06/12/18	11:18	—	Wipe				X				
WW1-2	6/12/18	14:22	—	Wipe				X				
~~WW7-5~~ WW7-2	6/12/18	16:18	—	Wipe				X				
~~WW7-3~~ Not Collected												
WW7-6	6/12/18	16:53	—	Wipe				X				
WW7-7	6/12/18	1702	—	Wipe				X				

RE
6-12-18

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Dustin Fletcher	6/12/18 / 17:37	GZA		6/12/18 1737	SYR
2	Relinquished	6-12-18, 19:00	Sgr		6-13-18 0110	TAS
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.4 #1

Ver: 08/04/2016

483325 - Syracuse SDG

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137329-1

Login Number: 137329

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GZA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137415-1
Client Project/Site: Roth Bro's

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/25/2018 2:59:48 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 6
Client Sample Results 7
Surrogate Summary 12
QC Sample Results 14
QC Association Summary 23
Lab Chronicle 27
Certification Summary 31
Method Summary 32
Sample Summary 33
Chain of Custody 34
Receipt Checklists 35

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-137415-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137415-1

Receipt
The samples were received on 6/14/2018 1:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.8º C.

Receipt Exceptions
The following sample was submitted for analysis; however, it was not listed on the Chain-of-Custody (COC): WI-7 (480-137415-12). It was assigned to the login on 6/18/18 at the direction of the TA PM.

GC/MS VOA
Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 480-420889 recovered outside acceptance criteria, low biased, for Chloroform. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated sample was non-detect for this analyte, the data have been reported.SB6 (480-137415-1)

Method(s) 8260C: The following samples were diluted due to the nature of the TCLP matrix: SB6 (480-137415-1) and (LB 480-420157/1-A). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8082A: The continuing calibration verification (CCV) associated with batch 480-419973 recovered above the upper control limit for PCB-1221 and PCB-1254. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: SB6-2 (480-137415-2), F3-1 (480-137415-5), F3-2 (480-137415-6), W3-3 (480-137415-7), W3-4 (480-137415-8), W3-5 (480-137415-9), F3-6 (480-137415-10) and W3-7 (480-137415-11).

Method(s) 8082A: The following sample was diluted due to the nature of the sample matrix: F3-2 (480-137415-6). Elevated reporting limits (RLs) are provided.

Method(s) 8082A: Surrogate recovery for the following sample was outside control limits: SB6 (480-137415-1). Re-extraction and/or re-analysis was performed with concurring results. The re-analysis has been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method(s) 6010C: The following samples were diluted for TCLP Cadmium due to the nature of the sample matrix: SB6 (480-137415-1), (480-137415-A-1-F MS), (480-137415-A-1-G MSD), (480-137415-A-1-E PDS) and (480-137415-A-1-E SD). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method(s) 1311: Due to insufficient sample the TCLP volume was reduced from 2000 ml to 1000 ml and the mass of the sample from 100g to 50g for the following sample: BIN COMPOSITE (480-137415-3). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following sample: BIN COMPOSITE (480-137415-3). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Job ID: 480-137415-1 (Continued)

Laboratory: TestAmerica Buffalo (Continued)

Method(s) 3550C: The following samples: SB6 (480-137415-1), SB6-2 (480-137415-2) and F3-2 (480-137415-6) was decanted prior to preparation.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Client Sample ID: SB6 — Lab Sample ID: 480-137415-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	4.1		1.1	0.21	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	2.7		1.1	0.51	mg/Kg	1	☼	8082A	Total/NA
Arsenic	0.012	J	0.015	0.0056	mg/L	1		6010C	TCLP
Barium	0.87	J	1.0	0.10	mg/L	1		6010C	TCLP
Chromium	0.012	J	0.020	0.010	mg/L	1		6010C	TCLP
Lead	0.019	J B	0.020	0.0030	mg/L	1		6010C	TCLP

Client Sample ID: BIN COMPOSITE — Lab Sample ID: 480-137415-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	4.7		0.25	0.048	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	2.2		0.25	0.12	mg/Kg	1	☼	8082A	Total/NA
Barium	2.8		1.0	0.10	mg/L	1		6010C	TCLP
Cadmium	2.1		0.0020	0.00050	mg/L	1		6010C	TCLP
Chromium	0.023		0.020	0.010	mg/L	1		6010C	TCLP
Lead	4.3		0.020	0.0030	mg/L	1		6010C	TCLP

Client Sample ID: F3-1 — Lab Sample ID: 480-137415-5

No Detections.

Client Sample ID: F3-2 — Lab Sample ID: 480-137415-6

No Detections.

Client Sample ID: W3-3 — Lab Sample ID: 480-137415-7

No Detections.

Client Sample ID: W3-4 — Lab Sample ID: 480-137415-8

No Detections.

Client Sample ID: W3-5 — Lab Sample ID: 480-137415-9

No Detections.

Client Sample ID: F3-6 — Lab Sample ID: 480-137415-10

No Detections.

Client Sample ID: W3-7 — Lab Sample ID: 480-137415-11

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SB6
Date Collected: 06/13/18 11:11
Date Received: 06/14/18 01:00

Lab Sample ID: 480-137415-1
Matrix: Solid

Method: 8260C - TCLP Volatiles - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.010	0.0041	mg/L			06/21/18 22:47	10
Carbon tetrachloride	ND		0.010	0.0027	mg/L			06/21/18 22:47	10
Chlorobenzene	ND		0.010	0.0075	mg/L			06/21/18 22:47	10
Chloroform	ND		0.010	0.0034	mg/L			06/21/18 22:47	10
1,2-Dichloroethane	ND		0.010	0.0021	mg/L			06/21/18 22:47	10
1,1-Dichloroethene	ND		0.010	0.0029	mg/L			06/21/18 22:47	10
2-Butanone (MEK)	ND		0.050	0.013	mg/L			06/21/18 22:47	10
Tetrachloroethene	ND		0.010	0.0036	mg/L			06/21/18 22:47	10
Trichloroethene	ND		0.010	0.0046	mg/L			06/21/18 22:47	10
Vinyl chloride	ND		0.010	0.0090	mg/L			06/21/18 22:47	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*77 - 120*		*06/21/18 22:47*	*10*
Toluene-d8 (Surr)	*94*		*80 - 120*		*06/21/18 22:47*	*10*
4-Bromofluorobenzene (Surr)	*91*		*73 - 120*		*06/21/18 22:47*	*10*
Dibromofluoromethane (Surr)	*89*		*75 - 123*		*06/21/18 22:47*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010	0.00046	mg/L		06/19/18 14:38	06/21/18 21:29	1
2,4-Dinitrotoluene	ND		0.0050	0.00045	mg/L		06/19/18 14:38	06/21/18 21:29	1
Hexachlorobenzene	ND		0.0050	0.00051	mg/L		06/19/18 14:38	06/21/18 21:29	1
Hexachlorobutadiene	ND		0.0050	0.00068	mg/L		06/19/18 14:38	06/21/18 21:29	1
Hexachloroethane	ND		0.0050	0.00059	mg/L		06/19/18 14:38	06/21/18 21:29	1
3-Methylphenol	ND		0.010	0.00040	mg/L		06/19/18 14:38	06/21/18 21:29	1
2-Methylphenol	ND		0.0050	0.00040	mg/L		06/19/18 14:38	06/21/18 21:29	1
4-Methylphenol	ND		0.010	0.00036	mg/L		06/19/18 14:38	06/21/18 21:29	1
Nitrobenzene	ND		0.0050	0.00029	mg/L		06/19/18 14:38	06/21/18 21:29	1
Pentachlorophenol	ND		0.010	0.0022	mg/L		06/19/18 14:38	06/21/18 21:29	1
Pyridine	ND		0.025	0.00041	mg/L		06/19/18 14:38	06/21/18 21:29	1
2,4,5-Trichlorophenol	ND		0.0050	0.00048	mg/L		06/19/18 14:38	06/21/18 21:29	1
2,4,6-Trichlorophenol	ND		0.0050	0.00061	mg/L		06/19/18 14:38	06/21/18 21:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*94*		*41 - 120*	*06/19/18 14:38*	*06/21/18 21:29*	*1*
2-Fluorobiphenyl	*97*		*48 - 120*	*06/19/18 14:38*	*06/21/18 21:29*	*1*
2-Fluorophenol	*64*		*35 - 120*	*06/19/18 14:38*	*06/21/18 21:29*	*1*
Nitrobenzene-d5	*100*		*46 - 120*	*06/19/18 14:38*	*06/21/18 21:29*	*1*
p-Terphenyl-d14	*83*		*59 - 136*	*06/19/18 14:38*	*06/21/18 21:29*	*1*
Phenol-d5	*44*		*22 - 120*	*06/19/18 14:38*	*06/21/18 21:29*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.012**	**J**	0.015	0.0056	mg/L		06/19/18 11:07	06/20/18 20:35	1
Barium	**0.87**	**J**	1.0	0.10	mg/L		06/19/18 11:07	06/20/18 20:35	1
Cadmium	ND		0.010	0.0025	mg/L		06/19/18 11:07	06/21/18 10:25	5
Chromium	**0.012**	**J**	0.020	0.010	mg/L		06/19/18 11:07	06/20/18 20:35	1
Lead	**0.019**	**J B**	0.020	0.0030	mg/L		06/19/18 11:07	06/20/18 20:35	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 11:07	06/20/18 20:35	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 11:07	06/20/18 20:35	1

Client Sample ID: SB6

Lab Sample ID: 480-137415-1
Date Collected: 06/13/18 11:11
Matrix: Solid
Date Received: 06/14/18 01:00

Method: 7470A - TCLP Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 20:01	1

Client Sample ID: SB6

Lab Sample ID: 480-137415-1
Date Collected: 06/13/18 11:11
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 22.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		1.1	0.21	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1221	ND		1.1	0.21	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1232	ND		1.1	0.21	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1242	**4.1**		1.1	0.21	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1248	ND		1.1	0.21	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1254	**2.7**		1.1	0.51	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1
PCB-1260	ND		1.1	0.51	mg/Kg	☼	06/14/18 14:56	06/18/18 20:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*48*	*X*	*60 - 154*	*06/14/18 14:56*	*06/18/18 20:56*	*1*
DCB Decachlorobiphenyl	*44*	*X*	*65 - 174*	*06/14/18 14:56*	*06/18/18 20:56*	*1*

Client Sample ID: BIN COMPOSITE

Lab Sample ID: 480-137415-3
Date Collected: 06/13/18 13:28
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1221	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1232	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1242	**4.7**		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1248	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1254	**2.2**		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 14:56	06/18/18 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*132*		*60 - 154*	*06/14/18 14:56*	*06/18/18 21:11*	*1*
DCB Decachlorobiphenyl	*82*		*65 - 174*	*06/14/18 14:56*	*06/18/18 21:11*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015	0.0056	mg/L		06/19/18 10:37	06/20/18 11:30	1
Barium	**2.8**		1.0	0.10	mg/L		06/19/18 10:37	06/20/18 11:30	1
Cadmium	**2.1**		0.0020	0.00050	mg/L		06/19/18 10:37	06/20/18 11:30	1
Chromium	**0.023**		0.020	0.010	mg/L		06/19/18 10:37	06/20/18 11:30	1
Lead	**4.3**		0.020	0.0030	mg/L		06/19/18 10:37	06/20/18 11:30	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 10:37	06/20/18 11:30	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 10:37	06/20/18 11:30	1

Method: 7470A - TCLP Mercury - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 19:27	1

Client Sample ID: F3-1

Lab Sample ID: 480-137415-5

Date Collected: 06/13/18 14:54
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 96.7

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1221	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1232	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1242	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1248	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1254	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1
PCB-1260	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 11:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*87*		*60 - 154*	*06/14/18 14:56*	*06/16/18 11:40*	*1*
DCB Decachlorobiphenyl	*84*		*65 - 174*	*06/14/18 14:56*	*06/16/18 11:40*	*1*

Client Sample ID: F3-2

Lab Sample ID: 480-137415-6

Date Collected: 06/13/18 15:00
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 72.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.47	0.092	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1221	ND		0.47	0.092	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1232	ND		0.47	0.092	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1242	ND		0.47	0.092	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1248	ND		0.47	0.092	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1254	ND		0.47	0.22	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2
PCB-1260	ND		0.47	0.22	mg/Kg	☼	06/14/18 14:56	06/16/18 12:57	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*79*		*60 - 154*	*06/14/18 14:56*	*06/16/18 12:57*	*2*
DCB Decachlorobiphenyl	*82*		*65 - 174*	*06/14/18 14:56*	*06/16/18 12:57*	*2*

Client Sample ID: W3-3

Lab Sample ID: 480-137415-7

Date Collected: 06/13/18 15:10
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1221	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1232	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1242	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1248	ND		0.25	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1254	ND		0.25	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1
PCB-1260	ND		0.25	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*91*		*60 - 154*	*06/14/18 14:56*	*06/16/18 13:12*	*1*
DCB Decachlorobiphenyl	*105*		*65 - 174*	*06/14/18 14:56*	*06/16/18 13:12*	*1*

Client Sample ID: W3-4

Lab Sample ID: 480-137415-8

Date Collected: 06/13/18 15:15
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 91.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1221	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1232	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1242	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1248	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1254	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1
PCB-1260	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*103*		*60 - 154*	*06/14/18 14:56*	*06/16/18 13:27*	*1*
DCB Decachlorobiphenyl	*117*		*65 - 174*	*06/14/18 14:56*	*06/16/18 13:27*	*1*

Client Sample ID: W3-5

Lab Sample ID: 480-137415-9

Date Collected: 06/13/18 15:24
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.043	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1221	ND		0.22	0.043	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1232	ND		0.22	0.043	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1242	ND		0.22	0.043	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1248	ND		0.22	0.043	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1254	ND		0.22	0.10	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1
PCB-1260	ND		0.22	0.10	mg/Kg	☼	06/14/18 14:56	06/16/18 13:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*114*		*60 - 154*	*06/14/18 14:56*	*06/16/18 13:43*	*1*
DCB Decachlorobiphenyl	*123*		*65 - 174*	*06/14/18 14:56*	*06/16/18 13:43*	*1*

Client Sample ID: F3-6

Lab Sample ID: 480-137415-10

Date Collected: 06/13/18 15:32
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.7

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1221	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1232	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1242	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1248	ND		0.24	0.048	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1254	ND		0.24	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1
PCB-1260	ND		0.24	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 13:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*76*		*60 - 154*	*06/14/18 14:56*	*06/16/18 13:58*	*1*
DCB Decachlorobiphenyl	*82*		*65 - 174*	*06/14/18 14:56*	*06/16/18 13:58*	*1*

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Client Sample ID: W3-7
Date Collected: 06/13/18 15:39
Date Received: 06/14/18 01:00

Lab Sample ID: 480-137415-11
Matrix: Solid
Percent Solids: 97.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1221	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1232	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1242	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1248	ND		0.23	0.045	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1254	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1
PCB-1260	ND		0.23	0.11	mg/Kg	☼	06/14/18 14:56	06/16/18 14:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*118*		*60 - 154*	*06/14/18 14:56*	*06/16/18 14:13*	*1*
DCB Decachlorobiphenyl	*120*		*65 - 174*	*06/14/18 14:56*	*06/16/18 14:13*	*1*

Method: 8260C - TCLP Volatiles

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(77-120)	(80-120)	(73-120)	(75-123)
LCS 480-420889/5	Lab Control Sample	92	100	100	97
MB 480-420889/7	Method Blank	96	101	96	97

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260C - TCLP Volatiles

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(77-120)	(80-120)	(73-120)	(75-123)
480-137415-1	SB6	91	94	91	89
LB 480-420157/1-A	Method Blank	94	94	91	94

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(59-136)	(22-120)
LCS 480-420428/2-A	Lab Control Sample	93	85	46	81	104	36
LCSD 480-420428/3-A	Lab Control Sample Dup	89	86	47	84	101	38
MB 480-420428/1-A	Method Blank	84	104	58	107	116	43

Surrogate Legend

TBP = 2,4,6-Tribromophenol
FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
TPHd14 = p-Terphenyl-d14
PHL = Phenol-d5

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	TPHd14	PHL
Lab Sample ID	Client Sample ID	(41-120)	(48-120)	(35-120)	(46-120)	(59-136)	(22-120)
480-137415-1	SB6	94	97	64	100	83	44
LB2 480-420208/1-G	Method Blank	92	99	58	101	111	42

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Surrogate Legend

TBP = 2,4,6-Tribromophenol
FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol
NBZ = Nitrobenzene-d5
TPHd14 = p-Terphenyl-d14
PHL = Phenol-d5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)											
		TCX1	DCBP1										
Lab Sample ID	Client Sample ID	(60-154)	(65-174)										
480-137415-1	SB6	48 X	44 X										
480-137415-3	BIN COMPOSITE	132	82										
480-137415-5	F3-1	87	84										
480-137415-5 MS	F3-1	133	112										
480-137415-5 MSD	F3-1	128	113										
480-137415-6	F3-2	79	82										
480-137415-7	W3-3	91	105										
480-137415-8	W3-4	103	117										
480-137415-9	W3-5	114	123										
480-137415-10	F3-6	76	82										
480-137415-11	W3-7	118	120										
LCS 480-419642/2-A	Lab Control Sample	127	125										
MB 480-419642/1-A	Method Blank	106	108										

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Method: 8260C - TCLP Volatiles

Lab Sample ID: MB 480-420889/7
Matrix: Solid
Analysis Batch: 420889

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0010	0.00041	mg/L			06/21/18 16:47	1
Carbon tetrachloride	ND		0.0010	0.00027	mg/L			06/21/18 16:47	1
Chlorobenzene	ND		0.0010	0.00075	mg/L			06/21/18 16:47	1
Chloroform	ND		0.0010	0.00034	mg/L			06/21/18 16:47	1
1,2-Dichloroethane	ND		0.0010	0.00021	mg/L			06/21/18 16:47	1
1,1-Dichloroethene	ND		0.0010	0.00029	mg/L			06/21/18 16:47	1
2-Butanone (MEK)	ND		0.0050	0.0013	mg/L			06/21/18 16:47	1
Tetrachloroethene	ND		0.0010	0.00036	mg/L			06/21/18 16:47	1
Trichloroethene	ND		0.0010	0.00046	mg/L			06/21/18 16:47	1
Vinyl chloride	ND		0.0010	0.00090	mg/L			06/21/18 16:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*77 - 120*		*06/21/18 16:47*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*06/21/18 16:47*	*1*
4-Bromofluorobenzene (Surr)	*96*		*73 - 120*		*06/21/18 16:47*	*1*
Dibromofluoromethane (Surr)	*97*		*75 - 123*		*06/21/18 16:47*	*1*

Lab Sample ID: LCS 480-420889/5
Matrix: Solid
Analysis Batch: 420889

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0250	0.0242		mg/L		97	71 - 124
Carbon tetrachloride	0.0250	0.0266		mg/L		106	72 - 134
Chlorobenzene	0.0250	0.0244		mg/L		98	80 - 120
Chloroform	0.0250	0.0223		mg/L		89	73 - 127
1,2-Dichloroethane	0.0250	0.0233		mg/L		93	75 - 120
1,1-Dichloroethene	0.0250	0.0246		mg/L		98	66 - 127
2-Butanone (MEK)	0.125	0.111		mg/L		89	57 - 140
Tetrachloroethene	0.0250	0.0250		mg/L		100	74 - 122
Trichloroethene	0.0250	0.0247		mg/L		99	74 - 123
Vinyl chloride	0.0250	0.0243		mg/L		97	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*77 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*73 - 120*
Dibromofluoromethane (Surr)	*97*		*75 - 123*

Lab Sample ID: LB 480-420157/1-A
Matrix: Solid
Analysis Batch: 420889

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.010	0.0041	mg/L			06/21/18 19:37	10
Carbon tetrachloride	ND		0.010	0.0027	mg/L			06/21/18 19:37	10
Chlorobenzene	ND		0.010	0.0075	mg/L			06/21/18 19:37	10

Method: 8260C - TCLP Volatiles (Continued)

Lab Sample ID: LB 480-420157/1-A
Matrix: Solid
Analysis Batch: 420889

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.010	0.0034	mg/L			06/21/18 19:37	10
1,2-Dichloroethane	ND		0.010	0.0021	mg/L			06/21/18 19:37	10
1,1-Dichloroethene	ND		0.010	0.0029	mg/L			06/21/18 19:37	10
2-Butanone (MEK)	ND		0.050	0.013	mg/L			06/21/18 19:37	10
Tetrachloroethene	ND		0.010	0.0036	mg/L			06/21/18 19:37	10
Trichloroethene	ND		0.010	0.0046	mg/L			06/21/18 19:37	10
Vinyl chloride	ND		0.010	0.0090	mg/L			06/21/18 19:37	10

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*77 - 120*		*06/21/18 19:37*	*10*
Toluene-d8 (Surr)	*94*		*80 - 120*		*06/21/18 19:37*	*10*
4-Bromofluorobenzene (Surr)	*91*		*73 - 120*		*06/21/18 19:37*	*10*
Dibromofluoromethane (Surr)	*94*		*75 - 123*		*06/21/18 19:37*	*10*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-420428/1-A
Matrix: Solid
Analysis Batch: 420842

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420428

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0025	0.00012	mg/L		06/19/18 14:38	06/21/18 13:06	1
2,4-Dinitrotoluene	ND		0.0013	0.00011	mg/L		06/19/18 14:38	06/21/18 13:06	1
Hexachlorobenzene	ND		0.0013	0.00013	mg/L		06/19/18 14:38	06/21/18 13:06	1
Hexachlorobutadiene	ND		0.0013	0.00017	mg/L		06/19/18 14:38	06/21/18 13:06	1
Hexachloroethane	ND		0.0013	0.00015	mg/L		06/19/18 14:38	06/21/18 13:06	1
3-Methylphenol	ND		0.0025	0.00010	mg/L		06/19/18 14:38	06/21/18 13:06	1
2-Methylphenol	ND		0.0013	0.00010	mg/L		06/19/18 14:38	06/21/18 13:06	1
4-Methylphenol	ND		0.0025	0.000090	mg/L		06/19/18 14:38	06/21/18 13:06	1
Nitrobenzene	ND		0.0013	0.000073	mg/L		06/19/18 14:38	06/21/18 13:06	1
Pentachlorophenol	ND		0.0025	0.00055	mg/L		06/19/18 14:38	06/21/18 13:06	1
Pyridine	ND		0.0063	0.00010	mg/L		06/19/18 14:38	06/21/18 13:06	1
2,4,5-Trichlorophenol	ND		0.0013	0.00012	mg/L		06/19/18 14:38	06/21/18 13:06	1
2,4,6-Trichlorophenol	ND		0.0013	0.00015	mg/L		06/19/18 14:38	06/21/18 13:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol	*84*		*41 - 120*	*06/19/18 14:38*	*06/21/18 13:06*	*1*
2-Fluorobiphenyl	*104*		*48 - 120*	*06/19/18 14:38*	*06/21/18 13:06*	*1*
2-Fluorophenol	*58*		*35 - 120*	*06/19/18 14:38*	*06/21/18 13:06*	*1*
Nitrobenzene-d5	*107*		*46 - 120*	*06/19/18 14:38*	*06/21/18 13:06*	*1*
p-Terphenyl-d14	*116*		*59 - 136*	*06/19/18 14:38*	*06/21/18 13:06*	*1*
Phenol-d5	*43*		*22 - 120*	*06/19/18 14:38*	*06/21/18 13:06*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-420428/2-A
Matrix: Solid
Analysis Batch: 420842

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420428

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,4-Dichlorobenzene			0.0500	0.0304		mg/L		61	51 - 120		
2,4-Dinitrotoluene			0.0500	0.0481		mg/L		96	69 - 120		
Hexachlorobenzene			0.0500	0.0478		mg/L		96	61 - 120		
Hexachlorobutadiene			0.0500	0.0318		mg/L		64	35 - 120		
Hexachloroethane			0.0500	0.0280		mg/L		56	43 - 120		
3-Methylphenol			0.0500	0.0319		mg/L		64	39 - 120		
2-Methylphenol			0.0500	0.0340		mg/L		68	39 - 120		
4-Methylphenol			0.0500	0.0319		mg/L		64	29 - 131		
Nitrobenzene			0.0500	0.0398		mg/L		80	53 - 123		
Pentachlorophenol			0.100	0.0883		mg/L		88	29 - 136		
Pyridine			0.100	0.0548		mg/L		55	10 - 120		
2,4,5-Trichlorophenol			0.0500	0.0449		mg/L		90	65 - 126		
2,4,6-Trichlorophenol			0.0500	0.0427		mg/L		85	64 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol	*93*		*41 - 120*
2-Fluorobiphenyl	*85*		*48 - 120*
2-Fluorophenol	*46*		*35 - 120*
Nitrobenzene-d5	*81*		*46 - 120*
p-Terphenyl-d14	*104*		*59 - 136*
Phenol-d5	*36*		*22 - 120*

Lab Sample ID: LCSD 480-420428/3-A
Matrix: Solid
Analysis Batch: 420842

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 420428

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dichlorobenzene			0.0500	0.0309		mg/L		62	51 - 120	2	36
2,4-Dinitrotoluene			0.0500	0.0465		mg/L		93	69 - 120	3	20
Hexachlorobenzene			0.0500	0.0466		mg/L		93	61 - 120	3	15
Hexachlorobutadiene			0.0500	0.0322		mg/L		64	35 - 120	1	44
Hexachloroethane			0.0500	0.0281		mg/L		56	43 - 120	1	46
3-Methylphenol			0.0500	0.0328		mg/L		66	39 - 120	3	30
2-Methylphenol			0.0500	0.0355		mg/L		71	39 - 120	5	27
4-Methylphenol			0.0500	0.0328		mg/L		66	29 - 131	3	24
Nitrobenzene			0.0500	0.0408		mg/L		82	53 - 123	3	24
Pentachlorophenol			0.100	0.0846		mg/L		85	29 - 136	4	37
Pyridine			0.100	0.0547		mg/L		55	10 - 120	0	49
2,4,5-Trichlorophenol			0.0500	0.0423		mg/L		85	65 - 126	6	18
2,4,6-Trichlorophenol			0.0500	0.0430		mg/L		86	64 - 120	1	19

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4,6-Tribromophenol	*89*		*41 - 120*
2-Fluorobiphenyl	*86*		*48 - 120*
2-Fluorophenol	*47*		*35 - 120*
Nitrobenzene-d5	*84*		*46 - 120*
p-Terphenyl-d14	*101*		*59 - 136*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 480-420428/3-A
Matrix: Solid
Analysis Batch: 420842

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 420428

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Phenol-d5	*38*		*22 - 120*

Lab Sample ID: LB2 480-420208/1-G
Matrix: Solid
Analysis Batch: 420842

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 420428

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.010	0.00046	mg/L		06/19/18 14:38	06/21/18 14:20	1
2,4-Dinitrotoluene	ND		0.0050	0.00045	mg/L		06/19/18 14:38	06/21/18 14:20	1
Hexachlorobenzene	ND		0.0050	0.00051	mg/L		06/19/18 14:38	06/21/18 14:20	1
Hexachlorobutadiene	ND		0.0050	0.00068	mg/L		06/19/18 14:38	06/21/18 14:20	1
Hexachloroethane	ND		0.0050	0.00059	mg/L		06/19/18 14:38	06/21/18 14:20	1
3-Methylphenol	ND		0.010	0.00040	mg/L		06/19/18 14:38	06/21/18 14:20	1
2-Methylphenol	ND		0.0050	0.00040	mg/L		06/19/18 14:38	06/21/18 14:20	1
4-Methylphenol	ND		0.010	0.00036	mg/L		06/19/18 14:38	06/21/18 14:20	1
Nitrobenzene	ND		0.0050	0.00029	mg/L		06/19/18 14:38	06/21/18 14:20	1
Pentachlorophenol	ND		0.010	0.0022	mg/L		06/19/18 14:38	06/21/18 14:20	1
Pyridine	ND		0.025	0.00041	mg/L		06/19/18 14:38	06/21/18 14:20	1
2,4,5-Trichlorophenol	ND		0.0050	0.00048	mg/L		06/19/18 14:38	06/21/18 14:20	1
2,4,6-Trichlorophenol	ND		0.0050	0.00061	mg/L		06/19/18 14:38	06/21/18 14:20	1

Surrogate	LB2 %Recovery	LB2 Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol	*92*		*41 - 120*	*06/19/18 14:38*	*06/21/18 14:20*	*1*
2-Fluorobiphenyl	*99*		*48 - 120*	*06/19/18 14:38*	*06/21/18 14:20*	*1*
2-Fluorophenol	*58*		*35 - 120*	*06/19/18 14:38*	*06/21/18 14:20*	*1*
Nitrobenzene-d5	*101*		*46 - 120*	*06/19/18 14:38*	*06/21/18 14:20*	*1*
p-Terphenyl-d14	*111*		*59 - 136*	*06/19/18 14:38*	*06/21/18 14:20*	*1*
Phenol-d5	*42*		*22 - 120*	*06/19/18 14:38*	*06/21/18 14:20*	*1*

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419642/1-A
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419642

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1221	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1232	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1242	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1248	ND		0.24	0.047	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1254	ND		0.24	0.11	mg/Kg		06/14/18 14:56	06/16/18 10:39	1
PCB-1260	ND		0.24	0.11	mg/Kg		06/14/18 14:56	06/16/18 10:39	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	*106*		*60 - 154*	*06/14/18 14:56*	*06/16/18 10:39*	*1*
DCB Decachlorobiphenyl	*108*		*65 - 174*	*06/14/18 14:56*	*06/16/18 10:39*	*1*

Lab Sample ID: LCS 480-419642/2-A
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419642

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016			2.15	3.10		mg/Kg		145	51 - 185		
PCB-1260			2.15	3.52		mg/Kg		164	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*127*		*60 - 154*
DCB Decachlorobiphenyl	*125*		*65 - 174*

Lab Sample ID: 480-137415-5 MS
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: F3-1
Prep Type: Total/NA
Prep Batch: 419642

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016	ND		2.50	3.28		mg/Kg	☼	131	50 - 177		
PCB-1260	ND		2.50	3.29		mg/Kg	☼	132	33 - 200		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*133*		*60 - 154*
DCB Decachlorobiphenyl	*112*		*65 - 174*

Lab Sample ID: 480-137415-5 MSD
Matrix: Solid
Analysis Batch: 419973

Client Sample ID: F3-1
Prep Type: Total/NA
Prep Batch: 419642

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016	ND		2.59	3.04		mg/Kg	☼	118	50 - 177	8	50
PCB-1260	ND		2.59	2.91		mg/Kg	☼	112	33 - 200	13	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*128*		*60 - 154*
DCB Decachlorobiphenyl	*113*		*65 - 174*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-420353/2-A
Matrix: Solid
Analysis Batch: 420638

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420353

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015	0.0056	mg/L		06/19/18 10:37	06/20/18 10:01	1
Barium	ND		1.0	0.10	mg/L		06/19/18 10:37	06/20/18 10:01	1
Cadmium	ND		0.0020	0.00050	mg/L		06/19/18 10:37	06/20/18 10:01	1
Chromium	ND		0.020	0.010	mg/L		06/19/18 10:37	06/20/18 10:01	1
Lead	ND		0.020	0.0030	mg/L		06/19/18 10:37	06/20/18 10:01	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 10:37	06/20/18 10:01	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 10:37	06/20/18 10:01	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 480-420353/3-A
Matrix: Solid
Analysis Batch: 420638

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420353

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	1.13		mg/L		113	80 - 120
Barium	1.00	0.995	J	mg/L		100	80 - 120
Cadmium	1.00	1.11		mg/L		111	80 - 120
Chromium	1.00	1.06		mg/L		106	80 - 120
Lead	1.00	1.09		mg/L		109	80 - 120
Selenium	1.00	1.14		mg/L		114	80 - 120
Silver	1.00	1.14		mg/L		114	80 - 120

Lab Sample ID: MB 480-420367/2-A
Matrix: Solid
Analysis Batch: 420782

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015	0.0056	mg/L		06/19/18 11:07	06/20/18 20:09	1
Barium	ND		1.0	0.10	mg/L		06/19/18 11:07	06/20/18 20:09	1
Cadmium	ND		0.0020	0.00050	mg/L		06/19/18 11:07	06/20/18 20:09	1
Chromium	ND		0.020	0.010	mg/L		06/19/18 11:07	06/20/18 20:09	1
Lead	0.00394	J	0.020	0.0030	mg/L		06/19/18 11:07	06/20/18 20:09	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 11:07	06/20/18 20:09	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 11:07	06/20/18 20:09	1

Lab Sample ID: LCS 480-420367/3-A
Matrix: Solid
Analysis Batch: 420782

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	0.967		mg/L		97	80 - 120
Barium	1.00	0.928	J	mg/L		93	80 - 120
Cadmium	1.00	0.958		mg/L		96	80 - 120
Chromium	1.00	0.985		mg/L		98	80 - 120
Lead	1.00	0.941		mg/L		94	80 - 120
Selenium	1.00	1.01		mg/L		101	80 - 120
Silver	1.00	0.960		mg/L		96	80 - 120

Lab Sample ID: LB 480-420156/1-B
Matrix: Solid
Analysis Batch: 420638

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 420353

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015	0.0056	mg/L		06/19/18 10:37	06/20/18 09:57	1
Barium	ND		1.0	0.10	mg/L		06/19/18 10:37	06/20/18 09:57	1
Cadmium	ND		0.0020	0.00050	mg/L		06/19/18 10:37	06/20/18 09:57	1
Chromium	ND		0.020	0.010	mg/L		06/19/18 10:37	06/20/18 09:57	1
Lead	ND		0.020	0.0030	mg/L		06/19/18 10:37	06/20/18 09:57	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 10:37	06/20/18 09:57	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 10:37	06/20/18 09:57	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LB2 480-420208/1-C
Matrix: Solid
Analysis Batch: 420782

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 420367

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.015	0.0056	mg/L		06/19/18 11:07	06/20/18 20:05	1
Barium	ND		1.0	0.10	mg/L		06/19/18 11:07	06/20/18 20:05	1
Cadmium	ND		0.0020	0.00050	mg/L		06/19/18 11:07	06/20/18 20:05	1
Chromium	ND		0.020	0.010	mg/L		06/19/18 11:07	06/20/18 20:05	1
Lead	ND		0.020	0.0030	mg/L		06/19/18 11:07	06/20/18 20:05	1
Selenium	ND		0.025	0.0087	mg/L		06/19/18 11:07	06/20/18 20:05	1
Silver	ND		0.0060	0.0017	mg/L		06/19/18 11:07	06/20/18 20:05	1

Lab Sample ID: 480-137415-1 MS
Matrix: Solid
Analysis Batch: 420782

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.012	J	1.00	1.07		mg/L		106	75 - 125
Barium	0.87	J	1.00	1.82		mg/L		94	75 - 125
Chromium	0.012	J	1.00	0.952		mg/L		94	75 - 125
Lead	0.019	J B	1.00	1.02		mg/L		100	75 - 125
Selenium	ND		1.00	1.08		mg/L		108	75 - 125
Silver	ND		1.00	1.07		mg/L		107	75 - 125

Lab Sample ID: 480-137415-1 MS
Matrix: Solid
Analysis Batch: 420916

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		1.00	1.02		mg/L		102	75 - 125

Lab Sample ID: 480-137415-1 MSD
Matrix: Solid
Analysis Batch: 420782

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.012	J	1.00	1.04		mg/L		103	75 - 125	3	20
Barium	0.87	J	1.00	1.76		mg/L		89	75 - 125	3	20
Chromium	0.012	J	1.00	0.925		mg/L		91	75 - 125	3	20
Lead	0.019	J B	1.00	0.986		mg/L		97	75 - 125	3	20
Selenium	ND		1.00	1.05		mg/L		105	75 - 125	3	20
Silver	ND		1.00	1.04		mg/L		104	75 - 125	3	20

Lab Sample ID: 480-137415-1 MSD
Matrix: Solid
Analysis Batch: 420916

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		1.00	0.976		mg/L		98	75 - 125	4	20

Method: 7470A - TCLP Mercury

Lab Sample ID: MB 480-420406/2-A
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420406

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 19:05	1

Lab Sample ID: LCS 480-420406/3-A
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420406

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00668	0.00570		mg/L		85	80 - 120

Lab Sample ID: MB 480-420408/2-A
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420408

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 19:54	1

Lab Sample ID: LCS 480-420408/3-A
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420408

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00668	0.00590		mg/L		88	80 - 120

Lab Sample ID: LB 480-420156/1-C
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 420406

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 19:02	1

Lab Sample ID: LB2 480-420208/1-E
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 420408

Analyte	LB2 Result	LB2 Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	0.00012	mg/L		06/19/18 13:45	06/19/18 19:53	1

Lab Sample ID: 480-137415-1 MS
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420408

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00668	0.00540		mg/L		81	80 - 120

Lab Sample ID: 480-137415-1 MSD
Matrix: Solid
Analysis Batch: 420593

Client Sample ID: SB6
Prep Type: TCLP
Prep Batch: 420408

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00668	0.00548		mg/L		82	80 - 120	2	20

GC/MS VOA

Leach Batch: 420157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	1311	
LB 480-420157/1-A	Method Blank	TCLP	Solid	1311	

Analysis Batch: 420889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	8260C	420157
LB 480-420157/1-A	Method Blank	TCLP	Solid	8260C	420157
MB 480-420889/7	Method Blank	Total/NA	Solid	8260C	
LCS 480-420889/5	Lab Control Sample	Total/NA	Solid	8260C	

GC/MS Semi VOA

Leach Batch: 420208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	1311	
LB2 480-420208/1-G	Method Blank	TCLP	Solid	1311	

Prep Batch: 420428

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	3510C	420208
LB2 480-420208/1-G	Method Blank	TCLP	Solid	3510C	420208
MB 480-420428/1-A	Method Blank	Total/NA	Solid	3510C	
LCS 480-420428/2-A	Lab Control Sample	Total/NA	Solid	3510C	
LCSD 480-420428/3-A	Lab Control Sample Dup	Total/NA	Solid	3510C	

Analysis Batch: 420842

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	8270D	420428
LB2 480-420208/1-G	Method Blank	TCLP	Solid	8270D	420428
MB 480-420428/1-A	Method Blank	Total/NA	Solid	8270D	420428
LCS 480-420428/2-A	Lab Control Sample	Total/NA	Solid	8270D	420428
LCSD 480-420428/3-A	Lab Control Sample Dup	Total/NA	Solid	8270D	420428

GC Semi VOA

Prep Batch: 419642

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	Total/NA	Solid	3550C	
480-137415-3	BIN COMPOSITE	Total/NA	Solid	3550C	
480-137415-5	F3-1	Total/NA	Solid	3550C	
480-137415-6	F3-2	Total/NA	Solid	3550C	
480-137415-7	W3-3	Total/NA	Solid	3550C	
480-137415-8	W3-4	Total/NA	Solid	3550C	
480-137415-9	W3-5	Total/NA	Solid	3550C	
480-137415-10	F3-6	Total/NA	Solid	3550C	
480-137415-11	W3-7	Total/NA	Solid	3550C	
MB 480-419642/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419642/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-137415-5 MS	F3-1	Total/NA	Solid	3550C	
480-137415-5 MSD	F3-1	Total/NA	Solid	3550C	

GC Semi VOA (Continued)

Analysis Batch: 419973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-5	F3-1	Total/NA	Solid	8082A	419642
480-137415-6	F3-2	Total/NA	Solid	8082A	419642
480-137415-7	W3-3	Total/NA	Solid	8082A	419642
480-137415-8	W3-4	Total/NA	Solid	8082A	419642
480-137415-9	W3-5	Total/NA	Solid	8082A	419642
480-137415-10	F3-6	Total/NA	Solid	8082A	419642
480-137415-11	W3-7	Total/NA	Solid	8082A	419642
MB 480-419642/1-A	Method Blank	Total/NA	Solid	8082A	419642
LCS 480-419642/2-A	Lab Control Sample	Total/NA	Solid	8082A	419642
480-137415-5 MS	F3-1	Total/NA	Solid	8082A	419642
480-137415-5 MSD	F3-1	Total/NA	Solid	8082A	419642

Analysis Batch: 420192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	Total/NA	Solid	8082A	419642
480-137415-3	BIN COMPOSITE	Total/NA	Solid	8082A	419642

Metals

Leach Batch: 420156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-3	BIN COMPOSITE	TCLP	Solid	1311	
LB 480-420156/1-B	Method Blank	TCLP	Solid	1311	
LB 480-420156/1-C	Method Blank	TCLP	Solid	1311	

Leach Batch: 420208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	1311	
LB2 480-420208/1-C	Method Blank	TCLP	Solid	1311	
LB2 480-420208/1-E	Method Blank	TCLP	Solid	1311	
480-137415-1 MS	SB6	TCLP	Solid	1311	
480-137415-1 MSD	SB6	TCLP	Solid	1311	

Prep Batch: 420353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-3	BIN COMPOSITE	TCLP	Solid	3010A	420156
LB 480-420156/1-B	Method Blank	TCLP	Solid	3010A	420156
MB 480-420353/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-420353/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 420367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	3010A	420208
LB2 480-420208/1-C	Method Blank	TCLP	Solid	3010A	420208
MB 480-420367/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-420367/3-A	Lab Control Sample	Total/NA	Solid	3010A	
480-137415-1 MS	SB6	TCLP	Solid	3010A	420208
480-137415-1 MSD	SB6	TCLP	Solid	3010A	420208

Metals (Continued)

Prep Batch: 420406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-3	BIN COMPOSITE	TCLP	Solid	7470A	420156
LB 480-420156/1-C	Method Blank	TCLP	Solid	7470A	420156
MB 480-420406/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-420406/3-A	Lab Control Sample	Total/NA	Solid	7470A	

Prep Batch: 420408

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	7470A	420208
LB2 480-420208/1-E	Method Blank	TCLP	Solid	7470A	420208
MB 480-420408/2-A	Method Blank	Total/NA	Solid	7470A	
LCS 480-420408/3-A	Lab Control Sample	Total/NA	Solid	7470A	
480-137415-1 MS	SB6	TCLP	Solid	7470A	420208
480-137415-1 MSD	SB6	TCLP	Solid	7470A	420208

Analysis Batch: 420593

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	7470A	420408
480-137415-3	BIN COMPOSITE	TCLP	Solid	7470A	420406
LB 480-420156/1-C	Method Blank	TCLP	Solid	7470A	420406
LB2 480-420208/1-E	Method Blank	TCLP	Solid	7470A	420408
MB 480-420406/2-A	Method Blank	Total/NA	Solid	7470A	420406
MB 480-420408/2-A	Method Blank	Total/NA	Solid	7470A	420408
LCS 480-420406/3-A	Lab Control Sample	Total/NA	Solid	7470A	420406
LCS 480-420408/3-A	Lab Control Sample	Total/NA	Solid	7470A	420408
480-137415-1 MS	SB6	TCLP	Solid	7470A	420408
480-137415-1 MSD	SB6	TCLP	Solid	7470A	420408

Analysis Batch: 420638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-3	BIN COMPOSITE	TCLP	Solid	6010C	420353
LB 480-420156/1-B	Method Blank	TCLP	Solid	6010C	420353
MB 480-420353/2-A	Method Blank	Total/NA	Solid	6010C	420353
LCS 480-420353/3-A	Lab Control Sample	Total/NA	Solid	6010C	420353

Analysis Batch: 420782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	6010C	420367
LB2 480-420208/1-C	Method Blank	TCLP	Solid	6010C	420367
MB 480-420367/2-A	Method Blank	Total/NA	Solid	6010C	420367
LCS 480-420367/3-A	Lab Control Sample	Total/NA	Solid	6010C	420367
480-137415-1 MS	SB6	TCLP	Solid	6010C	420367
480-137415-1 MSD	SB6	TCLP	Solid	6010C	420367

Analysis Batch: 420916

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	TCLP	Solid	6010C	420367
480-137415-1 MS	SB6	TCLP	Solid	6010C	420367
480-137415-1 MSD	SB6	TCLP	Solid	6010C	420367

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

General Chemistry

Analysis Batch: 419535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137415-1	SB6	Total/NA	Solid	Moisture	
480-137415-3	BIN COMPOSITE	Total/NA	Solid	Moisture	
480-137415-5	F3-1	Total/NA	Solid	Moisture	
480-137415-6	F3-2	Total/NA	Solid	Moisture	
480-137415-7	W3-3	Total/NA	Solid	Moisture	
480-137415-8	W3-4	Total/NA	Solid	Moisture	
480-137415-9	W3-5	Total/NA	Solid	Moisture	
480-137415-10	F3-6	Total/NA	Solid	Moisture	
480-137415-11	W3-7	Total/NA	Solid	Moisture	

Client Sample ID: SB6

Lab Sample ID: 480-137415-1

Date Collected: 06/13/18 11:11

Matrix: Solid

Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			420157	06/18/18 11:18	JRD	TAL BUF
TCLP	Analysis	8260C		10	420889	06/21/18 22:47	S1V	TAL BUF
TCLP	Leach	1311			420208	06/18/18 13:28	JRD	TAL BUF
TCLP	Prep	3510C			420428	06/19/18 14:38	ATG	TAL BUF
TCLP	Analysis	8270D		1	420842	06/21/18 21:29	RJS	TAL BUF
TCLP	Leach	1311			420208	06/18/18 13:28	JRD	TAL BUF
TCLP	Prep	3010A			420367	06/19/18 11:07	KMP	TAL BUF
TCLP	Analysis	6010C		5	420916	06/21/18 10:25	AMH	TAL BUF
TCLP	Leach	1311			420208	06/18/18 13:28	JRD	TAL BUF
TCLP	Prep	3010A			420367	06/19/18 11:07	KMP	TAL BUF
TCLP	Analysis	6010C		1	420782	06/20/18 20:35	AMH	TAL BUF
TCLP	Leach	1311			420208	06/18/18 13:28	JRD	TAL BUF
TCLP	Prep	7470A			420408	06/19/18 13:45	BMB	TAL BUF
TCLP	Analysis	7470A		1	420593	06/19/18 20:01	BMB	TAL BUF
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: SB6

Lab Sample ID: 480-137415-1

Date Collected: 06/13/18 11:11

Matrix: Solid

Date Received: 06/14/18 01:00

Percent Solids: 22.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 20:56	W1T	TAL BUF

Client Sample ID: BIN COMPOSITE

Lab Sample ID: 480-137415-3

Date Collected: 06/13/18 13:28

Matrix: Solid

Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			420156	06/18/18 10:56	JRD	TAL BUF
TCLP	Prep	3010A			420353	06/19/18 10:37	KMP	TAL BUF
TCLP	Analysis	6010C		1	420638	06/20/18 11:30	LMH	TAL BUF
TCLP	Leach	1311			420156	06/18/18 10:56	JRD	TAL BUF
TCLP	Prep	7470A			420406	06/19/18 13:45	BMB	TAL BUF
TCLP	Analysis	7470A		1	420593	06/19/18 19:27	BMB	TAL BUF
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: BIN COMPOSITE

Lab Sample ID: 480-137415-3

Date Collected: 06/13/18 13:28

Matrix: Solid

Date Received: 06/14/18 01:00

Percent Solids: 98.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF

Client Sample ID: BIN COMPOSITE — **Lab Sample ID: 480-137415-3**
Date Collected: 06/13/18 13:28 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8082A		1	420192	06/18/18 21:11	W1T	TAL BUF

Client Sample ID: F3-1 — **Lab Sample ID: 480-137415-5**
Date Collected: 06/13/18 14:54 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F3-1 — **Lab Sample ID: 480-137415-5**
Date Collected: 06/13/18 14:54 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 96.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 11:40	W1T	TAL BUF

Client Sample ID: F3-2 — **Lab Sample ID: 480-137415-6**
Date Collected: 06/13/18 15:00 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F3-2 — **Lab Sample ID: 480-137415-6**
Date Collected: 06/13/18 15:00 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 72.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		2	419973	06/16/18 12:57	W1T	TAL BUF

Client Sample ID: W3-3 — **Lab Sample ID: 480-137415-7**
Date Collected: 06/13/18 15:10 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W3-3 — **Lab Sample ID: 480-137415-7**
Date Collected: 06/13/18 15:10 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 13:12	W1T	TAL BUF

Client Sample ID: W3-4 — **Lab Sample ID: 480-137415-8**
Date Collected: 06/13/18 15:15 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W3-4 — **Lab Sample ID: 480-137415-8**
Date Collected: 06/13/18 15:15 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 91.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 13:27	W1T	TAL BUF

Client Sample ID: W3-5 — **Lab Sample ID: 480-137415-9**
Date Collected: 06/13/18 15:24 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W3-5 — **Lab Sample ID: 480-137415-9**
Date Collected: 06/13/18 15:24 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 13:43	W1T	TAL BUF

Client Sample ID: F3-6 — **Lab Sample ID: 480-137415-10**
Date Collected: 06/13/18 15:32 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Client Sample ID: F3-6

Lab Sample ID: 480-137415-10

Date Collected: 06/13/18 15:32
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 13:58	W1T	TAL BUF

Client Sample ID: W3-7

Lab Sample ID: 480-137415-11

Date Collected: 06/13/18 15:39
Matrix: Solid
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W3-7

Lab Sample ID: 480-137415-11

Date Collected: 06/13/18 15:39
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 97.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419642	06/14/18 14:56	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419973	06/16/18 14:13	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
7470A	7470A	Solid	Mercury
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Method	Method Description	Protocol	Laboratory
8260C	TCLP Volatiles	SW846	TAL BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL BUF
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
6010C	Metals (ICP)	SW846	TAL BUF
7470A	TCLP Mercury	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
1311	TCLP Extraction	SW846	TAL BUF
3010A	Preparation, Total Metals	SW846	TAL BUF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF
5030C	Purge and Trap	SW846	TAL BUF
7470A	Preparation, Mercury	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137415-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137415-1	SB6	Solid	06/13/18 11:11	06/14/18 01:00
480-137415-3	BIN COMPOSITE	Solid	06/13/18 13:28	06/14/18 01:00
480-137415-5	F3-1	Solid	06/13/18 14:54	06/14/18 01:00
480-137415-6	F3-2	Solid	06/13/18 15:00	06/14/18 01:00
480-137415-7	W3-3	Solid	06/13/18 15:10	06/14/18 01:00
480-137415-8	W3-4	Solid	06/13/18 15:15	06/14/18 01:00
480-137415-9	W3-5	Solid	06/13/18 15:24	06/14/18 01:00
480-137415-10	F3-6	Solid	06/13/18 15:32	06/14/18 01:00
480-137415-11	W3-7	Solid	06/13/18 15:39	06/14/18 01:00

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-137415 COC

Client Information	Sampler: D. Peacock	Lab PM: Stone, Judy L	Carrier	COC No: 480-114396-26482.5
Client Contact: Ms. Julia Braunmueller	Phone:	E-Mail: judy.stone@testamericainc.com		Page: Page 5 of 6
Company: GZA GeoEnvironmental, Inc.		Analysis Requested		Job #:
Address: 6296 Fly Road	Due Date Requested:			
City: East Syracuse	TAT Requested (days): Standard			
State, Zip: NY, 13057	PO #: Purchase Order not required			
Phone: 315-800-1807(Tel)	WO #:			
Email: julia.braunmueller@gza.com	Project #: 48018260			
Project Name: Bulk Waste Samples	SSOW#:			
Site: Roth Bros				

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SB6-1	6/13/18	1111	6	Solid			X	X	X	X		
SB6-2	6/13/18	1111	6	Solid			X	X	X	X		
Bin Composite 1	6/13/18	1328	6	Solid			X	X				
Bin Composite 2	6/13/18	1328	6	Solid			X	X				
F3-1	6/13/18	1454	6	Solid				X				
F3-2	6/13/18	1500	6	Solid				X				
W3-3	6/13/18	1510	6	Solid				X				
W3-4	6/13/18	1515	6	Solid				X				
W3-5	6/13/18	1529	6	Solid				X				
F3-6	6/13/18	1532	6	Solid				X				
W3-7	6/13/18	1539	6	Wipe				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-13-18, 1640	GZA	[signature]	6-13-18, 16:40	
[signature]	6-13-18, 19:00	SyR	[signature]	6-14-18 0100	TBS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:	1.8 #1

Ver: 08/04/2016

6/25/2018

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137415-1

Login Number: 137415

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GZA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137417-1
Client Project/Site: Roth Bro's

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/18/2018 5:28:27 PM
Joe Giacomazza, Project Management Assistant II
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Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Visit us at: www.testamericainc.com

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
Surrogate Summary 10
QC Sample Results 11
QC Association Summary 12
Lab Chronicle 13
Certification Summary 17
Method Summary 18
Sample Summary 19
Chain of Custody 20
Receipt Checklists 21

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-137417-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137417-1

Receipt
The samples were received on 6/14/2018 1:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.8º C.

GC Semi VOA
Method(s) 8082A: Surrogate recovery for the following sample was outside control limits: F5-4 (480-137417-5). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Client Sample ID: F6-8 — Lab Sample ID: 480-137417-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1260	0.82		0.21	0.098	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F5-1 — Lab Sample ID: 480-137417-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1260	0.090	J	0.18	0.085	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W5-2 — Lab Sample ID: 480-137417-3

No Detections.

Client Sample ID: W5-3 — Lab Sample ID: 480-137417-4

No Detections.

Client Sample ID: F5-4 — Lab Sample ID: 480-137417-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1260	0.27	J	0.28	0.13	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F4-1 — Lab Sample ID: 480-137417-6

No Detections.

Client Sample ID: F4-2 — Lab Sample ID: 480-137417-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1260	0.52		0.22	0.10	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F4-3 — Lab Sample ID: 480-137417-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1260	0.71		0.24	0.11	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W4-4 — Lab Sample ID: 480-137417-9

No Detections.

Client Sample ID: W4-5 — Lab Sample ID: 480-137417-10

No Detections.

Client Sample ID: W4-6 — Lab Sample ID: 480-137417-11

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: F6-8

Lab Sample ID: 480-137417-1

Date Collected: 06/13/18 11:43
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 96.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.041	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1221	ND		0.21	0.041	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1232	ND		0.21	0.041	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1242	ND		0.21	0.041	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1248	ND		0.21	0.041	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1254	ND		0.21	0.098	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1
PCB-1260	**0.82**		0.21	0.098	mg/Kg	☼	06/14/18 15:12	06/15/18 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*82*		*60 - 154*	*06/14/18 15:12*	*06/15/18 15:44*	*1*
DCB Decachlorobiphenyl	*82*		*65 - 174*	*06/14/18 15:12*	*06/15/18 15:44*	*1*

Client Sample ID: F5-1

Lab Sample ID: 480-137417-2

Date Collected: 06/13/18 12:11
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.5

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.18	0.035	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1221	ND		0.18	0.035	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1232	ND		0.18	0.035	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1242	ND		0.18	0.035	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1248	ND		0.18	0.035	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1254	ND		0.18	0.085	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1
PCB-1260	**0.090**	**J**	0.18	0.085	mg/Kg	☼	06/14/18 15:12	06/15/18 15:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*72*		*60 - 154*	*06/14/18 15:12*	*06/15/18 15:59*	*1*
DCB Decachlorobiphenyl	*88*		*65 - 174*	*06/14/18 15:12*	*06/15/18 15:59*	*1*

Client Sample ID: W5-2

Lab Sample ID: 480-137417-3

Date Collected: 06/13/18 12:21
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.23	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1221	ND		0.23	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1232	ND		0.23	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1242	ND		0.23	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1248	ND		0.23	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1254	ND		0.23	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1
PCB-1260	ND		0.23	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 16:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*101*		*60 - 154*	*06/14/18 15:12*	*06/15/18 16:15*	*1*
DCB Decachlorobiphenyl	*108*		*65 - 174*	*06/14/18 15:12*	*06/15/18 16:15*	*1*

Client Sample ID: W5-3

Lab Sample ID: 480-137417-4

Date Collected: 06/13/18 12:25
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.6

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1221	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1232	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1242	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1248	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1254	ND		0.22	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1
PCB-1260	ND		0.22	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 16:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*84*		*60 - 154*	*06/14/18 15:12*	*06/15/18 16:30*	*1*
DCB Decachlorobiphenyl	*94*		*65 - 174*	*06/14/18 15:12*	*06/15/18 16:30*	*1*

Client Sample ID: F5-4

Lab Sample ID: 480-137417-5

Date Collected: 06/13/18 12:34
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 85.0

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.28	0.056	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1221	ND		0.28	0.056	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1232	ND		0.28	0.056	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1242	ND		0.28	0.056	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1248	ND		0.28	0.056	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1254	ND		0.28	0.13	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1
PCB-1260	**0.27**	**J**	0.28	0.13	mg/Kg	☼	06/14/18 15:12	06/15/18 16:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*51*	*X*	*60 - 154*	*06/14/18 15:12*	*06/15/18 16:45*	*1*
DCB Decachlorobiphenyl	*72*		*65 - 174*	*06/14/18 15:12*	*06/15/18 16:45*	*1*

Client Sample ID: F4-1

Lab Sample ID: 480-137417-6

Date Collected: 06/13/18 13:44
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 85.7

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.050	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1221	ND		0.25	0.050	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1232	ND		0.25	0.050	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1242	ND		0.25	0.050	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1248	ND		0.25	0.050	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1254	ND		0.25	0.12	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 15:12	06/15/18 17:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*119*		*60 - 154*	*06/14/18 15:12*	*06/15/18 17:01*	*1*
DCB Decachlorobiphenyl	*107*		*65 - 174*	*06/14/18 15:12*	*06/15/18 17:01*	*1*

Client Sample ID: F4-2

Lab Sample ID: 480-137417-7

Date Collected: 06/13/18 13:54
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 91.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1221	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1232	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1242	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1248	ND		0.22	0.044	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1254	ND		0.22	0.10	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1
PCB-1260	**0.52**		0.22	0.10	mg/Kg	☼	06/14/18 15:12	06/15/18 17:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*80*		*60 - 154*	*06/14/18 15:12*	*06/15/18 17:16*	*1*
DCB Decachlorobiphenyl	*83*		*65 - 174*	*06/14/18 15:12*	*06/15/18 17:16*	*1*

Client Sample ID: F4-3

Lab Sample ID: 480-137417-8

Date Collected: 06/13/18 13:58
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 88.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1221	ND		0.24	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1232	ND		0.24	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1242	ND		0.24	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1248	ND		0.24	0.046	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1254	ND		0.24	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1
PCB-1260	**0.71**		0.24	0.11	mg/Kg	☼	06/14/18 15:12	06/15/18 17:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*76*		*60 - 154*	*06/14/18 15:12*	*06/15/18 17:31*	*1*
DCB Decachlorobiphenyl	*78*		*65 - 174*	*06/14/18 15:12*	*06/15/18 17:31*	*1*

Client Sample ID: W4-4

Lab Sample ID: 480-137417-9

Date Collected: 06/13/18 14:09
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 98.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.19	0.037	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1221	ND		0.19	0.037	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1232	ND		0.19	0.037	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1242	ND		0.19	0.037	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1248	ND		0.19	0.037	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1254	ND		0.19	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1
PCB-1260	ND		0.19	0.089	mg/Kg	☼	06/14/18 15:12	06/15/18 17:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*98*		*60 - 154*	*06/14/18 15:12*	*06/15/18 17:47*	*1*
DCB Decachlorobiphenyl	*109*		*65 - 174*	*06/14/18 15:12*	*06/15/18 17:47*	*1*

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Client Sample ID: W4-5

Lab Sample ID: 480-137417-10

Date Collected: 06/13/18 14:12
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 92.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.20	0.038	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1221	ND		0.20	0.038	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1232	ND		0.20	0.038	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1242	ND		0.20	0.038	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1248	ND		0.20	0.038	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1254	ND		0.20	0.091	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1
PCB-1260	ND		0.20	0.091	mg/Kg	☼	06/14/18 15:12	06/15/18 18:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*86*		*60 - 154*	*06/14/18 15:12*	*06/15/18 18:02*	*1*
DCB Decachlorobiphenyl	*97*		*65 - 174*	*06/14/18 15:12*	*06/15/18 18:02*	*1*

Client Sample ID: W4-6

Lab Sample ID: 480-137417-11

Date Collected: 06/13/18 14:21
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 97.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.040	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1221	ND		0.21	0.040	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1232	ND		0.21	0.040	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1242	ND		0.21	0.040	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1248	ND		0.21	0.040	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1254	ND		0.21	0.096	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1
PCB-1260	ND		0.21	0.096	mg/Kg	☼	06/14/18 15:12	06/15/18 18:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*60 - 154*	*06/14/18 15:12*	*06/15/18 18:17*	*1*
DCB Decachlorobiphenyl	*105*		*65 - 174*	*06/14/18 15:12*	*06/15/18 18:17*	*1*

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)											
		TCX1	DCBP1										
Lab Sample ID	Client Sample ID	(60-154)	(65-174)										
480-137417-1	F6-8	82	82										
480-137417-2	F5-1	72	88										
480-137417-3	W5-2	101	108										
480-137417-4	W5-3	84	94										
480-137417-5	F5-4	51 X	72										
480-137417-6	F4-1	119	107										
480-137417-7	F4-2	80	83										
480-137417-8	F4-3	76	78										
480-137417-9	W4-4	98	109										
480-137417-10	W4-5	86	97										
480-137417-11	W4-6	92	105										
LCS 480-419649/2-A	Lab Control Sample	131	130										
MB 480-419649/1-A	Method Blank	108	116										

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCBP = DCB Decachlorobiphenyl

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419649/1-A
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419649

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1221	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1232	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1242	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1248	ND		0.24	0.046	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1254	ND		0.24	0.11	mg/Kg		06/14/18 15:12	06/15/18 13:26	1
PCB-1260	ND		0.24	0.11	mg/Kg		06/14/18 15:12	06/15/18 13:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*108*		*60 - 154*	*06/14/18 15:12*	*06/15/18 13:26*	*1*
DCB Decachlorobiphenyl	*116*		*65 - 174*	*06/14/18 15:12*	*06/15/18 13:26*	*1*

Lab Sample ID: LCS 480-419649/2-A
Matrix: Solid
Analysis Batch: 419769

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419649

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016			2.45	3.47		mg/Kg		142	51 - 185		
PCB-1260			2.45	4.01		mg/Kg		164	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*131*		*60 - 154*
DCB Decachlorobiphenyl	*130*		*65 - 174*

GC Semi VOA

Prep Batch: 419649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137417-1	F6-8	Total/NA	Solid	3550C	
480-137417-2	F5-1	Total/NA	Solid	3550C	
480-137417-3	W5-2	Total/NA	Solid	3550C	
480-137417-4	W5-3	Total/NA	Solid	3550C	
480-137417-5	F5-4	Total/NA	Solid	3550C	
480-137417-6	F4-1	Total/NA	Solid	3550C	
480-137417-7	F4-2	Total/NA	Solid	3550C	
480-137417-8	F4-3	Total/NA	Solid	3550C	
480-137417-9	W4-4	Total/NA	Solid	3550C	
480-137417-10	W4-5	Total/NA	Solid	3550C	
480-137417-11	W4-6	Total/NA	Solid	3550C	
MB 480-419649/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419649/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 419769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137417-1	F6-8	Total/NA	Solid	8082A	419649
480-137417-2	F5-1	Total/NA	Solid	8082A	419649
480-137417-3	W5-2	Total/NA	Solid	8082A	419649
480-137417-4	W5-3	Total/NA	Solid	8082A	419649
480-137417-5	F5-4	Total/NA	Solid	8082A	419649
480-137417-6	F4-1	Total/NA	Solid	8082A	419649
480-137417-7	F4-2	Total/NA	Solid	8082A	419649
480-137417-8	F4-3	Total/NA	Solid	8082A	419649
480-137417-9	W4-4	Total/NA	Solid	8082A	419649
480-137417-10	W4-5	Total/NA	Solid	8082A	419649
480-137417-11	W4-6	Total/NA	Solid	8082A	419649
MB 480-419649/1-A	Method Blank	Total/NA	Solid	8082A	419649
LCS 480-419649/2-A	Lab Control Sample	Total/NA	Solid	8082A	419649

General Chemistry

Analysis Batch: 419535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137417-1	F6-8	Total/NA	Solid	Moisture	
480-137417-2	F5-1	Total/NA	Solid	Moisture	
480-137417-3	W5-2	Total/NA	Solid	Moisture	
480-137417-4	W5-3	Total/NA	Solid	Moisture	
480-137417-5	F5-4	Total/NA	Solid	Moisture	
480-137417-6	F4-1	Total/NA	Solid	Moisture	
480-137417-7	F4-2	Total/NA	Solid	Moisture	
480-137417-8	F4-3	Total/NA	Solid	Moisture	
480-137417-9	W4-4	Total/NA	Solid	Moisture	
480-137417-10	W4-5	Total/NA	Solid	Moisture	
480-137417-11	W4-6	Total/NA	Solid	Moisture	

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Client Sample ID: F6-8 — **Lab Sample ID: 480-137417-1**
Date Collected: 06/13/18 11:43 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F6-8 — **Lab Sample ID: 480-137417-1**
Date Collected: 06/13/18 11:43 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 96.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 15:44	W1T	TAL BUF

Client Sample ID: F5-1 — **Lab Sample ID: 480-137417-2**
Date Collected: 06/13/18 12:11 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F5-1 — **Lab Sample ID: 480-137417-2**
Date Collected: 06/13/18 12:11 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 15:59	W1T	TAL BUF

Client Sample ID: W5-2 — **Lab Sample ID: 480-137417-3**
Date Collected: 06/13/18 12:21 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W5-2 — **Lab Sample ID: 480-137417-3**
Date Collected: 06/13/18 12:21 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 16:15	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Client Sample ID: W5-3 — **Lab Sample ID: 480-137417-4**
Date Collected: 06/13/18 12:25 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W5-3 — **Lab Sample ID: 480-137417-4**
Date Collected: 06/13/18 12:25 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 16:30	W1T	TAL BUF

Client Sample ID: F5-4 — **Lab Sample ID: 480-137417-5**
Date Collected: 06/13/18 12:34 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F5-4 — **Lab Sample ID: 480-137417-5**
Date Collected: 06/13/18 12:34 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 85.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 16:45	W1T	TAL BUF

Client Sample ID: F4-1 — **Lab Sample ID: 480-137417-6**
Date Collected: 06/13/18 13:44 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F4-1 — **Lab Sample ID: 480-137417-6**
Date Collected: 06/13/18 13:44 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 85.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 17:01	W1T	TAL BUF

Client Sample ID: F4-2 — **Lab Sample ID: 480-137417-7**
Date Collected: 06/13/18 13:54 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F4-2 — **Lab Sample ID: 480-137417-7**
Date Collected: 06/13/18 13:54 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 91.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 17:16	W1T	TAL BUF

Client Sample ID: F4-3 — **Lab Sample ID: 480-137417-8**
Date Collected: 06/13/18 13:58 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: F4-3 — **Lab Sample ID: 480-137417-8**
Date Collected: 06/13/18 13:58 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 88.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 17:31	W1T	TAL BUF

Client Sample ID: W4-4 — **Lab Sample ID: 480-137417-9**
Date Collected: 06/13/18 14:09 — **Matrix: Solid**
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W4-4 — **Lab Sample ID: 480-137417-9**
Date Collected: 06/13/18 14:09 — **Matrix: Solid**
Date Received: 06/14/18 01:00 — **Percent Solids: 98.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 17:47	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Client Sample ID: W4-5
Lab Sample ID: 480-137417-10

Date Collected: 06/13/18 14:12
Matrix: Solid
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W4-5
Lab Sample ID: 480-137417-10

Date Collected: 06/13/18 14:12
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 92.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 18:02	W1T	TAL BUF

Client Sample ID: W4-6
Lab Sample ID: 480-137417-11

Date Collected: 06/13/18 14:21
Matrix: Solid
Date Received: 06/14/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419535	06/14/18 08:05	CSW	TAL BUF

Client Sample ID: W4-6
Lab Sample ID: 480-137417-11

Date Collected: 06/13/18 14:21
Matrix: Solid
Date Received: 06/14/18 01:00
Percent Solids: 97.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419649	06/14/18 15:12	SGD	TAL BUF
Total/NA	Analysis	8082A		1	419769	06/15/18 18:17	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's

TestAmerica Job ID: 480-137417-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137417-1	F6-8	Solid	06/13/18 11:43	06/14/18 01:00
480-137417-2	F5-1	Solid	06/13/18 12:11	06/14/18 01:00
480-137417-3	W5-2	Solid	06/13/18 12:21	06/14/18 01:00
480-137417-4	W5-3	Solid	06/13/18 12:25	06/14/18 01:00
480-137417-5	F5-4	Solid	06/13/18 12:34	06/14/18 01:00
480-137417-6	F4-1	Solid	06/13/18 13:44	06/14/18 01:00
480-137417-7	F4-2	Solid	06/13/18 13:54	06/14/18 01:00
480-137417-8	F4-3	Solid	06/13/18 13:58	06/14/18 01:00
480-137417-9	W4-4	Solid	06/13/18 14:09	06/14/18 01:00
480-137417-10	W4-5	Solid	06/13/18 14:12	06/14/18 01:00
480-137417-11	W4-6	Solid	06/13/18 14:21	06/14/18 01:00

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

480-137417 COC

Client Information	Sampler:	Lab PM: Stone, Judy L	COC No: 480-114396-26482.4
Client Contact: Ms. Julia Braunmueller	Phone:	E-Mail: judy.stone@testamericainc.com	Page: Page ~~1~~ 2 of
Company: GZA GeoEnvironmental, Inc.			Job #:
Address: 6296 Fly Road	Due Date Requested:		
City: East Syracuse	TAT Requested (days): Standard		
State, Zip: NY, 13057			
Phone: 315-800-1807(Tel)	PO #: Purchase Order not required		
Email: julia.braunmueller@gza.com	WO #:		
Project Name: Bulk Waste Samples	Project #: 48018260		
Site: Koth Bros	SSOW#:		

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
F6-8	6/13/18	1143	6	Solid				X				
F5-1	6/13/18	1211	6	Solid				X				
W5-2	6/13/18	1221	6	Solid				X				
W5-3	6/13/18	1225	6	Solid				X				
~~FS DUP~~ FS-4	6/13/18	1234	6	Solid				X				
F4-1	6/13/18	1344	6	Solid				X				
F4-2	6/13/18	1354	6	Solid				X				
F4-3	6/13/18	1358	6	Solid				X				
~~F4-4~~ W4-4	6/13/18	1407	6	Solid				X				
~~FS-5 DUP~~ ~~FB-5~~ W4-5	6/13/18	1412	6	Solid				X				
~~FB-4 DUP~~ W4-6	6/13/18	1421	6	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by: [signature]	Date/Time: 6/13/18 / 16:40	Company: GZA	Received by: R.English	Date/Time: 6-13-18, 16:40	Company: Sya
Relinquished by: R.English	Date/Time: 6-13-18, 19:00	Company: Sya	Received by: [signature]	Date/Time: 6-14-18 0100	Company: [illegible]
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.8 #1

Ver: 08/04/2016

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137417-1

Login Number: 137417

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GZA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-137330-1
Client Project/Site: Roth Bro's. Steel/Bld2

For:
GZA GeoEnvironmental, Inc.
6296 Fly Road
East Syracuse, New York 13057

Attn: Ms. Julia Braunmueller

Joseph V. Giacomazza

Authorized for release by:
6/20/2018 3:41:54 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Judy Stone, Senior Project Manager
(484)685-0868
judy.stone@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 7
Surrogate Summary 11
QC Sample Results 12
QC Association Summary 13
Lab Chronicle 14
Certification Summary 18
Method Summary 19
Sample Summary 20
Chain of Custody 21
Receipt Checklists 22

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery is outside acceptance limits.
X	Surrogate is outside control limits
F4	MS/MSD RPD exceeds control limits due to sample size difference.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-137330-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-137330-1

Receipt
The samples were received on 6/13/2018 1:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

GC Semi VOA
Method(s) 8082A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries and precision for preparation batch 480-419519 and analytical batch 480-420192 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 8082A: Surrogate recovery for the following samples were outside control limits: F2-3 (480-137330-2), F2-4 (480-137330-3), F2-6 (480-137330-5), W2-7 (480-137330-6), W2-10 (480-137330-9), F2-11 (480-137330-10), (480-137330-A-1-A MS) and (480-137330-A-1-B MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Client Sample ID: F2-2 — Lab Sample ID: 480-137330-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	1.1		0.28	0.055	mg/Kg	1	☼	8082A	Total/NA
PCB-1260	1.2	F1 F2	0.28	0.13	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F2-3 — Lab Sample ID: 480-137330-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	4.9		0.25	0.049	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	1.5		0.25	0.12	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F2-4 — Lab Sample ID: 480-137330-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	1.5		0.17	0.034	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	1.2		0.17	0.081	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W2-5 — Lab Sample ID: 480-137330-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	0.93		0.24	0.046	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	0.48		0.24	0.11	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F2-6 — Lab Sample ID: 480-137330-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	2.3		0.22	0.042	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	1.9		0.22	0.10	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W2-7 — Lab Sample ID: 480-137330-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	1.3		0.22	0.043	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	0.41		0.22	0.10	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: F2-8 — Lab Sample ID: 480-137330-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	1.7		0.24	0.048	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	1.1		0.24	0.11	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W2-9 — Lab Sample ID: 480-137330-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	1.2		0.25	0.049	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	0.43		0.25	0.12	mg/Kg	1	☼	8082A	Total/NA

Client Sample ID: W2-10 — Lab Sample ID: 480-137330-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	0.27		0.20	0.039	mg/Kg	1	☼	8082A	Total/NA
PCB-1254	0.13	J	0.20	0.093	mg/Kg	1	☼	8082A	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Client Sample ID: F2-11 **Lab Sample ID: 480-137330-10**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
PCB-1242	2.8		0.21	0.042	mg/Kg	1	☼	8082A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: F2-2

Lab Sample ID: 480-137330-1

Date Collected: 06/12/18 15:36
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 83.1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	F2	0.28	0.055	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1221	ND		0.28	0.055	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1232	ND		0.28	0.055	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1242	**1.1**		0.28	0.055	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1248	ND		0.28	0.055	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1254	ND		0.28	0.13	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1
PCB-1260	**1.2**	**F1 F2**	0.28	0.13	mg/Kg	☼	06/14/18 06:22	06/18/18 15:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*88*		*60 - 154*	*06/14/18 06:22*	*06/18/18 15:36*	*1*
DCB Decachlorobiphenyl	*67*		*65 - 174*	*06/14/18 06:22*	*06/18/18 15:36*	*1*

Client Sample ID: F2-3

Lab Sample ID: 480-137330-2

Date Collected: 06/12/18 11:49
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 96.2

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1221	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1232	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1242	**4.9**		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1248	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1254	**1.5**		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 15:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*55*	*X*	*60 - 154*	*06/14/18 06:22*	*06/18/18 15:52*	*1*
DCB Decachlorobiphenyl	*39*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 15:52*	*1*

Client Sample ID: F2-4

Lab Sample ID: 480-137330-3

Date Collected: 06/12/18 11:59
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.4

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.17	0.034	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1221	ND		0.17	0.034	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1232	ND		0.17	0.034	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1242	**1.5**		0.17	0.034	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1248	ND		0.17	0.034	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1254	**1.2**		0.17	0.081	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1
PCB-1260	ND		0.17	0.081	mg/Kg	☼	06/14/18 06:22	06/18/18 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*57*	*X*	*60 - 154*	*06/14/18 06:22*	*06/18/18 16:08*	*1*
DCB Decachlorobiphenyl	*44*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 16:08*	*1*

Client Sample ID: W2-5

Lab Sample ID: 480-137330-4

Date Collected: 06/12/18 12:10
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 91.3

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.046	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1221	ND		0.24	0.046	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1232	ND		0.24	0.046	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1242	**0.93**		0.24	0.046	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1248	ND		0.24	0.046	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1254	**0.48**		0.24	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1
PCB-1260	ND		0.24	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 16:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*77*		*60 - 154*	*06/14/18 06:22*	*06/18/18 16:24*	*1*
DCB Decachlorobiphenyl	*68*		*65 - 174*	*06/14/18 06:22*	*06/18/18 16:24*	*1*

Client Sample ID: F2-6

Lab Sample ID: 480-137330-5

Date Collected: 06/12/18 12:19
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1221	ND		0.22	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1232	ND		0.22	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1242	**2.3**		0.22	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1248	ND		0.22	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1254	**1.9**		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1
PCB-1260	ND		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 16:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*63*		*60 - 154*	*06/14/18 06:22*	*06/18/18 16:40*	*1*
DCB Decachlorobiphenyl	*47*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 16:40*	*1*

Client Sample ID: W2-7

Lab Sample ID: 480-137330-6

Date Collected: 06/12/18 12:29
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.9

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1221	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1232	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1242	**1.3**		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1248	ND		0.22	0.043	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1254	**0.41**		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1
PCB-1260	ND		0.22	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 16:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*57*	*X*	*60 - 154*	*06/14/18 06:22*	*06/18/18 16:56*	*1*
DCB Decachlorobiphenyl	*49*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 16:56*	*1*

Client Sample ID: F2-8

Lab Sample ID: 480-137330-7
Date Collected: 06/12/18 12:38
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 98.4

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.24	0.048	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1221	ND		0.24	0.048	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1232	ND		0.24	0.048	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1242	**1.7**		0.24	0.048	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1248	ND		0.24	0.048	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1254	**1.1**		0.24	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1
PCB-1260	ND		0.24	0.11	mg/Kg	☼	06/14/18 06:22	06/18/18 17:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*85*		*60 - 154*	*06/14/18 06:22*	*06/18/18 17:12*	*1*
DCB Decachlorobiphenyl	*146*		*65 - 174*	*06/14/18 06:22*	*06/18/18 17:12*	*1*

Client Sample ID: W2-9

Lab Sample ID: 480-137330-8
Date Collected: 06/12/18 12:48
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 84.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1221	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1232	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1242	**1.2**		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1248	ND		0.25	0.049	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1254	**0.43**		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1
PCB-1260	ND		0.25	0.12	mg/Kg	☼	06/14/18 06:22	06/18/18 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*71*		*60 - 154*	*06/14/18 06:22*	*06/18/18 17:28*	*1*
DCB Decachlorobiphenyl	*65*		*65 - 174*	*06/14/18 06:22*	*06/18/18 17:28*	*1*

Client Sample ID: W2-10

Lab Sample ID: 480-137330-9
Date Collected: 06/12/18 12:56
Matrix: Solid
Date Received: 06/13/18 01:15
Percent Solids: 97.8

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.20	0.039	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1221	ND		0.20	0.039	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1232	ND		0.20	0.039	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1242	**0.27**		0.20	0.039	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1248	ND		0.20	0.039	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1254	**0.13**	**J**	0.20	0.093	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1
PCB-1260	ND		0.20	0.093	mg/Kg	☼	06/14/18 06:22	06/18/18 17:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*56*	*X*	*60 - 154*	*06/14/18 06:22*	*06/18/18 17:44*	*1*
DCB Decachlorobiphenyl	*46*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 17:44*	*1*

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Client Sample ID: F2-11
Date Collected: 06/12/18 13:06
Date Received: 06/13/18 01:15

Lab Sample ID: 480-137330-10
Matrix: Solid
Percent Solids: 92.7

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1221	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1232	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1242	**2.8**		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1248	ND		0.21	0.042	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1254	ND		0.21	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1
PCB-1260	ND		0.21	0.10	mg/Kg	☼	06/14/18 06:22	06/18/18 18:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*86*		*60 - 154*	*06/14/18 06:22*	*06/18/18 18:00*	*1*
DCB Decachlorobiphenyl	*57*	*X*	*65 - 174*	*06/14/18 06:22*	*06/18/18 18:00*	*1*

Surrogate Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)											
		TCX1	DCBP1										
Lab Sample ID	Client Sample ID	(60-154)	(65-174)										
480-137330-1	F2-2	88	67										
480-137330-1 MS	F2-2	91	58 X										
480-137330-1 MSD	F2-2	73	46 X										
480-137330-2	F2-3	55 X	39 X										
480-137330-3	F2-4	57 X	44 X										
480-137330-4	W2-5	77	68										
480-137330-5	F2-6	63	47 X										
480-137330-6	W2-7	57 X	49 X										
480-137330-7	F2-8	85	146										
480-137330-8	W2-9	71	65										
480-137330-9	W2-10	56 X	46 X										
480-137330-10	F2-11	86	57 X										
LCS 480-419519/2-A	Lab Control Sample	114	90										
MB 480-419519/1-A	Method Blank	97	79										

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCBP = DCB Decachlorobiphenyl

Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 480-419519/1-A
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 419519

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1221	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1232	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1242	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1248	ND		0.18	0.035	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1254	ND		0.18	0.084	mg/Kg		06/14/18 06:22	06/18/18 14:32	1
PCB-1260	ND		0.18	0.084	mg/Kg		06/14/18 06:22	06/18/18 14:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*97*		*60 - 154*	*06/14/18 06:22*	*06/18/18 14:32*	*1*
DCB Decachlorobiphenyl	*79*		*65 - 174*	*06/14/18 06:22*	*06/18/18 14:32*	*1*

Lab Sample ID: LCS 480-419519/2-A
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 419519

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016			1.71	2.20		mg/Kg		129	51 - 185		
PCB-1260			1.71	2.19		mg/Kg		128	61 - 184		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*114*		*60 - 154*
DCB Decachlorobiphenyl	*90*		*65 - 174*

Lab Sample ID: 480-137330-1 MS
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: F2-2
Prep Type: Total/NA
Prep Batch: 419519

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
PCB-1016	ND	F2	2.97	3.40		mg/Kg	☼	115	50 - 177		
PCB-1260	1.2	F1 F2	2.97	3.32		mg/Kg	☼	72	33 - 200		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*91*		*60 - 154*
DCB Decachlorobiphenyl	*58*	*X*	*65 - 174*

Lab Sample ID: 480-137330-1 MSD
Matrix: Solid
Analysis Batch: 420192

Client Sample ID: F2-2
Prep Type: Total/NA
Prep Batch: 419519

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016	ND	F2	2.22	1.81	F4	mg/Kg	☼	81	50 - 177	61	50
PCB-1260	1.2	F1 F2	2.22	1.80	F1 F4	mg/Kg	☼	28	33 - 200	59	50

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*73*		*60 - 154*
DCB Decachlorobiphenyl	*46*	*X*	*65 - 174*

GC Semi VOA

Prep Batch: 419519

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137330-1	F2-2	Total/NA	Solid	3550C	
480-137330-2	F2-3	Total/NA	Solid	3550C	
480-137330-3	F2-4	Total/NA	Solid	3550C	
480-137330-4	W2-5	Total/NA	Solid	3550C	
480-137330-5	F2-6	Total/NA	Solid	3550C	
480-137330-6	W2-7	Total/NA	Solid	3550C	
480-137330-7	F2-8	Total/NA	Solid	3550C	
480-137330-8	W2-9	Total/NA	Solid	3550C	
480-137330-9	W2-10	Total/NA	Solid	3550C	
480-137330-10	F2-11	Total/NA	Solid	3550C	
MB 480-419519/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-419519/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-137330-1 MS	F2-2	Total/NA	Solid	3550C	
480-137330-1 MSD	F2-2	Total/NA	Solid	3550C	

Analysis Batch: 420192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137330-1	F2-2	Total/NA	Solid	8082A	419519
480-137330-2	F2-3	Total/NA	Solid	8082A	419519
480-137330-3	F2-4	Total/NA	Solid	8082A	419519
480-137330-4	W2-5	Total/NA	Solid	8082A	419519
480-137330-5	F2-6	Total/NA	Solid	8082A	419519
480-137330-6	W2-7	Total/NA	Solid	8082A	419519
480-137330-7	F2-8	Total/NA	Solid	8082A	419519
480-137330-8	W2-9	Total/NA	Solid	8082A	419519
480-137330-9	W2-10	Total/NA	Solid	8082A	419519
480-137330-10	F2-11	Total/NA	Solid	8082A	419519
MB 480-419519/1-A	Method Blank	Total/NA	Solid	8082A	419519
LCS 480-419519/2-A	Lab Control Sample	Total/NA	Solid	8082A	419519
480-137330-1 MS	F2-2	Total/NA	Solid	8082A	419519
480-137330-1 MSD	F2-2	Total/NA	Solid	8082A	419519

General Chemistry

Analysis Batch: 419523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-137330-1	F2-2	Total/NA	Solid	Moisture	
480-137330-2	F2-3	Total/NA	Solid	Moisture	
480-137330-3	F2-4	Total/NA	Solid	Moisture	
480-137330-4	W2-5	Total/NA	Solid	Moisture	
480-137330-5	F2-6	Total/NA	Solid	Moisture	
480-137330-6	W2-7	Total/NA	Solid	Moisture	
480-137330-7	F2-8	Total/NA	Solid	Moisture	
480-137330-8	W2-9	Total/NA	Solid	Moisture	
480-137330-9	W2-10	Total/NA	Solid	Moisture	
480-137330-10	F2-11	Total/NA	Solid	Moisture	

Client Sample ID: F2-2 — **Lab Sample ID: 480-137330-1**
Date Collected: 06/12/18 15:36 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-2 — **Lab Sample ID: 480-137330-1**
Date Collected: 06/12/18 15:36 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 83.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 15:36	W1T	TAL BUF

Client Sample ID: F2-3 — **Lab Sample ID: 480-137330-2**
Date Collected: 06/12/18 11:49 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-3 — **Lab Sample ID: 480-137330-2**
Date Collected: 06/12/18 11:49 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 96.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 15:52	W1T	TAL BUF

Client Sample ID: F2-4 — **Lab Sample ID: 480-137330-3**
Date Collected: 06/12/18 11:59 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-4 — **Lab Sample ID: 480-137330-3**
Date Collected: 06/12/18 11:59 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 16:08	W1T	TAL BUF

Client Sample ID: W2-5 — **Lab Sample ID: 480-137330-4**
Date Collected: 06/12/18 12:10 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W2-5 — **Lab Sample ID: 480-137330-4**
Date Collected: 06/12/18 12:10 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 91.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 16:24	W1T	TAL BUF

Client Sample ID: F2-6 — **Lab Sample ID: 480-137330-5**
Date Collected: 06/12/18 12:19 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-6 — **Lab Sample ID: 480-137330-5**
Date Collected: 06/12/18 12:19 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 16:40	W1T	TAL BUF

Client Sample ID: W2-7 — **Lab Sample ID: 480-137330-6**
Date Collected: 06/12/18 12:29 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W2-7 — **Lab Sample ID: 480-137330-6**
Date Collected: 06/12/18 12:29 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 16:56	W1T	TAL BUF

Client Sample ID: F2-8 — **Lab Sample ID: 480-137330-7**
Date Collected: 06/12/18 12:38 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-8 — **Lab Sample ID: 480-137330-7**
Date Collected: 06/12/18 12:38 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 98.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 17:12	W1T	TAL BUF

Client Sample ID: W2-9 — **Lab Sample ID: 480-137330-8**
Date Collected: 06/12/18 12:48 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W2-9 — **Lab Sample ID: 480-137330-8**
Date Collected: 06/12/18 12:48 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 84.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 17:28	W1T	TAL BUF

Client Sample ID: W2-10 — **Lab Sample ID: 480-137330-9**
Date Collected: 06/12/18 12:56 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: W2-10 — **Lab Sample ID: 480-137330-9**
Date Collected: 06/12/18 12:56 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 97.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 17:44	W1T	TAL BUF

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Client Sample ID: F2-11 — **Lab Sample ID: 480-137330-10**
Date Collected: 06/12/18 13:06 — **Matrix: Solid**
Date Received: 06/13/18 01:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	419523	06/14/18 06:52	CSW	TAL BUF

Client Sample ID: F2-11 — **Lab Sample ID: 480-137330-10**
Date Collected: 06/12/18 13:06 — **Matrix: Solid**
Date Received: 06/13/18 01:15 — **Percent Solids: 92.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			419519	06/14/18 06:22	CAM	TAL BUF
Total/NA	Analysis	8082A		1	420192	06/18/18 18:00	W1T	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Method	Method Description	Protocol	Laboratory
8082A	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Roth Bro's. Steel/Bld2

TestAmerica Job ID: 480-137330-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-137330-1	F2-2	Solid	06/12/18 15:36	06/13/18 01:15
480-137330-2	F2-3	Solid	06/12/18 11:49	06/13/18 01:15
480-137330-3	F2-4	Solid	06/12/18 11:59	06/13/18 01:15
480-137330-4	W2-5	Solid	06/12/18 12:10	06/13/18 01:15
480-137330-5	F2-6	Solid	06/12/18 12:19	06/13/18 01:15
480-137330-6	W2-7	Solid	06/12/18 12:29	06/13/18 01:15
480-137330-7	F2-8	Solid	06/12/18 12:38	06/13/18 01:15
480-137330-8	W2-9	Solid	06/12/18 12:48	06/13/18 01:15
480-137330-9	W2-10	Solid	06/12/18 12:56	06/13/18 01:15
480-137330-10	F2-11	Solid	06/12/18 13:06	06/13/18 01:15

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone (716) 691-2600 Fax (716) 691-7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: D. Peacock	Lab PM: Stone, Judy L	Carr	COC No: 480-114396-26482.2
Client Contact: Ms. Julia Braunmueller	Phone: 315-800-1807	E-Mail: judy.stone@testamericainc.com		Page: Page 2 of 6
Company: GZA GeoEnvironmental, Inc.		Analysis Reques	480-137330 COC	Job #:
Address: 6296 Fly Road	Due Date Requested:			
City: East Syracuse	TAT Requested (days): Standard			
State, Zip: NY, 13057				
Phone: 315-800-1807(Tel)	PO #: Purchase Order not required			
Email: julia.braunmueller@gza.com	WO #:			
Project Name: Bulk Waste Samples	Project #: 48018260			
Site: Roth Bro's Steel/BLD 2	SSOW#:			

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010C, 7470A, 8082A	8082A - TCL PCBs - OLM04.2	6010C, 7470A, 8082A, 8270D	8260C - TCLP Volatiles	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
~~WW2-1~~ F2-2	06/12/18	~~11:32~~ 15:36	G	Solid				X				
F2-3	06/12/18	11:49	G	Solid				X				
F2-4	06/12/18	11:59	G	Solid				X				
W2-5	06/12/18	12:10	G	Solid				X				
F2-6	06/12/18	12:19	G	Solid				X				
W2-7	06/12/18	12:29	G	Solid				X				
F2-8	06/12/18	12:38	G	Solid				X				
W2-9	06/12/18	12:48	G	Solid				X				
W2-10	06/12/18	12:56	G	Solid				X				
F2-11	06/12/18	13:06	G	Solid				X				
	RE			Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Dustin Fletcher	6/13/18 / 17:37			6/17/18 1737	SYR
Relinquished by: RELINQUISHED	Date/Time: 6-13-18, 19:00	Company SYR	Received by:	Date/Time: 6-13-18 0115	Company TMS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.4 #1

Ver: 08/04/2016

Login Sample Receipt Checklist

Client: GZA GeoEnvironmental, Inc.

Job Number: 480-137330-1

Login Number: 137330

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	gza
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hawatha Blvd
Location: Syracuse, NY
Number: 1800.085

Order #: 254339

Matrix Paint
Received 04/03/18
Analyzed 04/04/18
Reported 04/04/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Sample Date	Weight / Total µg	% / Wt.	Conc.	RL*
254339-001	Paint-001	Building 2 Interior	03/29/18	331 mg			
Lead		EPA 7000B / 3050B		20.1 µg	0.00608 %	60.8 mg/kg	30.2 mg/kg
254339-002	Paint-002	Building 2 Exterior	03/29/18	349 mg			
Lead		EPA 7000B / 3050B		10400 µg	2.97 %	29700 mg/kg	716 mg/kg
254339-003	Paint-003	Building 2 Exterior	03/29/18	333 mg			
Lead		EPA 7000B / 3050B		6630 µg	1.99 %	19900 mg/kg	751 mg/kg
254339-004	Paint-004	Building 3 Interior	03/29/18	339 mg			
Lead		EPA 7000B / 3050B		762 µg	0.225 %	2250 mg/kg	59.0 mg/kg
254339-005	Paint-005	Building 3 Interior	03/29/18	320 mg			
Lead		EPA 7000B / 3050B		1170 µg	0.367 %	3670 mg/kg	156 mg/kg
		Sample contains substrate which may affect the calculation of weight percent and mg/kg.					
254339-006	Paint-006	Building 4 Interior	03/29/18	333 mg			
Lead		EPA 7000B / 3050B		96.1 µg	0.0289 %	289 mg/kg	30.0 mg/kg
254339-007	Paint-007	Building 5 Exterior	03/29/18	325 mg			
Lead		EPA 7000B / 3050B		109 µg	0.0337 %	337 mg/kg	30.8 mg/kg
254339-008	Paint-008	Building 5 Interior	03/29/18	322 mg			
Lead		EPA 7000B / 3050B		1050 µg	0.326 %	3260 mg/kg	155 mg/kg
254339-009	Paint-009	Building 5 Interior	03/29/18	335 mg			
Lead		EPA 7000B / 3050B		2170 µg	0.648 %	6480 mg/kg	149 mg/kg

Analyst: SA
254339-04/04/18 05:40 PM

Reviewed By: **Eric Broaddus**
Analyst

Federal Lead Paint Statute

Location	Clearance	Unit
Lead in paint by weight	< 0.50	%
Lead in paint as PPM	< 5000	mg/kg

Minimum reporting limit: 10.0 µg. Concentration and *Reporting Limit (RL) based on weights provided by client. All internal QC parameters were met. Unusual sample conditions, if any, are described. Values are reported to three significant figures. PPM = mg/kg | PPB = µg/kg. The test results reported relate only to the samples submitted. AIHA-LAP, LLC accredited for Lead.

Arctic
ENTERPRISES, INC.

LEAD BULK SAMPLE CHAIN OF CUSTODY

Project Number 1800.085
Client ERSI
Address Roth Steel
800 Hiawatha Blvd
Syracuse, NY

Contact Name: Bridget Ruane
Office Number: 315-476-1757
Fax Number: 315-476-1764
Email: arcticlab@arcticent.com

SAMPLE ID	LOCATION	DESCRIPTION
PAINT-001	Building 2 Interior	White Block Paint
PAINT-002	Building 2 Exterior	Red Exterior Paint
PAINT-003	Building 2 Exterior	Yellow Exterior Paint
PAINT-004	Building 3 Interior	Yellow Wall Paint
PAINT-005	Building 3 Interior	Brown Window Sill Paint
Paint-006	Building 4 Interior	Silver Wall Paint
PAINT-007	Building 5 Exterior	Red Door Paint
PAINT-008	Building 5 Interior	Black Door Paint
PAINT-009	Building 5 Interior	Peach Door Paint

254339 R 9
V:\254\254339
fghraizi 4/3/2018 9:4 5:00 AM
UPS 1Z2E2899906 3216671

Reporting Information: e-mail – (arcticlab@arcticent.com)

1. Analyze all samples via EPA 7000B for lead
2. Report results in %

Sample Turnaround Time: 5 Day

Sampled By:	**Date:** 3/29/18	**Time:**
Shipped By: UPS	**Date:** 3/30/18	
Received By Lab:	**Date:**	
Results e-mailed By:	**Date:**	

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd
Location: Syracuse, NY
Number: 1800.085

Order #: 254340

Matrix Paint
Received 04/03/18
Analyzed 04/04/18
Reported 04/04/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Location	Sample Date	Weight / Total µg	% / Wt.	Conc.	RL*
254340-001	Paint-010	Building 6 Video Store	03/30/18	320 mg			
Lead		EPA 7000B / 3050B		16.3 µg	0.0051 %	51.0 mg/kg	31.3 mg/kg

Analyst: SA
254340-04/04/18 05:41 PM

Reviewed By: **Eric Broaddus**
Analyst

Federal Lead Paint Statute

Location	Clearance	Unit
Lead in paint by weight	< 0.50	%
Lead in paint as PPM	< 5000	mg/kg

Minimum reporting limit: 10.0 µg. Concentration and *Reporting Limit (RL) based on weights provided by client. All internal QC parameters were met. Unusual sample conditions, if any, are described. Values are reported to three significant figures. PPM = mg/kg | PPB = µg/kg. The test results reported relate only to the samples submitted. AIHA-LAP, LLC accredited for Lead.

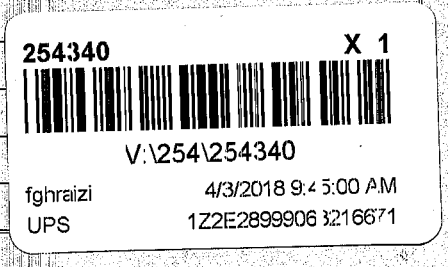
Arctic ENTERPRISES, INC.

LEAD BULK SAMPLE CHAIN OF CUSTODY

Project Number 1800.085
Client ERSI
Address Roth Steel
800 Hiawatha Blvd.
Syracuse, NY

Contact Name: Bridget Ruane
Office Number: 315-476-1757
Fax Number: 315-476-1764
Email: arcticlab@arcticent.com

SAMPLE ID	LOCATION	DESCRIPTION
PAINT-010	Building 6 Video Store	White Wall Paint



Reporting Information: e-mail – (arcticlab@arcticent.com)

1. Analyze all samples via EPA 7000B for lead
2. Report results in %

Sample Turnaround Time: 5 Day

Sampled By:	**Date:** 3/30/18	**Time:**
Shipped By: UPS	**Date:** 3/30/18	
Received By Lab:	**Date:**	
Results e-mailed By:	**Date:**	

ATTACHMENT D

PCB BULK SAMPLE LABORATORY REPORTS

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255762-001	FTM-001P	Bldg 2 1st FL Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<778**	778	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255762-002	CBM-009P	Bldg 2 1st FL Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<899**	899	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255762-003	FTM-015P	Bldg 3 E Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<981**	981	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255762-004	CBM-017P	Bldg 3 E Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<798**	798	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255762-005	CFTM-023P	Bldg 1 N Entry					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**3940**	771	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<772**	771	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255762-006	FTM-027P	Bldg 1 N Corridor					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<2840**	2830	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255762-007	FTM-034P	Bldg 1 N Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**46900**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<3780**	3770	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255762-008	FTM-041P	Bldg 4 E Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<1790**	1790	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255762-009	FTM-049P	Bldg 5 E Offices					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<943**	943	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

255762-04/16/18 01:54 PM

Reviewed By: **Thoria Nadiem**
Analyst

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse
Number: 1800.085

Order #: 255762

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Location	Result	RL*	Units	Analysis Date	Analyst

State Certifications

Method	Parameter	New York	Virginia
SW846 8082A	Aroclor - 1016	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1221	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1232	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1242	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1248	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1254	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1260	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1262	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1268	ELAP Certified	VELAP Certified

State	Certificate Number
New York	ELAP 57776
Virginia	VELAP 9567

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Arctic
ENTERPRISES, INC.

PCB BULK SAMPLE CHAIN OF CUSTODY

Project Number 1800.085
Client ERSI
Address Roth Steel Site
800 Hiawatha Blvd., Syracuse

Contact Name: Bridget Ruane
Office Number: 315-476-1757
Fax Number: 315-476-1764
Email: arcticlab@arcticent.com

SAMPLE ID	LOCATION	DESCRIPTION
FTM-001P	BUILDING 2-1ST Floor Offices	Black Floor Tile Mastic (under 9")
CBM-009P	BUILDING 2-1ST Floor Offices	Black Cove Base Mastic (under 6" CB)
FTM-015P	Building 3-East Offices	Black Floor Tile Mastic
CBM-017P	Building 3-East Offices	Brown Cove Base Mastic
CFTM-023P	Building 1-North Entry Way	Black Ceramic Floor Tile Mastic
FTM-027P	Building 1-North Corridor	Black Floor Tile Mastic (under 12" x 12")
FTM-034P	Building 1-North Offices	Black Floor Tile Mastic (under 9" x 9")
FTM-041P	Building 4-East Offices	Black Floor Tile Mastic (under 9" x 9")
FTM-049P	Building 5-East Offices	Black Floor Tile Mastic (under 9" x 9")

255762 R 9
V:\255\255762
fghraizi 4/12/2018 9:35:00 AM
UPS 1Z2E2899906 [illegible]

Reporting Information: e-mail – (arcticlab@arcticent.com)

Sample Turnaround Time: 5 DAY

Sampled By: David Brewer	**Date:** 4/2/2018	**Time:** 3:00 pm
Shipped By: UPS	**Date:** 4/10/18	
Received By Lab:	**Date:**	
No. of Samples 9 / 9	**Page**	**of**

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse, NY
Number: 1800.085

Order #: 255763

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255763-001	WCLK-004P	Bldg 2 E Storage Rm					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**1150**	478	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<479**	478	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255763-002	WGLAZE-005P	Bldg 2 E Storage Rm					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**2550**	470	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<470**	470	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse, NY
Number: 1800.085

Order #: 255763

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
255763-003	DCLK-006P	Bldg 2 E Storage Rm Ext					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<510**	509	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
255763-004	WGLAZE-007P	Bldg 2 E Storage Rm					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1221		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1232		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1242		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1248		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1254		SW846 8082A	**921**	448	µg/Kg	04/13/18	BRW
Aroclor - 1260		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1262		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
Aroclor - 1268		SW846 8082A	**<448**	448	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse, NY
Number: 1800.085

Order #: 255763

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Result	RL*	Units	Analysis Date	Analyst
255763-005	PUTTY-010P / Bldg 2 Ext Penetrations					
Semi-volatile Organic Compounds						
Aroclor - 1016	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1221	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1232	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1242	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1248	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1254	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1260	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1262	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
Aroclor - 1268	SW846 8082A	**<4590**	4590	µg/Kg	04/13/18	BRW
PCB - Surrogate Recoveries						
DCB	D					
TCMX	D					

255763-04/16/18 01:56 PM

Reviewed By: **Thoria Nadiem**
Analyst

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: 800 Hiawatha Blvd.
Location: Syracuse, NY
Number: 1800.085

Order #: 255763

Matrix Bulk
Received 04/12/18
Reported 04/16/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Location	Result	RL*	Units	Analysis Date	Analyst

State Certifications

Method	Parameter	New York	Virginia
SW846 8082A	Aroclor - 1016	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1221	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1232	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1242	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1248	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1254	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1260	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1262	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1268	ELAP Certified	VELAP Certified

State	Certificate Number
New York	ELAP 57776
Virginia	VELAP 9567

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Arctic
ENTERPRISES, INC.

PCB Bulk Sample Chain of Custody

Project Number 1800.085
Client ERSI
Address Roth Steel
800 Hiawatha Blvd.
Syracuse, NY

Contact Name: Bridget Ruane
Office Number: 315-476-1757
Fax Number: 315-476-1764
Email: arcticlab@arcticent.com

Sample ID	Location	Description
WCLK-004P	Building 2 East Storage Room	Gray Window Caulk
WGlaze-005P	Building 2 East Storage Room	Thick White Window Glaze.
DCLK-006P	Building 2 East Storage Room Exterior	White Door Caulk
WGlaze-007P	Building 2 East Storage Room	Thin Gray Window Glaze.
Putty-010P	Building 2 Exterior Penetrations	Black Penetration Putty

255763 S 5
V:\255\255763
fghraizi 4/12/2018 9:3 5:00 AM
UPS 1Z2E2899906 1273835

Reporting Information: e-mail – (arcticlab@arcticent.com)

Sample Turnaround Time: 5 Day

Sampled By: [signature]		
Shipped By: UPS	Date: 3/29/18	Time:
Received By Lab:	Date: 4/10/18	
No. of Samples 5 / 5	Date:	
	Page 1 of 1	

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Result	RL*	Units	Analysis Date	Analyst
257448-001	PAINT-001 / Building 2 Int Wht/Blk					
Semi-volatile Organic Compounds						
Aroclor - 1016	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1221	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1232	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1242	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1248	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1254	SW846 8082A	**5180**	733	µg/Kg	05/01/18	AE
Aroclor - 1260	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1262	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
Aroclor - 1268	SW846 8082A	**<734**	733	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries						
DCB	MI					
TCMX	MI					
257448-002	PAINT-002 / Building 2 Ext Red					
Semi-volatile Organic Compounds						
Aroclor - 1016	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1221	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1232	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1242	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1248	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1254	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1260	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1262	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
Aroclor - 1268	SW846 8082A	**<410**	409	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries						
DCB	MI					
TCMX	MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
257448-003	PAINT-003	Building 2 Ext Yellow					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<487**	486	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
257448-004	PAINT-004	Building 3 Int Yellow					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<465**	465	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Result	RL*	Units	Analysis Date	Analyst
257448-005	PAINT-005 / Building 3 Int Brown					
Semi-volatile Organic Compounds						
Aroclor - 1016	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1221	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1232	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1242	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1248	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1254	SW846 8082A	**2700**	415	µg/Kg	05/01/18	AE
Aroclor - 1260	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1262	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
Aroclor - 1268	SW846 8082A	**<415**	415	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries						
DCB	MI					
TCMX	MI					
257448-006	PAINT-006 / Building 4 Int Silver					
Semi-volatile Organic Compounds						
Aroclor - 1016	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1221	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1232	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1242	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1248	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1254	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1260	SW846 8082A	**4110**	703	µg/Kg	05/01/18	AE
Aroclor - 1262	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
Aroclor - 1268	SW846 8082A	**<704**	703	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries						
DCB	MI					
TCMX	MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
257448-007	PAINT-007	Building 5 Ext Red					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<439**	438	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
257448-008	PAINT-008	Building 5 Int Blk					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<1310**	1300	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
257448-009	PAINT-009	Building 5 Int Blue					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**1680**	426	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<426**	426	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					
257448-010	PAINT-010	Building 6 Int Wht					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<770**	770	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID	Location / Method	Result	RL*	Units	Analysis Date	Analyst
257448-011	PAINT-011	Building 8 Ext Gray					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1221		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1232		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1242		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1248		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1254		SW846 8082A	**4710**	692	µg/Kg	05/01/18	AE
Aroclor - 1260		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1262		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
Aroclor - 1268		SW846 8082A	**<693**	692	µg/Kg	05/01/18	AE
PCB - Surrogate Recoveries							
DCB		MI					
TCMX		MI					

257448-05/01/18 03:01 PM

Reviewed By: **Ben Wood**
Analyst

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Arctic Enterprises, Inc. (4677)
Address: 222 Teall Ave. Ste. 201
Syracuse, NY 13210

Attn:

Project: Roth Steel
Location: 800 Hiawatha Blvd, Syracuse NY
Number: 1800.085

Order #: 257448

Matrix Bulk
Received 04/25/18
Reported 05/01/18

PO Number:

Sample ID / Parameter	Cust. Sample ID / Method	Location	Result	RL*	Units	Analysis Date	Analyst

State Certifications

Method	Parameter	New York	Virginia
SW846 8082A	Aroclor - 1016	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1221	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1232	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1242	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1248	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1254	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1260	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1262	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1268	ELAP Certified	VELAP Certified

State	Certificate Number
New York	ELAP 57776
Virginia	VELAP 9567

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results reported relate only to the samples submitted.

Arctic ENTERPRISES, INC.

257448 X 11
V:\257\257448
msolomon 4/25/2018 9:25:00 AM
UPS 1Z2E28999064926723

PCB BULK SAMPLE CHAIN OF CUSTODY

Project Number 1800.085
Client ERSI
Address Roth Steel
800 Hiawatha Blvd.
Syracuse, NY

Contact Name: Bridget Ruane
Office Number: 315-476-1757
Fax Number: 315-476-1764
Email: arcticlab@arcticent.com

SAMPLE ID	LOCATION	DESCRIPTION
PAINT-001	Building 2 Interior	White Block Paint
PAINT-002	Building 2 Exterior	Red Exterior Paint
PAINT-003	Building 2 Exterior	Yellow Exterior Paint
PAINT-004	Building 3 Interior	Yellow Wall Paint
PAINT-005	Building 3 Interior	Brown Window Sill Paint
PAINT-006	Building 4 Interior	Silver Wall Paint
PAINT-007	Building 5 Exterior	Red Door Paint
PAINT-008	Building 5 Interior	Black Door Paint
PAINT-009	Building 5 Interior	Blue Door Paint (Peach)
PAINT-010	Building 6 Interior Video Store	White Wall Paint
PAINT-011	Building 8 Exterior	Gray paint on Stucco

Reporting Information: e-mail – (arcticlab@arcticent.com)

Sample Turnaround Time: 5 Day

Sampled By: [signature] / Bridget Ruane	Date: 4/23/18	Time:
Shipped By: UPS	Date:	
Received By Lab:	Date:	
No. of Samples 11 / 11	Page of	

ATTACHMENT E

SAMPLE LOCATION & POSITIVE MATERIAL LOCATION DRAWINGS (FIGURES 1-8)

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-140886-1
Client Project/Site: Characteristic Analysis

For:
Arctic Enterprises, Inc.
222 Teall Ave
Suite 201
Syracuse, New York 13210

Attn: Ms. Bridget Ruane

Joseph V. Giacomazza

Authorized for release by:
9/4/2018 4:22:20 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Brian Fischer, Manager of Project Management
(716)504-9835
brian.fischer@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 5
Client Sample Results 6
QC Sample Results 7
QC Association Summary 8
Lab Chronicle 9
Certification Summary 11
Method Summary 12
Sample Summary 13
Chain of Custody 14
Receipt Checklists 15

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Job ID: 480-140886-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-140886-1

Comments
No additional comments.

Receipt
The samples were received on 8/25/2018 1:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method(s) 1311: The physical characteristics of the following sample prohibited particle size reduction as required by SW-846 Method 1311: BLDG. 2-WOD (003) (480-140886-3). TCLP extraction was continued per the client request.

Method(s) 1311: Due to a computer glitch the exact EFD second pH values were erased, but were decidedly less than 5 thus fluid one was used.

BLDGS. 4,5,6-BLOCK (002) (480-140886-2) and BLDG. 2-WOD (003) (480-140886-3)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Client Sample ID: BLDGS. 1,2,3-BLOCK (001) — Lab Sample ID: 480-140886-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	60.9		0.98	0.24	mg/Kg	1	☼	6010C	Total/NA
Lead	0.010	J	0.020	0.0030	mg/L	1		6010C	TCLP

Client Sample ID: BLDGS. 4,5,6-BLOCK (002) — Lab Sample ID: 480-140886-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.6		1.0	0.24	mg/Kg	1	☼	6010C	Total/NA

Client Sample ID: BLDG. 2-WOD (003) — Lab Sample ID: 480-140886-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	22.5		1.1	0.25	mg/Kg	1	☼	6010C	Total/NA
Lead	0.051		0.020	0.0030	mg/L	1		6010C	TCLP

This Detection Summary does not include radiochemical test results.

Client Sample ID: BLDGS. 1,2,3-BLOCK (001)

Lab Sample ID: 480-140886-1
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.010	J	0.020	0.0030	mg/L		08/30/18 10:21	08/30/18 16:47	1

Client Sample ID: BLDGS. 1,2,3-BLOCK (001)

Lab Sample ID: 480-140886-1
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00
Percent Solids: 98.0

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	60.9		0.98	0.24	mg/Kg	☼	08/30/18 10:38	08/31/18 00:11	1

Client Sample ID: BLDGS. 4,5,6-BLOCK (002)

Lab Sample ID: 480-140886-2
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.020	0.0030	mg/L		08/30/18 10:21	08/30/18 16:51	1

Client Sample ID: BLDGS. 4,5,6-BLOCK (002)

Lab Sample ID: 480-140886-2
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00
Percent Solids: 98.6

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	2.6		1.0	0.24	mg/Kg	☼	08/30/18 10:38	08/31/18 00:15	1

Client Sample ID: BLDG. 2-WOD (003)

Lab Sample ID: 480-140886-3
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.051		0.020	0.0030	mg/L		08/30/18 10:21	08/30/18 16:55	1

Client Sample ID: BLDG. 2-WOD (003)

Lab Sample ID: 480-140886-3
Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00
Percent Solids: 94.1

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	22.5		1.1	0.25	mg/Kg	☼	08/30/18 10:38	08/31/18 00:19	1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-432175/1-A
Matrix: Solid
Analysis Batch: 432352

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432175

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		1.0	0.24	mg/Kg		08/30/18 10:38	08/30/18 22:01	1

Lab Sample ID: LCSSRM 480-432175/2-A
Matrix: Solid
Analysis Batch: 432352

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432175

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	210	186.2		mg/Kg		88.7	71.9 - 121.0

Lab Sample ID: MB 480-432177/2-A
Matrix: Solid
Analysis Batch: 432349

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432177

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.020	0.0030	mg/L		08/30/18 10:21	08/30/18 16:35	1

Lab Sample ID: LCS 480-432177/3-A
Matrix: Solid
Analysis Batch: 432349

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432177

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	1.00	1.00		mg/L		100	80 - 120

Lab Sample ID: LB 480-431967/1-B
Matrix: Solid
Analysis Batch: 432349

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 432177

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.020	0.0030	mg/L		08/30/18 10:21	08/30/18 16:31	1

QC Association Summary

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Metals

Leach Batch: 431967

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	TCLP	Solid	1311	
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	TCLP	Solid	1311	
480-140886-3	BLDG. 2-WOD (003)	TCLP	Solid	1311	
LB 480-431967/1-B	Method Blank	TCLP	Solid	1311	

Prep Batch: 432175

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	Total/NA	Solid	3050B	
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	Total/NA	Solid	3050B	
480-140886-3	BLDG. 2-WOD (003)	Total/NA	Solid	3050B	
MB 480-432175/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-432175/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Prep Batch: 432177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	TCLP	Solid	3010A	431967
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	TCLP	Solid	3010A	431967
480-140886-3	BLDG. 2-WOD (003)	TCLP	Solid	3010A	431967
LB 480-431967/1-B	Method Blank	TCLP	Solid	3010A	431967
MB 480-432177/2-A	Method Blank	Total/NA	Solid	3010A	
LCS 480-432177/3-A	Lab Control Sample	Total/NA	Solid	3010A	

Analysis Batch: 432349

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	TCLP	Solid	6010C	432177
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	TCLP	Solid	6010C	432177
480-140886-3	BLDG. 2-WOD (003)	TCLP	Solid	6010C	432177
LB 480-431967/1-B	Method Blank	TCLP	Solid	6010C	432177
MB 480-432177/2-A	Method Blank	Total/NA	Solid	6010C	432177
LCS 480-432177/3-A	Lab Control Sample	Total/NA	Solid	6010C	432177

Analysis Batch: 432352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	Total/NA	Solid	6010C	432175
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	Total/NA	Solid	6010C	432175
480-140886-3	BLDG. 2-WOD (003)	Total/NA	Solid	6010C	432175
MB 480-432175/1-A	Method Blank	Total/NA	Solid	6010C	432175
LCSSRM 480-432175/2-A	Lab Control Sample	Total/NA	Solid	6010C	432175

General Chemistry

Analysis Batch: 431903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	Total/NA	Solid	Moisture	
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	Total/NA	Solid	Moisture	
480-140886-3	BLDG. 2-WOD (003)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Client Sample ID: BLDGS. 1,2,3-BLOCK (001)

Lab Sample ID: 480-140886-1

Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			431967	08/29/18 10:18	LMS	TAL BUF
TCLP	Prep	3010A			432177	08/30/18 10:21	KMP	TAL BUF
TCLP	Analysis	6010C		1	432349	08/30/18 16:47	EMB	TAL BUF
Total/NA	Analysis	Moisture		1	431903	08/29/18 07:37	CSW	TAL BUF

Client Sample ID: BLDGS. 1,2,3-BLOCK (001)

Lab Sample ID: 480-140886-1

Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00
Percent Solids: 98.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			432175	08/30/18 10:38	KMP	TAL BUF
Total/NA	Analysis	6010C		1	432352	08/31/18 00:11	LMH	TAL BUF

Client Sample ID: BLDGS. 4,5,6-BLOCK (002)

Lab Sample ID: 480-140886-2

Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			431967	08/29/18 10:18	LMS	TAL BUF
TCLP	Prep	3010A			432177	08/30/18 10:21	KMP	TAL BUF
TCLP	Analysis	6010C		1	432349	08/30/18 16:51	EMB	TAL BUF
Total/NA	Analysis	Moisture		1	431903	08/29/18 07:37	CSW	TAL BUF

Client Sample ID: BLDGS. 4,5,6-BLOCK (002)

Lab Sample ID: 480-140886-2

Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00
Percent Solids: 98.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			432175	08/30/18 10:38	KMP	TAL BUF
Total/NA	Analysis	6010C		1	432352	08/31/18 00:15	LMH	TAL BUF

Client Sample ID: BLDG. 2-WOD (003)

Lab Sample ID: 480-140886-3

Date Collected: 08/24/18 00:00
Matrix: Solid
Date Received: 08/25/18 01:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			431967	08/29/18 10:18	LMS	TAL BUF
TCLP	Prep	3010A			432177	08/30/18 10:21	KMP	TAL BUF
TCLP	Analysis	6010C		1	432349	08/30/18 16:55	EMB	TAL BUF
Total/NA	Analysis	Moisture		1	431903	08/29/18 07:37	CSW	TAL BUF

Lab Chronicle

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Client Sample ID: BLDG. 2-WOD (003)
Date Collected: 08/24/18 00:00
Date Received: 08/25/18 01:00

Lab Sample ID: 480-140886-3
Matrix: Solid
Percent Solids: 94.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			432175	08/30/18 10:38	KMP	TAL BUF
Total/NA	Analysis	6010C		1	432352	08/31/18 00:19	LMH	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
1311	TCLP Extraction	SW846	TAL BUF
3010A	Preparation, Total Metals	SW846	TAL BUF
3050B	Preparation, Metals	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Arctic Enterprises, Inc.
Project/Site: Characteristic Analysis

TestAmerica Job ID: 480-140886-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-140886-1	BLDGS. 1,2,3-BLOCK (001)	Solid	08/24/18 00:00	08/25/18 01:00
480-140886-2	BLDGS. 4,5,6-BLOCK (002)	Solid	08/24/18 00:00	08/25/18 01:00
480-140886-3	BLDG. 2-WOD (003)	Solid	08/24/18 00:00	08/25/18 01:00

Example Chain

TestAmerica Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: B. RUANE	Site Contact:	Date: 8/24/18	COC No:
Your Company Name here: ARCTIC ENTERPRISES	Tel/Fax:	Lab Contact:	Carrier:	____ of ____ COCs
Address: 222 TEALL AVE.	Analysis Turnaround Time			Sampler:
City/State/Zip: SYRACUSE, NY	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(xxx) xxx-xxxx Phone: 315.476.1757	TAT if different from Below ____			Walk-in Client:
(xxx) xxx-xxxx FAX	☐ 2 weeks			Lab Sampling:
Project Name: ROTH STEEL	☑ 1 week			
Site: 800 HIAWATHA BLVD., SYR	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

480-140886 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	6010C TCLP for Lead	6010B For Lead TOTAL LEAD	Sample Specific Notes:
BLDGS. 1, 2, 3 - BLOCK (001)	8/24/18		C	BLOCK	2			✓	✓	Please contact B. RUANE if Sample volume is insufficient
BLDGS. 4, 5, 6 - BLOCK (002)	8/24/18		C	BLOCK	2			✓	✓	
BLDG. 2 - WOOD (003)	8/24/18		C	WOOD	1			✓	✓	
								1	1	

AP 8-24-18

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ 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:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: 1.2 Corr'd: ____	Therm ID No.: #1	
Relinquished by: Bridget Ruane	Company: ARCTIC	Date/Time: 8/24/18 1545	Received by:	Company: SYR	Date/Time: 8/24/18 1545
Relinquished by: RE English	Company: Syr, 8.24.18	Date/Time: 19:00	Received by:	Company: FAS	Date/Time: 8-25-18 0100
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.17, dated 4/27/2018

Login Sample Receipt Checklist

Client: Arctic Enterprises, Inc.

Job Number: 480-140886-1

Login Number: 140886

List Source: TestAmerica Buffalo

List Number: 1

Creator: Williams, Christopher S

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	ARCTIC
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

APPENDIX C

GENERAL DEMOLITION PROCEDURES (ERSI)

General Demolition Approach:

ERSI intends to demolish (7) of the (8) structures within the Roth Steel scope of work utilizing controlled demolition methodology. Buildings will be demolished utilizing a site specific variance per NYS ICR-56. The intent will be to demolish the structures utilizing (1), (2) 50,000 – 75,000 class excavator(s) with grapple or bucket and thumb attachments. Clean fill materials such as block and concrete will be segregated along with any ferrous or non-ferrous recyclable metal. Building will be demolished via wet demolition methods to help mitigate dust migration. Building 5 will not require a site-specific variance.

Major Demolition Components Include:

- Building 1: 8,800 sf
- Building 2: 11,225 sf
- Building 3: 4,775 sf
- Building 4: 7,200 sf
- Building 5: 4,625 sf
- Building 6: 7,170 sf
- Building 7: 1,950 sf
- Building 8: 1,150 sf

Building Demolition

1) Utility Work and Verification – Prior to demolition activities, ERSI will identify, disconnect, isolate, and cap utility services. Work will be done in connection with OCIDA as well as drawings made available. All identified inactive underground utility lines including water, sewer and fire shall be removed from the limits of demolition and capped and abandoned in place where they continue beyond the limits unless otherwise noted. Any relocation or reestablishment of utility services scheduled to remain shall be performed by others. A visual inspection of all areas will occur involving both ERSI and OCIDA.

2) OSHA Engineering Survey- ERSI will prepare an Engineering Survey specific for demolition activities. Completion of the Engineering Survey is a collective effort that requires the participation of the entire site leadership team.

3) Work Area Controls - The work area will be cordoned off via orange snow fence with "Danger Asbestos" signs or barrier tape. Workers will enter and exit the work area through the personnel decontamination unit that will be placed at the orange fence line of the building; workers entering this work zone will be required to sign in and out of the work area. Area will be properly wetted throughout demolition activities. Potential water runoff will be diverted from storm drains by way of hay bales and collected.

4) Work & Safety Plan- *Safety is always our top priority.* ERSI will submit a comprehensive, site specific safety plan for the execution of this project. The safety plan will be written by ERSI on staff CIH, Director of Health & Safety, Dan Woody. The report will include all facets of the project, including but not limited to; organizational structure, site characterization & job hazard analysis, site control, training programs, medical surveillance, PPE, general site safety, monitoring programs, decontamination, & emergency response plans. This document will be generated and submitted upon award with feedback and dialogue from OCIDA on site safety personnel. While the site specific safety plan will be created upon project award, ERSI's corporate Health and Safety Program is always available upon request.

Mechanical Demolition Means & Methods

a) Background- The project involves the mechanical demolition of approximately 47,000 square feet within (8) single-story steel and masonry industrial buildings located at the former Roth Steel site. Work will be performed in accordance with RFP set forth by the OCIDA and regulations and codes of the local municipality.

b) Manpower: The procedures listed below shall be accomplished utilizing the following personnel:
   - One (1) project manager.
   - One (1) site superintendent.
   - Two (2) heavy equipment operators.
   - Three (3) to Six (6) skilled laborers and burners.

c) Equipment: The procedures listed below shall be accomplished utilizing the following equipment:
   - Two (2) 200-400 series excavator with various implements including grapples, shears, processors, hammers, and buckets.
   - One (1) to two (2) front end wheel or track loaders.
   - One (1) skid steer loaders.
   - One (1) to three (3) portable dust suppression units.

d) Methodology- ERSI will accomplish demolition, debris removal and site restoration activities per the following means and methods:

   An excavator utilizing a processor or grapple will perform primary building demolition activities incorporating proprietary methods to complete the mechanical demolition of structures. In advance of building demolition, ERSI may remove non-load bearing walls, facades, windows, and or exterior appurtenances, as necessary to access structural supports of the building.

   Buildings will be demolished utilizing an excavator with processor or grapple attachment to cut columns and beams and pull structural support from the building in a controlled manner that will allow the roof and walls to collapse in a designed approach. Work will begin on one side of the building and proceed across or down the building on a bay by bay approach.

   Additional excavator(s) with grapple attachments will then be used to assist in demolishing the structure as the building is removed in sections. As demolition of the building is accomplished, recyclable steel will be separated from general construction and demolition debris including masonry will be stockpiled and crushed on site if deemed cleaned by 3rd party consultant. The grapple attachment will be used for several activities, including building dismantling or demolition and material handling, sorting, and loading trucks. Large excavators with hammer and grapple attachments will be utilized to break the above-grade concrete floor slabs into smaller sections to facilitate further processing. A smaller backhoe or bobcat with a hammer attachment will be used for areas where access prohibits the use of an excavator or for small areas of concrete not suited for an excavator.

   Following the segregation and separation of materials caused by building demolition, construction and demolition debris will be stockpiled and subsequently live-loaded into walking floor or dump trailers for transport and legal disposal in an appropriate manner. Concrete aggregate material will be stockpiled for crushing on-site, if deemed clean by 3rd party consultant. During the activities that may create nuisance dust, ERSI will keep debris adequately wet with water from nearby provided water source. A demolition exclusion zone will be established along the perimeter of each building pad in these areas. No construction and demolition debris will be allowed to be removed from this exclusion zone.

Waste Disposal

As specified by the Workplan, waste from this site, excluding recyclables, will be shipped as non-friable demolition debris. All dumpsters/trailers will be lined with 2 layers of polyethylene sheeting, or as per NYS variance requirements and shipped to the appropriate landfill capable of accepting non-friable demolition debris. ERSI will be primarily utilizing both Seneca Meadows Landfill and High Acres Landfill, however we will not be restricting ourselves to these locations. Waste will be sorted, segregated and shipped on a regular basis in order to keep the site clean and help ensure migration of fugitive dust and debris. As specified in the Workplan, some concrete/brick will be crushed and stored on site in designated areas for future use as fill on the Roth Site.

The steps involved in the demolition process detailed above will be repeated for each of the onsite (8) structures to be demolished until satisfactory completion is achieved.

Building slabs and foundations demolition, as well as any below grade activities, is not included in this Phase of work.

At the completion of the project, ERSI will tour the site with OCIDA personnel in an effort to sign off on each area. When successful project has been achieved, crews will remove all temporary facilities and controls including field office trailers and silt fencing from the project site.

Asbestos Abatement – Friable

The abatement team will have a dedicated supervisor & (4) laborers based on survey results. The team may be split up to work concurrently in different structures to achieve more efficient removals. If this option is chosen, each structure will have its own supervision.

An equipment room with an air lock to the work area and curtained doorway to the shower room.

A shower room with two curtained doorways, one to the equipment room and one to the clean room. The shower room will contain sufficient showers with hot and cold water to support the planned crew during each work shift. ERSI will contain and filter all shower wastewater. Wastewater will be pumped or HEPA vacuumed to a holding tank for analysis and filtering. The water will be filtered through 25.0 and 5.0 micron filters. The analyzed and filtered water will be pumped from the holding tank to a tanker truck for disposal. Alternately, the filtered water may be re-used as wetting water in the asbestos containment area.

A clean room with one curtained doorway into the shower room and one curtained doorway/entrance.

ERSI will isolate the work areas for the duration of the abatement, completely sealing all openings. Any fixed objects will be covered with 6 mil poly taped securely in place. Emergency exits will be clearly marked throughout the work area and emergency access will be provided during all abatement activities. Fire extinguishers will be located in each work area.

Asbestos containing material will be removed using wet methods. All removed asbestos materials will be placed, while wet, in double 6 mil bags or wrapped in two layers of 6 mil polyethylene sheeting and sealed.

Following post-removal cleanup, the work area will be visually inspected for the presence of remaining asbestos containing materials. If additional asbestos containing materials are identified, they will be removed and the work area will be re-cleaned. The inspection procedure will then be repeated. After passing the visual inspection, the work area will be encapsulated (except those surfaces subject to removal) prior to collecting final air clearance samples.

In the unlikely event that final air clearance results are unacceptable, the work area will be re-cleaned and the final air clearance sampling process is repeated. Upon receipt of successful final air clearance results, asbestos containments and decontamination units may be dismantled and removed.

APPENDIX D

HEALTH AND SAFETY PLAN

Job Hazard Analysis	**Controlled Demolition**	**Date: July 27, 2018**
Site Location: Former Roth Steel		**Syracuse, NY**
Contractor: ERSI	**Work Area Location: Multiple**	**Completed by: Tim Niedzwiecki**

Activity Operation	**Unsafe Condition, Action, or Other Hazard**	**Preventative or Corrective Action That Will Be Taken**
Personnel will complete Site Orientation.	Lack of Site Knowledge	Attend and complete Site Orientation.
Review approved HASP with ERSI personnel.	Use of untrained personnel working in the area.	Personnel will sign off after thorough review and understanding of HASP.
Conduct daily safety briefing and review of JHA/Daily Task Briefing.	Lack of Hazard Recognition	Personnel will sign off after thorough review and understanding of JHA/Daily Task Briefing.
Conduct walk down and observe work area for typical demolition physical hazards.	Head/Eye Impact Hand cuts and abrasions Biologic Hazards Foot Impact Noise Impaired Visibility Fall Hazard	Workers to wear hardhat/safety glasses for work activities Gloves specific for the task will be worn for work activities in the field. Long sleeve shirts to be worn by fields personal, to protect against ticks. Employees to wear steel toed boots. Employees working in areas in excess of 85db TWA shall wear ear plugs. Workers to don high visibility vest Personnel will wear fall protection when require

This JHA has been developed for general compliance with the jobsite safety requirements. This JHA is a supplement to the Activity Hazard Analysis (AHA) for General Site Hazards.

Work Area Controls Erect barriers, road closures, demarcate and secure building(s) demolition footprint as needed, while restricting access to the work area to ERSI and authorized personnel only. **Building(s) Demolished** The work area will be cordoned off via orange snow fence with "Danger Asbestos" signs or barrier tape. Workers will enter and exit the work area through the personnel decontamination unit that will be placed at the limits of the buildings exclusion zone; workers entering this work zone will be required to sign in and out of the work area.	Unauthorized entry Head/Eye Impact Hand cuts and abrasions Foot Impact Impaired Visibility Slippery or uneven surfaces	Verify that barriers and signage remains intact to properly establish work area and control of access. Workers to wear hardhat/safety glasses for work activities Gloves will be worn for work activities in the field. Employees to wear steel toed boots. Workers to don high visibility vest Inspect travel route for obstructions, holes and uneven surfaces.
Mobilize tools, equipment and materials needed to complete task.	Head/Eye Impact Hand cuts and abrasions Foot Impact Impaired Visibility Pinch Points Strains, Sprains	Workers to wear hardhat/safety glasses for work activities Gloves will be worn for work activities in the field. Employees to wear steel toed boots. Workers to don high visibility vest Training on identification of pinch points and awareness of hand placement. Use proper lifting technique and get assistance for bulky or

	Crushing Hazard; Impaired Vision; Moving Traffic	heavy loads. Use spotter as needed. Obey all Site traffic rules and regulations. • Use flagmen to keep unauthorized personnel away from active work and 15' from mobile equipment • Speed limit 20 mph in/out or as posted • No cell phone use while driving • Wear seat belts Inspect travel route for obstructions, holes and uneven surfaces; Good Housekeeping
Mobilize decontamination Unit (clean room; shower; equipment/ dirty room), at a central location to complete Transite removal. The same unit may be used for Building 1 North and South as the unit can be remote to the work area.	Head/Eye Impact Hand cuts and abrasions Foot Impact Impaired Visibility	Workers to wear hardhat/safety glasses for work activities Impact resistant Kevlar gloves will be worn for work activities in the field. Employees to wear steel toed boots. Workers to don high visibility vest

Demolition Method The majority of the buildings will be demolished utilizing a site specific variance per NYS ICR-56. The intent will be to demolish the structures utilizing (1), (2) 50,000 – 75,000 class excavator(s) with	Asbestos, Lead paint and PCBs exposure Uneven or obstructed pathways	Workers will don full body suits, half face respirators with P-100 HEPA filters, safety glasses. Inspect travel route for obstructions, holes and uneven surfaces; Good Housekeeping Plant Outages, Spotters, Flagging

grapple and a PC 450/490 with a 3rd member shear or UHD front with shear.	Overhead Electrical Hazard Pinch Points, Struck by, Crushed by. Spills, Leaks, Failure of Hydraulic system Fugitive Dust No Cage on excavator, full glass/cage on skid steer	Training on identification of pinch points and awareness of hand placement. Equipment inspection, Wet methods Equipment Inspection prior to use.
Waste Disposal Friable demolition debris will be shipped in containers will be lined with 2 layers of polyethylene sheeting, or in compliance per NYS variance requirement labeled, properly manifested, and dispose of wastes in approved disposal location(s). Waste will be sorted, segregated and shipped on a regular basis in order to keep the site clean and help ensure migration of fugitive dust and debris	Missing labels	Use proper labelling techniques and communicate hazards.
Work Area to be hand picked, hand cleaned upon compltion of demo and load out actvities.	Asbestos and PCB exposure Head/Eye Impact Hand cuts and abrasions	Workers will don full body suits, half face respirators with P-100 HEPA filters, safety glasses. Workers to wear hardhat/safety glasses for work activities Gloves will be worn for work activities in the field.

This JHA has been developed for general compliance with the jobsite safety requirements. This JHA is a supplement to the Activity Hazard Analysis (AHA) for General Site Hazards.

	Foot Impact	Employees to wear steel toed boots.
	Noise	Employees working in areas in excess of 85db TWA shall wear ear plugs.
	Impaired Visibility	Workers to don high visibility vest
	Pinch Points	Training on identification of pinch points and awareness of hand placement.
	Strains, Sprains, Injury's	Use proper lifting technique and get assistance for bulky or heavy loads.

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ENVIRONMENTAL GROUP, INC.
ENGINEERING, ARCHITECTURE & SURVEYING, PC

SITE SPECIFIC
HEALTH & SAFETY PLAN

800 HIAWATHA BOULEVARD WEST
SYRACUSE, NEW YORK
(FORMER ROTH STEEL SITE)

NYSDEC BCP SITE #C734083

Prepared by:

Spectra Environmental Group, Inc.
19 British American Boulevard
Latham, New York 12110
Project #16140

October 2016

SITE SPECIFIC HEALTH & SAFETY PLAN
800 HIAWATHA BOULEVARD WEST, SYRACUSE, NY
NYSDEC BCP SITE #C734083

TABLE OF CONTENTS

1.0 INTRODUCTION....1

2.0 SCOPE OF WORK....2

3.0 DESIGNATION OF RESPONSIBILITIES....3

4.0 SITE-SPECIFIC HEALTH AND SAFETY CONCERNS....5

4.1 SITE LOCATION....5

4.2 SITE HISTORY AND SETTING....5

4.3 CHEMICAL CONSTITUENTS OF CONCERN....5

5.0 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS....6

5.1 KEY PERSONNEL....6

5.2 TRAINING....6

5.3 AIR MONITORING....7

5.4 PERSONAL PROTECTIVE EQUIPMENT....7

5.5 OTHER PROTECTIVE EQUIPMENT....8

5.6 EXCAVATION PROCEDURES....8

6.0 EMERGENCY PLAN....11

6.1 NOTIFICATION....11

6.2 PERSONNEL INJURY....11

6.3 FIRE/EXPLOSION....12

6.4 PERSONAL PROTECTION EQUIPMENT FAILURE....12

6.5 OTHER EQUIPMENT FAILURE....12

6.6 OFF-SITE EMERGENCY RESPONSE....12

6.7 DIRECTIONS AND MAP TO NEAREST HOSPITAL....12

6.8 RECORD KEEPING....14

FIGURES

FIGURE 1 SITE LOCATION MAP

APPENDICES

APPENDIX A GENERAL FIELD SAFETY RULES
APPENDIX B FIRST AID EQUIPMENT LIST
APPENDIX C GENERAL PROTECTIVE CLOTHING REQUIREMENTS
APPENDIX D DONNING AND DOFFING PROTECTIVE CLOTHING LEVEL C
APPENDIX E TEMPERATURE STRESSES: POLICIES AND PROCEDURES
APPENDIX F SOIL AND WELL SAMPLING HEALTH AND SAFETY GUIDELINES
APPENDIX G HEARING PROTECTION
APPENDIX H PROCEDURES FOR EXCAVATION, TRENCH OR TEST PIT DIGGING
APPENDIX I GENERAL HEALTH AND SAFETY GUIDELINES FOR DRUM HANDLING
APPENDIX J MSDS SHEETS

FIELD HEALTH AND SAFETY PLAN

This Site Specific Health and Safety Plan (SSHSP) is designed to assure compliance with OSHA's regulations covering hazardous waste sites (29 CFR 1910.120).

The purpose of the Site Specific Health and Safety Plan is to assure clear delegation of responsibilities, consistent work practices and proper oversight of health and safety issues during activities at the Site as identified in the attached Figure 1.

This plan is site-specific and has been reviewed and approved by Spectra's Corporate Health and Safety Officer and Project Manager prior to adoption.

A copy of this plan will available at the site. At the completion of planned activities, a copy of this plan shall be retained with other project related documentation including soil boring logs and well installation diagrams, etc.

APPROVED BY:

	October 20, 2016
Corporate Health and Safety Officer (CHSO)	Date
	October 20, 2016
Project Manager / On-Site Supervisor	Date

1.0 INTRODUCTION

This Site Specific Health and Safety Plan (SSHSP) has been developed to identify potential hazardous substances and conditions known or suspected to be present on the site and ensure that they do not adversely impact the health or safety of personnel conducting field activities. It is also intended to ensure that the procedures used during these field activities meet reasonable professional standards to protect human health and safety of workers and the surrounding community. This plan incorporates by reference to applicable requirements of the Occupational Safety and Health Administration in 29 CFR Parts 1910 and 1926.

The requirements in this SSHSP are based on review of site-specific information. Based on existing site information, it is known that elevated levels of PCBs, VOCs, SVOCs, and various metals exist or may exist at the site.

All field personnel working on this project must familiarize themselves with this SSHSP and abide by their requirements. Since every potential health and safety hazard encountered at a site cannot be anticipated, it is imperative that personnel are equipped and trained to respond promptly to a variety of possible hazards. Adherence to this plan will minimize the possibility that personnel at the site will be injured or exposed to significant hazards. Information on potential health, safety and environmental hazards is discussed in conjunction with appropriate protective measures including assignment of responsibility, personal protective equipment requirements, work practices, and emergency response procedures.

In general, subcontractors are responsible for the health and safety of their employees and complying with all regulations applicable to the work they are performing.

Spectra personnel can and must stop work when a subcontractor is observed to not be following health and safety procedures required by the plan. Spectra will also require that subcontractors develop a site and activity specific health and safety plan.

This SSHSP is specifically intended for Spectra personnel who will be conducting activities within the defined scope of work at the site.

2.0 SCOPE OF WORK

The scope of work for the former Roth Steel site (herein known as the "Site") will involve site assessment and the oversight of subcontracted services. These services include, but are not limited to:

- The staging and ultimate removal of drums and 5-gallon buckets of waste automotive fluids (oil, antifreeze, gasoline, etc.);
- The staging and ultimate removal of suspected PCB-containing oil (capacitors);
- The staging and ultimate removal of various containers of unlabeled materials;
- Sampling and characterization of waste materials prior to removal;
- Soil boring, well drilling, test pit excavation;
- Environmental sample collection (soil, groundwater, surface water, vapor); and
- Remediation construction oversight.

3.0 DESIGNATION OF RESPONSIBILITIES

The responsibility for implementing this SSHSP is shared by the Corporate Health and Safety Officer (CHSO), project manager (PM), and the On-Site Supervisor (OSS). The PM will recommend policy on all safety matters including work practices, training and response actions, and will provide the necessary resources to conduct the project safely.

The CHSO has overall responsibility for developing safety procedures and training programs, maintaining a high level of safety awareness; ensuring compliance with applicable federal, state and local health and safety regulations; determining appropriate protection including the selection of protective equipment, maintenance schedules and monitoring protocols; and maintaining close communication with the OSS and field personnel. The CHSO is the final decision point for determination of health and safety policies and protocols for all projects.

The OSS is responsible for establishing operating standards and coordinating all safety activities occurring at the site, with guidance from the CHSO. Specifically, the OSS is responsible for:

- Assuring that a copy of this SSHSP is at the site prior to the start of field activities and that all workers are familiar with it;
- Conducting training and briefing sessions if appropriate, prior to the start of field activities at the site and repeat sessions as necessary;
- Ensuring the availability, use, and proper maintenance of specified personal protective, decontamination, and other health or safety equipment;
- Maintaining a high level of safety awareness among team members and communicating pertinent matters to them promptly;
- Assuring that all field activities are performed in a manner consistent with Company policy and this SSHSP;
- Monitoring for dangerous conditions during field activities;
- Assuring proper decontamination of personnel and equipment;
- Coordinating with emergency response personnel and medical support facilities, and other Health and Safety representatives of the client and contractors;
- Initiating immediate corrective actions in the event of an emergency or unsafe condition;

- Notifying the CHSO promptly of any emergency, unsafe condition, problem encountered, or significant exceptions to the requirements in the SSHSP; and
- Recommending improved health and safety measures to the Project Manager, or the CHSO.

The OSS has the authority to:

- Suspend field activities or otherwise limit exposures if the health and safety of any person appears to be endangered;
- Direct Company or subcontractor personnel to alter work practices that are deemed not properly protective of human health or the environment; and
- Suspend an individual from field activities for significant infraction of the requirements in this SSHSP.

However, the presence of the OSS shall in no way relieve any person, company or subcontractor of its obligations to comply with the requirements of this Plan and all applicable federal, state and local laws and regulations.

The key element in the responsibility for health and safety is the individual field team member. Everyone must be familiar with and conform to the safety protocols prescribed in this SSHSP and communicate any relevant experience or observations to provide valuable inputs to improving overall safety.

4.0 SITE-SPECIFIC HEALTH AND SAFETY CONCERNS

4.1 SITE LOCATION

Hiawatha Boulvard Site
Former Roth Steel
800 Hiawatha Blvd West
Syracuse, NY

4.2 SITE HISTORY AND SETTING

The Site is the former location of The Roth Steel metal recycling facility. The Onondaga County Industrial Development Agency (OCIDA) currently owns the site. Various articles of scrap metal, primarily automobiles, were brought to the Facility for recovery of ferrous and non-ferrous metals. Automobiles were stored at various locations at the site before being shredded. Automobile shredder residue (ASR) tested for PCBs is buried in various areas onsite. The Site is located in an industrial/commercial area on the southern end of Onondaga Lake, in the City of Syracuse, Onondaga County, New York (Figure 1).

This Health and Safety Plan applies to the real property shown on Figure 1 in connection with the former Roth Steel Facility located in Syracuse, New York.

4.3 CHEMICAL CONSTITUENTS OF CONCERN

The primary health concerns and routes for exposure at this site are injection, ingestion, and absorption of soil and groundwater through injection, inhalation, ingestion, puncture, and direct skin contact while collecting soil and groundwater samples.

Skin and eye contact hazards are also potentially high. The protective equipment specified in Section 5.0 will provide adequate protection. Any symptoms are to be reported to the Project Manager and the CHSO immediately.

The potential for exposure will be further reduced by prohibiting eating, drinking, or smoking during all activities within the fieldwork areas.

Unknown or unexpected materials of a hazardous nature may be encountered during site activities. No work will be conducted if field measurements or observations indicate that a potential exposure is greater than the protection afforded by the requirements in this Plan.

- Potential contaminants include; PCBs, BTEX and other VOCs, SVOCs, and metals in soil and groundwater.

5.0 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS

5.1 KEY PERSONNEL

Site Contact:

Isabelle Harris (OCIDA)
333 W. Washington Street, Suite 130
Syracuse, NY 13202
(315) 435-3669

Project Manager

Name: John Ciampa (Spectra)
Telephone Number: (518) 782-0882

Project Engineer

Name: Frank Peduto, P.E. (Spectra)
Telephone Number: (518) 782-0882

Spectra Corporate Health and Safety Officer

Name: Paul M. Adel, P.E. (Spectra)
Telephone Number: (518) 782-0882

Site On-Site Supervisor (Depending on Activity)

Name: Yaicha Winters, Joe Krikorian, Mark Neves (Spectra)

5.2 TRAINING

All personnel working at the site that may come into contact with contaminated soil or groundwater while performing environmental sampling or remediation activities must have received training at least meeting the requirements established by the Occupational Safety and Health Administration in 29 CFR 1910.120 prior to the start of field activities.

Before authorized persons enter the active site for the first time, they will be briefed by the Project Manager or OSS as to the potential hazards that may be encountered. Topics will include:

- This SSHSP and the nature of its contents;
- Selection and use of personal protection equipment (PPE) to be worn;
- Decontamination procedures for personal protection and other equipment, as necessary;
- Emergency forms of notification, and evacuation routes to be followed;

- Prohibitions on smoking and carrying of tobacco products, eating, drinking, and open fires (except by permit) in the work area;
- Methods to obtain outside emergency assistance and medical attention;
- Specific health, safety, and emergency response requirements imposed by the facility's owner or operator; and
- The frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment.

5.3 AIR MONITORING

Site-specific monitoring programs have been designed and are consistent with known or suspected exposure to hazardous materials. The following monitoring is planned as part of this project.

All areas are adequately ventilated and do not present a potential for accumulation of harmful or ignitable quantities of vapors. During excavation/drilling activities a photoionization detector will be used to measure total volatile organic compounds both around the hole and in the employees' breathing zone.

5.4 PERSONAL PROTECTIVE EQUIPMENT

The minimum level of protection that will be required on site is Level D. Level D will be worn when a potential dermal hazard exists and air monitoring indicates that no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Safety-toe work boots meeting ANSI Z41;
- Hard hat, meeting ANSI Z89 (when near excavation or drilling activities);
- Tyvek suit and safety glasses (if splash protection is necessary);
- Hearing protection (when near excavation or drilling activities); and
- Nitrile gloves (when collecting samples).

Air monitoring will be performed when intrusive activities (i.e. excavation) are being conducted. Air monitoring will involve use of a PID to screen ambient air. If elevated levels of VOCs are detected, work will cease and an assessment will be made by the OSS. If the OSS determines that the airborne concentration of VOC contaminants continues to be elevated, PPE

will be upgraded to Level C and will include the addition of an air purifying respirator with combination organic vapor and HEPA dust cartridges.

Unless the CHSO directs otherwise, when respirators are used, the cartridges should be changed after eight hours of use, or at the end of each shift, or when any indication of breakthrough or excess resistance to breathing is detected.

Based on the potential presence of BTEX compounds, an upgrade to level C respiratory protection will be required if the PID meter exceeds 5 ppm above background for 5 minutes, in the breathing zone. If the PID exceeds 25 ppm in the breathing zone, field operations will cease and workers will move to an upwind area. The Spectra project manager or project engineer will be notified for further instructions.

5.5 OTHER PROTECTIVE EQUIPMENT

A first aid kit, and vehicle will be kept in close proximity to the site.

5.6 EXCAVATION PROCEDURES

On-site excavations can pose hazards to employees if they are not carefully controlled. Prior to excavation, the presence and locations of underground utilities within and near the work area must be determined. Utilities will be identified through review of historical records and through contact with DigSafe. No excavations will occur within the vicinity of any underground utilities.

All activities within the excavation will be performed remotely, without entering the excavation. Personnel will not enter excavations unless they are required to do so and no remote options are available

No person shall be permitted underneath loads handled by lifting or excavating equipment. Site personnel are required to stand away from any vehicle being loaded or unloaded to avoid being struck by the equipment or any falling debris.

Excavation equipment typically results in noise levels exceeding 85 decibels (dBA). All personnel must wear hearing protection when noise levels exceed 85 dBA.

PPE for operations involving excavation includes: hard hat, safety-toed shoes, safety glasses and hearing protection.

5.7 HEAT STRESS

Heat stress is a common but potentially serious illness at work sites and warrants preventive measures. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and individual characteristics of the worker. Depending on the

ambient conditions and the work being performed, heat stress can occur very rapidly – within as little as 15 minutes. In its early stages, heat stress can cause rashes, cramps, and drowsiness. This can result in impaired functional ability that threatens the safety of both the individual and co-workers. Persistent heat stress can lead to heat stroke and death.

Fieldwork involves activities such as walking, surveying, hand-digging, soil and water sampling etc. that range from light hand work to moderate work with the body. All personnel must consider the danger of heat stress when making decisions regarding conduct and duration of fieldwork.

The following heat stress protocol applies to on-site personnel working in lightweight cotton clothing (i.e., short-sleeve shirts and cotton pants) that allow for sweat evaporation.

Caution for heat illness is indicated when the temperature reaches 85°F or greater and the relative humidity is greater than 35%. When the temperature reaches 95°F or greater and the relative humidity is greater than 60%, there is extreme danger for heat illness. Personnel should take precautions in the field to reduce the potential for heat illnesses during daytime temperatures that are within the caution zone.

Precautions

It is important to be aware of the preventive measures, symptoms, and remedies for heat stress. These conditions can be caught and addressed early by learning to protect yourself.
Precautions that reduce the possibility of heat stress include the following:

- avoid caffeine and alcohol during work hours;
- drink water before feeling thirsty;
- watch for signs and symptoms of heat stress;
- rest in cool/dry areas, such as a vehicle or building or in the shade;
- use shifts when possible, e.g., early morning, cool part of the day; and
- use cooling devices such as vehicle air conditioning to cool off.

Work/Rest Regimen

The OSS will monitor the environmental conditions and condition of employees in the field and implement a work/rest cycle as appropriate.

Symptoms and Remedies

Symptoms of heat stress and appropriate responses include the following:

- Heat Rash: redness of skin.

  Remedy: Frequent rest and change of clothing.

- Heat Cramp: painful muscle spasms in hands, feet, and/or abdomen.

  Remedy: Administer lightly salted water (3 tsp per gallon) orally unless there are medical restrictions.

- Heat Exhaustion: clammy, moist, pale skin; dizziness, nausea, rapid pulse, fainting.

  Remedy: Remove to cooler area and administer fluids orally or have physician administer saline solution intravenously.

- Heat Stroke: hot dry skin; red, spotted or bluish; high body temperature of 104° mental confusion, loss of consciousness, convulsions or coma.

  Remedy: Immediately cool victim by immersion in cool water. Wrap in wet sheet while fanning, sponge with cool liquid. While fanning, treat for shock. Call for an ambulance.

DO NOT DELAY TREATMENT. COOL BODY WHILE AWAITING AMBULANCE.

6.0 EMERGENCY PLAN

The following standard emergency procedures will be used by on-site personnel. The PM / OSS will be notified of any on-site emergency and be responsible for ensuring the appropriate procedures are followed and the CHSO is notified. A first aid kit, eye wash unit, and fire extinguisher will be readily available to field personnel. Questions regarding procedures and practices described in this plan should be directed to the CHSO.

6.1 NOTIFICATION

Upon the occurrence of an emergency, personnel will be alerted and the area evacuated immediately.

The following alarm system will be utilized to alert personnel to evacuate the restricted area.

_____ Audible Alarm _____
Describe

__X__ Direct Verbal Communication (10 employees or less)

_____ Radio Communication or Equivalent (Remote Sites)

_____ Other _____
Describe

The following standard hand signals will also be used as necessary:

Hand gripping throat	Cannot breath / Out of air
Grip Partner's wrist	Leave area immediately (No debate)!
Hands of top of head	Need assistance
Thumbs up	Yes / Okay
Thumbs down	No / A problem

6.2 PERSONNEL INJURY

If anyone is injured, the OSS will evaluate the nature of the injury, and the affected person will be decontaminated to the extent feasible prior to movement. Appropriate first aid will be initiated, and if required, contact will be made for an ambulance and with the designated medical facility. No person will re-enter the work area until the cause of injury or symptoms is determined.

6.3 FIRE/EXPLOSION

Upon the occurrence of a fire beyond the incipient stage or an explosion anywhere on the site, the fire department will be alerted and all personnel will moved to a safe distance from the effected area.

6.4 PERSONAL PROTECTION EQUIPMENT FAILURE

If any worker in Level C experiences a failure or alteration of protective equipment that affects the protection factor (e.g. torn protective suit, odor inside respirator), that person (and his/her buddy, if in a regulated area) will immediately leave the work area. Re-entry will not be permitted until the equipment has been repaired or replaced and the cause of the problem is known.

6.5 OTHER EQUIPMENT FAILURE

If any other equipment at the work site fails to operate properly, the PM / OSS will be notified and will then determine the effect of this failure on continuing operations. If the failure affects the safety of personnel (e.g. failure of monitoring equipment) prevents completion of the planned tasks, all personnel will leave the work area until appropriated corrective actions have been taken.

6.6 OFF-SITE EMERGENCY RESPONSE

Emergency response requiring actions beyond evacuation of personnel from the work area will be handled by notification of off-site emergency response agencies. Phone numbers for these agencies and other support services are listed below:

Fire Department:	911
Ambulance:	911
Poison Control Center:	(800) 282-3171
Chemical Emergency Advice (CHEMTREC):	(800) 424-9300

6.7 DIRECTIONS AND MAP TO NEAREST HOSPITAL

St. Joseph's Hospital
301 Prospect Avenue
Syracuse, NY 13203

1. Start out going NORTHEAST on HIAWATHA BLVD WEST toward DUKE DRIVE.
2. Turn RIGHT onto LODI ST. Continue to follow LODI ST for 0.7 MILES.

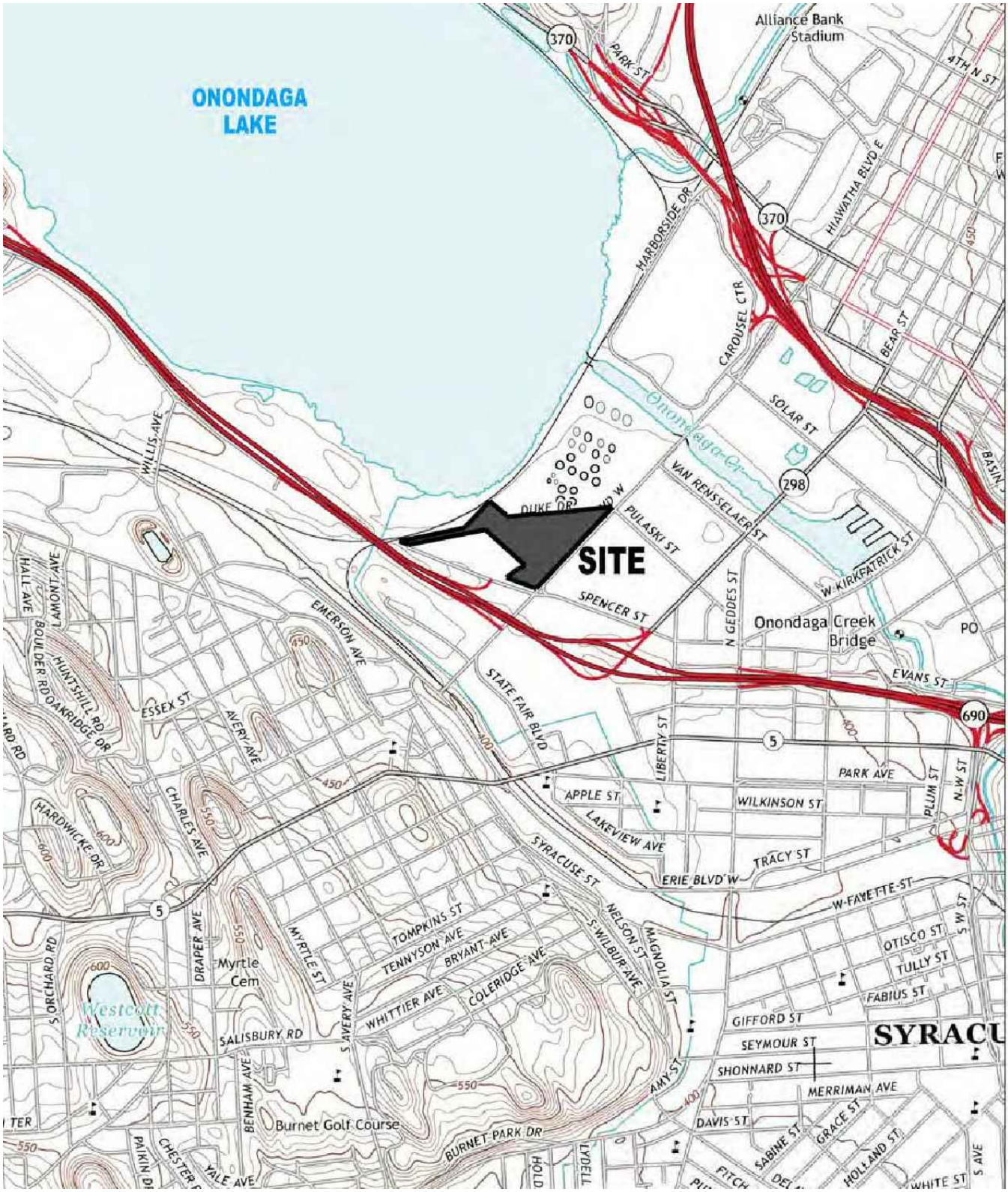
3. Turn RIGHT onto N SALINA ST. Continue to follow N SALINA ST for 0.5 MILES.
4. Turn LEFT onto ASH ST.
5. Turn RIGHT onto N TOWNSEND ST. Continue to follow N TOWNSEND ST for 0.3 MILES.
6. Turn RIGHT onto UNION AVE.
7. 301 PROSPECT AVE is on the RIGHT.

Map from 800 Hiawatha Boulevard West to Nearest Hospital (St. Joseph's Hospital)

6.8 RECORD KEEPING

Spectra shall maintain records of reports concerning occupational injuries and illnesses in accordance with 29 CFR 1904.

FIGURES



REF.: USGS - SYRACUSE WEST (NY) QUAD., 2013

SPECTRA ENVIRONMENTAL GROUP, INC.
19 British American Blvd.
Latham, NY 12110

Site Location Map
800 Hiawatha Boulevard Site
Syracuse, New York

CITY OF SYRACUSE — ONONDAGA CO., NY

PROJ. #:	15180	DATE:	4/29/16	SCALE:	NTS	DWG. NO.	15180B	FIGURE	1

APPENDIX A
GENERAL FIELD SAFETY RULES

FIELD SAFETY
GENERAL SAFETY RULES

1. Field Service personnel should maintain communications with their office counterparts. Periodic phone calls may be warranted to assure no mishaps have occurred.

2. The location and phone numbers of the nearest emergency care facility and local fire and police department should be determined and be readily available to field service employees prior to site access.

3. During initial site characterization potential hazards arising from unstable topography, presence of water, construction debris, plants, insects or animals should be identified and measures taken to avoid them.

4. Access to remote locations warrants careful consideration of protective clothing and/or first aid supplies to prevent and/or address insect or animal bites/stings etc. Proper first aid supplies and use of a buddy system are especially important for employees who have known allergies. Employees requiring immediate access to special first aid supplies (e.g. prescription drugs for allergies), shall be responsible for obtaining and arranging for administration of these medications as prescribed by their physician.

5. Spectra's employees who are at a customer's facility will be expected to adhere to the plant or facility safety and health rules in addition to the health and safety plan for the project. Where there are conflicts between facility rules and Spectra's health and safety plan, the project manager and corporate health and safety officer should be contacted for resolution of inconsistencies. Wherever possible, the two plans should be reviewed prior to site access to identify and resolve any conflicts.

APPENDIX B

FIRST AID EQUIPMENT LIST

First Aid Equipment List

The first aid kits that will be kept at the site will consist of a weatherproof container with individually sealed packages for each type of item. The kit will include at least the following items:

- Gauze roller bandages, l-inch and 2-inch
- Gauze compress bandages, 4-inch
- Gauze pads, 2-inch
- Adhesive tape, l-inch
- Band aids, 1-inch
- Butterfly bandages
- Triangular bandages, 4-inch
- Ampules of ammonia inhalants
- Antiseptic applicators or swabs
- Burn dressing and sterilized towels
- Surgical scissors
- Eye dressing
- Emergency eye-wash
- Alcohol
- Hydrogen Peroxide
- Clinical Grade Thermometer

APPENDIX C
PROTECTIVE CLOTHING

GENERAL PROTECTIVE CLOTHING REQUIREMENTS

Protective clothing shall meet the following minimum requirements:

1. They shall provide adequate protection against the particular hazards for which they area designed;

2. They shall be reasonably comfortable when worn under the designated conditions;

3. They shall fit snuggly and shall not unduly interfere with the movements of the water;

4. They shall be durable;

5. They shall be capable of being disinfected;

6. They shall be easily cleanable; and

7. Protective clothing should be kept clean and in good repair.

Note: See subsequent sections for additional activity-specific PPE.

APPENDIX D

DONNING AND DOFFING PROTECTIVE CLOTHING LEVEL C

DONNING AND DOFFING PROTECTIVE CLOTHING - LEVEL C

DONNING

1. Inspect equipment to ensure it is in good condition.
2. Place feet into the legs of chemically resistant protective suit (as specified in task specific health and safety plan and gather suit around waist.
3. Put on chemically resistant outer boots (as specified in the task specific health and safety plan) over feet of the suit and tape at boot/suit junction.
4. Don inner gloves (if required) placing wrist of glove beneath the chemically resistant suit.
5. Close suit and tape closure flaps.
6. Don air purifying respirator equipped with appropriate cartridges.
7. Perform negative/positive pressure tests.
8. Don safety glasses and hard hat (as required).
9. Don chemically resistant outer gloves and tape at glove/suit junction.
10. Have assistant check all closures and observe wearer to ensure fit and durability of protective gear.

DOFFING

1. Wash outer boots, gloves, and protective suit.
2. Remove tape at seams.
3. Remove boot covers and outer gloves.
4. Wash safety boots (as necessary).
5. Remove safety boots and suit.
6. Wash inner gloves.
7. Wash and remove face piece (and set aside for final decontamination).
8. Remove inner gloves.
9. Remove inner clothing (as necessary).
10. Field wash (as necessary).
11. Redress.

APPENDIX E

TEMPERATURE STRESSES POLICIES AND PROCEDURES

TEMPERATURE STRESSES POLICIES AND PROCEDURES

Cold Stress

Exposure to cold environments can result in reduced mental alertness, confusion, irritability and loss of consciousness. These effects are due to a lowering of the body's core temperature and can occur even if exposure is to air (or water) above freezing temperature (32 F, 0 C). High wind currents can aggravate exposure to cold temperatures by increased perceived cooling known as wind chill. Bodily extremities are at risk of "frost bite" when temperatures in the work environment are below freezing. The extremities are particularly sensitive to frostbite because of circulatory changes the body makes to maintain body core temperature. Symptoms of excessive exposure to cold include severe shivering and or pain in the extremities.

Fatal exposures are almost always due to an inability to escape from the cold environment (air or water).

Older employees or those with circulatory problems are more susceptible to cold stress.

Controls

The objectives of a cold stress management program are to maintain body core temperatures above 96.8 F (36 C) and prevent injury to the extremities (frost bite). The methods by which this is done include provision of appropriate clothing (including face, hand and foot coverings), scheduling periodic "warm-up" breaks in heated shelters and careful monitoring of employees and conditions in which they are working.

Clothing

Insulated clothing may be necessary for sustained work in environments below 40 F. Exposure to air currents at temperature below 40 F requires additional protective insulated clothing including outer windbreak garments.

Light work around water under cold conditions may require the use of impervious outer clothing to prevent wetting of inner insulating layers. Heavy work involving the use of impervious outer clothing is of concern as sweat may wet inner clothing and actually leads to cold stress. Impervious clothing should be equipped with provisions for adequate "breathing" to allow for evaporation of sweat. Wet clothing must be changed immediately when working in air temperatures near freezing.

Breathability of undergarments should also be high to encourage sweat evaporation, good examples include special weaves of synthetic or wool socks which encourage wicking away of sweat from inner to outer layers.

Work in temperatures below freezing requires special protection of extremities through face and head covers, insulated gloves and boots.

Warm-up Breaks

Periodic warm-up breaks in heated shelters should be scheduled for work below 20 F. The frequency of breaks should be increased and the duration should be shortened as temperature decreases, wind chill increases (winds > 5-20 mph) or based on careful observation of employees. The onset heavy shivering, occurrence of frost bite, or feelings of excessive fatigue or euphoria should trigger prompt return to the shelter.

Shelter areas should offer protection from the wind. When the employee first enters the shelter, the outer layer of clothing should be removed and remaining clothing loosened to allow for sweat evaporation. Dry clothing should be issued as necessary. Reentry to cold stress environments with wet clothing is to be avoided.

Provision of warm, sweet fluids or hot soups can help control dehydration. Coffee is not recommended due to its diuretic effect.

Monitoring/Work Scheduling

Employees should be closely monitored for development of cold stress symptoms. Constant observation is recommended at temperatures below 10 F.

Ambient air temperature measurements may be of value in establishing prescribed work/warm-up regiments for environments below 60 F. Wind speed measurements are necessary when air temperatures are below freezing. The ACGIH has published work/warm-up schedules based on air temperature and wind velocity when air temperatures are –15 F or colder.

Working intensity should be paced slow enough to avoid heavy sweating (without provisions for changes of dry clothing), but heavy enough to minimize prolonged periods of sitting or standing still.

Heat Stress

The stress of working in a hot environment can cause a variety of strains on the body, including heat exhaustion or heat stroke; the latter can be fatal. Personal protective equipment can significantly increase heat stress. You should learn to recognize the symptoms of heat stress in yourself and coworkers and take necessary actions when they occur. Your supervisor should provide instructions on ways to reduce or prevent heat stress, including frequent rest cycles to cool down and replace the body fluids and salts lost through perspiration. Some of the symptoms, which indicate heat exhaustion, are:

- Clammy skin
- Light-headedness
- Confusion
- Slurred speech
- Weakness, fatigue
- Fainting

- Rapid pulse
- Nausea (vomiting)

If these conditions are noted, take the following actions in the order given:

- Take victim to a cooler and uncontaminated area.
- Remove protective clothing
- Give water to drink, if conscious.
- Allow to rest.

Symptoms that indicate heat stroke include:

- Staggering gait.
- Hot skin, temperature rise (yet may feel chilled).
- Incoherent, delirious.
- Mental confusion.
- Convulsions.
- Unconsciousness.

If heat stroke conditions are noted, take the following actions in the order given:

- Take victim to a cooler and uncontaminated area.
- Remove protective clothing.
- Give water to drink, if conscious.
- Cool victim with water, cold compresses, and/or rapid fanning.
- Transport victim to a medical facility for further cooling and monitoring of body functions. HEAT STROKE IS A MEDICAL EMERGENCY.

Background

Heat stress is one of the most common stresses encountered in work at hazardous waste sites. This is especially true when work tasks require the wearing of impervious personal protective equipment. Heat stress can occur in environments where the ambient temperature is as low as 75 F (24 C) depending on humidity, solar load, work schedules and use of personal protective equipment.

The goal of heat stress management is to maintain the body temperature of employees below 100.4 F (38 C). The key to a successful program is to recognize when a potential heat stress condition exists, carefully monitor employees and work conditions and schedules and control heat build up by work rotation, employee selection and training, provision of fluids and cooling aids ranging from a shaded rest area to vortex cooled suits depending on the severity of conditions.

Preparation for prompt response to the occurrence of heat stress symptoms is essential. Appropriate levels of response range from observed rest in a cool area to immediate medical

attention. The location of and access to necessary support services including emergency medical care should be firmly established prior to work in potential heat stress environments.

Recognition

Individual employees vary greatly in their ability to withstand heat stress. The most important factors related to ability to work in heat stress environments include physical conditioning, general health status, acclimatization to heat environments, weight, job demands, and age.

Acclimatization is a process in which the body gradually becomes better able to withstand heat stress through more effective sweating without extreme loss of body salts, while maintaining lower heart rates and body temperature. The acclimatization process usually takes from several days to a week to take effect. Acclimatization can be lost within one week's absence from the work environment.

Reactions to heat stress progress from discomfort to inefficiency, physiological risk, collapse and pain as exposure increases. It is important to be alert to the appearance of heat stress symptoms among exposed employees. Initial symptoms include confusion, altered behavior (including sudden fits of anger) and affected judgments. The onset of these symptoms is often unrecognized by the victims of heat stress.

The classic symptoms of heat stress include:

Heat Rash

Due to blockage of sweat glands, this is often perceived as a tingling or burning sensation on the skin. Recommended treatment is removal to a cool environment. Cool showers and gentle drying may help.

Heat Cramps

The occurrence of intense and painful cramps in the skeletal and abdominal muscles often caused by salt depletion due to heavy sweating. Prevention consists of maintaining adequate salt intake through a balanced diet. Supplemental fluids containing minerals may also help (such as fruit juices, Gatorade, etc.). No caffeine beverages or alcoholic beverages.

Heat Exhaustion

General feelings of fatigue culminating with circulatory insufficiency due to dehydration. The skin is wet and pale. Nausea and fainting may occur but the body temperature is not unusually elevated. Treatment consists of placing the patient in a cool environment and providing water.

Heat Stroke

The most serious reaction to heat stress as a result of failure of the temperature regulatory system. Medical attention is required immediately to avoid fatalities or possible brain damage. Symptoms of heat stroke include elevated body temperature (>104 F) often accompanied with hot, dry skin with decreased or no sweating.

Treatment consists of immediate reduction of body core temperature and immediate medical attention. If heat stroke symptoms are noted in the field, accompanying personnel should attempt any measures available to reduce body temperature immediately. Such steps may include ice and cold packs, water immersion, fanning, etc.

Monitoring

When heat stress conditions are suspected, it is important to monitor environmental conditions and the employees. There are a number of heat stress indices based upon environmental combinations of ambient temperature, humidity and solar loading. The most popular indices are the Wet Bulb Globe Temperature Index (W.B.G.T. – ACGIH-TLV's) and Apparent Temperature (A.T.). Unfortunately none are universally accepted due to limitations of study populations or conditions on which they are based. Most common concerns with heat stress indices relate to variables in physical condition, solar and convective heat loading and clothing. No heat stress index is appropriate for work in impervious clothing, a frequent requirement for hazardous waste site work. As such, heat stress indices should be viewed as indicators of potential heat stress conditions but control measures are based on keen observation and monitoring of the employees themselves.

With normal work clothing and heavy work loads, one should be alert to potential heat stress at ambient temperatures of 75 to 80 F and high humidity. With very low humidity and similar work conditions observers should be alert for signs of heat stress at temperatures of 80-90 F.

Impervious work clothing interferes with man's primary cooling mechanism; evaporative cooling of sweat. As the sweat cannot evaporate, heat storage and elevated body temperature could be expected at much lower ambient temperatures, probably better correlated with work level and intensity than ambient temperature. NIOSH has recommended frequent (hourly) monitoring of employees working in impervious clothing in full sunlight at ambient temperatures as low as 70-75F.

An effective means to monitor employees in addition to observation for signs or symptoms of heat stress, is through heart rate check at the beginning of scheduled cycles. The goal is to establish a work-rest schedule, which maintains heart rates below 110 beats per minute. Heart rate checks above 110 beats per minute should be followed by reducing the subsequent work period duration by 1/3.

The frequency of employee monitoring should be increased up to 4 times per hour in extreme conditions, for employees wearing impervious clothing.

Monitoring of oral temperature (<99.6 F) and/or water loss (<1.5% of body weight) has been suggested by NIOSH. These measures, while useful, may prove difficult under field conditions.

Control Measures

The most common and universally applicable control for management of heat stress involves adjustment of work loads and work-rest scheduling. Work breaks should be scheduled at a frequency of between 1 every 2 hours up to 1 every 15 minutes depending upon work rate, heat load, personal protective equipment used, and workers' physical condition.

As newly exposed employees begin work in hot environments their work schedules should be set at 50% and increased 10% per day to allow for acclimatization. Employees will generally self limit exposure based on signs or symptoms of heat strain, but the insidious nature of heat stress symptom onset warrants caution in relying on self to control heat stress.

Work break areas should be shaded or cooler than the work environment, if possible. Cool, portable water should be immediately available to workers and administered in a manner, which encourages frequent drinks of small amounts (approximately 4 oz.). Mineral supplemented water (e.g. Gatorade) may be found more acceptable to employees under hot conditions. Once acclimated, employees are generally able to obtain adequate minerals (and salt) from a well balanced diet.

NOTE: Additional salt tablets should not be used in field.

Extreme conditions of temperature, humidity or impervious protective clothing, warrant provision of additional cooling measures e.g. fans, field showers and possibly artificially cooled suits.

The most effective control for management of heat stress is thorough training of employees to enable recognition of potential heat stress conditions and taking of appropriate preventative actions. Any behavior exhibiting signs or symptoms of heat stress should be promptly investigated and appropriate treatment rendered.

Susceptible Populations

Employees who are not physically fit or who suffer cardiovascular insufficiency are more susceptible to heat stress. Employees under the influence of drugs or alcohol may be increased risk. Employees who have previously suffered sun or heat strokes are also more susceptible to repeat occurrences of heat stress.

APPENDIX F

SOIL AND WELL SAMPLING
HEALTH AND SAFETY GUIDELINES

SOIL AND WELL SAMPLING HEALTH AND SAFETY GUIDELINES

Collection of soil, waste, and/or other environmental samples at hazardous waste sites presents a variety of potential health and safety hazards, many of which are due to the use of required equipment decontamination agents to assure appropriate quality control. Health and safety concerns due to potential hazards posed by the particular work site under investigation are addressed by the formal health and safety plan for that site. The following are key health and safety issues and recommend practices for field work involving sample collection at any work site. They address concerns posed by work activities necessary as part of proper sample collection techniques and quality assurance practices.

1. Protection from skin contact with soil, water or waste borne chemicals requires the selection and use of garments and protective coverings that will stop the chemicals in question and will not degrade upon chemical contact. This is especially important for highly concentrated chemicals (e.g., free product, concentrated wastes and decontamination chemicals).

    a. Thin, disposable latex or vinyl gloves are not designed to prevent entry of or withstand prolonged contact with many chemicals for which sampling is performed or which are used to decontaminate sampling equipment. These gloves are used primarily for quality control purposes as part of sample collection techniques.

    b. Where protection is necessary to prevent skin contact with suspect contaminants, the protective coverings should be worn under outer disposable gloves used for quality control purposes. This may require the use of large or extra large disposable gloves to accommodate inner coverings and not rip during donning/doffing.

2. Collection of samples containing high solvent concentrations may liberate volatile organics at levels sufficient to warrant respirator use (in addition to skin protection). This is especially true where high concentrations of materials or chemical layers (floating product) are encountered. Potential emissions should be monitored and protective equipment upgraded as specified in the health and safety plan.

3. During equipment decontamination activities involving extensive use of acetone, hexane, methanol or other solvents, Level C protection including organic vapor cartridges or equivalent, may be warranted.

    In addition, eye and skin protection may be required during decontamination activities requiring the use of nitric acid. It should be noted that improper preparation by the laboratory of acid preservatives in sampling containers might release irritating “fumes” unexpectedly upon addition of liquid samples.

4. Transport and storage of chemicals required for decontamination procedures require appropriate safeguards to prevent contact between incompatible and/or combustible materials. Nitric Acid is an oxidizer capable of starting a fire upon contact with flammable or combustible materials.

APPENDIX G

HEARING PROTECTION

HEARING PROTECTION

1. Hearing protection (ear muffs or plugs) is required whenever employees are exposed to noise levels of 85 decibels or greater as an 8-hour time weighted average (TWA). Industrial Hygiene workers exposed to noise levels in excess of 90 dBA will wear hearing protection regardless of the duration.

2. Hearing protection is to be inspected before each use, for tears and contamination. If deficiencies are noted; the hearing protector should be cleaned, repaired, or replaced before use.

APPENDIX H

PROCEDURES FOR EXCAVATION, TRENCH OR TEST PIT DIGGING

PROCEDURES FOR EXCAVATION TRENCH OR TEST PIT DIGGING

Trench or test pit digging can be expected to present hazards in addition to those encountered during general field work or drilling. Added control measures to be considered include the following:

1. Careful positioning of equipment with respect to the presence of known submerged objects.

    a. Where possible, power to underground electrical lines should be turned off (and locked out) while excavation activities are in process or until the area is secure from entrance of personnel.

    b. known gas (or chemical) lines adjacent to the immediate excavation site should also be secured (valves turned off and locked out) while excavation is underway or access by outside personnel possible. Where possible, it is desirable to purge these lines of their contents prior to start of excavation.

2. Controlled digging under careful observation of a watch person who has clear communication with the equipment operator. The watch person should be alert to notice the presence of (unknown) buried objects by visual inspection of the immediate excavation area.

3. Significant surface area of ground is exposed to the atmosphere as part o the trenching process. This may increase vapor exposures from volatile contaminants. Provisions should be made for air monitoring to trigger appropriate protective actions including temporary work stoppage. Use of vapor emissions controls or suppressants space entry procedures for greater details regarding control measures considerations.

4. Trenches or pits greater than 4 feet deep should be considered confined spaces, which may contain concentrated vapors, gases or oxygen deficient atmospheres. These areas must be checked to assure non-explosive, non-hazardous atmospheres before allowing entry and periodically (or continuously) thereafter. See confined space entry procedures for greater details regarding control measures considerations.

5. OSHA provisions regarding shoring and sloping of trench sides may apply. Subcontractors performing trenching or pit digging as part of sub-surface investigation must be aware that they will be expected to follow provisions under 29 CFR 1926.

6. Pits or trenches should be inspected daily for evidence of cracks, slides or scaling. Inspection should be more frequent if it is raining.

7. Heavy equipment should be kept away from the sides of trenches or pits.

8. Means of egress (e.g., steps, ladders) should be readily available (within 25') of employees working in pits or other excavations from which rapid exit is difficult.

9. Excavations, mud pits, etc, must be protected with barricades or covers. Temporary pits/trenches should be back filled upon completion of work.

APPENDIX I

GENERAL HEALTH AND SAFETY GUIDELINES FOR DRUM HANDLING

GENERAL HEALTH AND SAFETY GUIDELINES FOR DRUM HANDLING

Drum handling can pose serious hazards such as detonation, fire, explosion, vapor generation, and physical injury if proper precautions and procedures are not taken. Spectra personnel will be present to provide oversight of drum handling and will be enforcing the following procedures in order to maintain a safe work environment. In general, subcontractors are responsible for complying with all regulations and client policies applicable to the work they are performing. As previously stated, Spectra personnel can and must stop work when a Spectra subcontractor is observed to not be following health and safety procedures required by the plan.

The subcontractor will provide more specific health and safety procedures for drum handling. The following are typical protocols that should be followed when handling drums:

1. Visual Inspection: Prior to handling, the drums should be checked for symbols or labels indicating potential contents, signs of deterioration (i.e. corrosion, rust, leaks, evidence of pressure (i.e. swelling and bulging), drum type, and the configuration of the drum head.

2. Assess conditions in the immediate vicinity of the drum: Monitor around the drums using organic vapor monitors and a combustible gas meter to possibly determine drum contents and associated hazards. Radiation Surveys should be performed where drum contents may include Radioactive Materials.

3. Based on this preliminary investigation, develop a plan to specify the extent of handling necessary; the personnel selected for the activity and the most appropriate precautions to be taken. Be aware that negative determinations regarding organic vapors and radiation do not rule our hazards such as corrosives, unstable compounds, spontaneous ignition, or reactive materials.

4. Select drum handling equipment may include:

    a. Drum handling grappler attached to a hydraulic excavator.
    b. Small front-end loader.
    c. Rough-terrain fork-lift.
    d. Roller conveyor equipped with solid rollers.
    e. Drum cart designed specifically for drum handling.

5. Prior to initiation of drum handling operations:

    a. Personnel designated to handle drums should be trained in the proper lifting and movement techniques.
    b. Vehicle selection: vehicles should have a sufficient load capacity to handle the anticipated load to be carried.
    c. Respirator protection: a health and safety professional should recommend the proper respiratory protection to be utilized.

d. Overpacks: there should be a sufficient number of overpacks available in case of accidental spills or leaks.

e. Movement: an appropriate sequence of events regarding movement should be determined.

6. Special Conditions

Contents/Condition of Drums	Special Precautions
Bulging or Swelling Drums	• Same as for explosive drums. • Carefully overpack as necessary.
Leaking, Open or Deteriorating Drums	• If ruptures are noted, transfer contents to a drum in sound condition, using a pump designed for transporting that liquid. • Using a drum grappler, immediately place drum in an overpack.
Buried Drums	• Prior to subsurface excavation, use ground-penetrating systems such as electromagnetic wave, electrical sensitivity, ground penetrating radar, magnetometry, or a metal detector to locate and determine the depth of the drum. • Have a dry chemical fire extinguisher available.

7. Drum Opening: The following procedure should be followed when opening drums:

a. Depending on the nature of the materials, a supply of air cylinders available for Supplied Air Respirators outside the work area and supply air to operator via airline and escape SCBA's may be needed.

b. Place explosion resistant shields between operators and drums where drum contents are suspected to include explosives or unstable materials. All controls for drum opening equipment, monitors and fire suppression equipment should be located behind the shield.

c. Monitor continuously during opening. Place sensor as close to the drum opening as possible.

d. Utilize remote control devices to open drums. Examples of such devices are:

- § Pneumatically operated impact wrench to remove drum bungs;
- § Hydraulically or pneumatically operated drum piercers; and

- § Backhoes equipped with bronze spikes for penetrating drum tops in large scale operations.

Do not use chisels, picks, or firearms to open drums.

Hang or balance the drum opening equipment to minimize worker exertion.

If the drum exhibits signs of swelling and/or bulging, relieve excess pressure prior to opening it. When possible, remote control devices should be employed. If manual opening is necessary an explosive resistant plastic shield should be used.

e. PVC/polyethylene or exotic metal drums should be opened by removing or drilling the bung. The drum should then re re-sealed as soon as possible. When re-sealing is not possible, overpacks should be used and any holes plugged with 5 psi pressure venting caps.

8. Sampling: Since one of the most dangerous tasks associated with drum handling is sample collection, the following precautionary measures should be taken when collecting samples:

   a. Research background information about the waste;
   b. Determine, which drums, should be sampled;
   c. Select an appropriate sampling device and container;
   d. Develop sampling strategy;
   e. Develop standard procedures for opening, sampling, sample packaging, and transportation;
   f. Have a health and safety professional determine the level of protection to be used during sampling, decontamination and packaging; and
   g. Obtain samples with glass rods or vacuum pumps.

9. Characterization: obtain necessary information to determine how to deal and efficiently package and transport wastes for treatment and disposal.

10. Staging: to facilitate characterization, remedial action and to protect from potentially dangerous site conditions, a staging area should be identified. The staging area is site specific and can consist of up to five separate areas (i.e. opening area, sampling area, second staging area, and final staging area). When staging drums, they should be in two rows spaced 7-8 feet apart.

11. Bulking: once characterized, wastes can be mixed together and placed in tanks or vacuum trucks for shipment and treatment at a disposal facility (i.e. bulking) wastes:

    a. Inspect each tank and trailer and remove any residual materials from trailer prior to transporting (e.g. to prevent mixing of incompatible materials).

b. Use pumps for removing hazardous liquids. These pumps must be appropriately rated and have a safety relief valve with a splash shield. Hoses, gaskets, valves, and fittings should be compatible with the material being pumped.

c. Store flammable wastes in appropriate containers.

12. Shipment:

a. All shipments must comply with US DOT and EPA regulations pertaining to the shipment of hazardous materials.

b. The bulking area should be as close to the site exit as possible.

c. Prepare a circulation plan to minimize the conflict between clean-up teams and waste haulers.

d. Allow adequate space for vehicles to turn around.

e. Require drivers to remain in cabs in vehicle staging area.

f. Provide for the proper protection for vehicle drivers.

g. Do not double stack drums.

h. Tightly seal drums.

I. Make sure the truck and bed walls are clean and smooth.

j. Keep bulk solids several inches lower than the top of the truck bed.

i. Make sure the truck and bed walls are clean and smooth.

j. Keep bulk solids several inches lower than the top of the truck bed.

k. Cover loads with a clean layer of soil, foam, or a tarp.

l. Weigh vehicles to assure safe operation.

m. Decontaminate vehicle tires.

n. Check vehicle for visible emissions.

o. Develop procedures to be followed in the event that the vehicle has a mechanical malfunction or accident.

APPENDIX J
MSDS SHEETS

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Material Safety Data Sheets Collection:

Sheet No. 683
Polychlorinated Biphenyls (PCBs)

Issued: 11/88 Revision: A, 9/92

Section 1. Material Identification

39

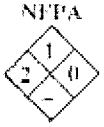
Polychlorinated Biphenyls [$C_{12}H_{10-n}Cl_n$ (n=3, 4, 5+] **Description:** A class of nonpolar chlorinated hydrocarbons with a biphenyl nucleus (two benzene nuclei connected by a single C-C bond) in which any or all of the hydrogen atoms have been replaced by chlorine. Commercial PCBs are mixtures of chlorinated biphenyl isomers with varying degrees of chlorination. Prepared industrially by the chlorination of biphenyl with anhydrous chlorine in the presence of a catalyst such as ferric chloride or iron filings. Except for limited research and development applications, PCBs have not been produced in the US since 1977. When large quantities of PCBs were manufactured in the US, they were marketed under the tradename Aroclor (Monsanto) and were characterized by four digit numbers. The first two digits indicating biphenyls (12), triphenyls (54), or both (25, 44), the last two digits indicating the weight percent of chlorine. PCBs' thermal stability, nonflammability, and high dielectric capability made them very useful in electrical equipment. Formerly used as additives in hydraulic fluids, heat transfer systems, lubricants, cutting oils, printer's ink, fire retardants, asphalt, brake linings, automobile body sealants, plasticizers, adhesives, synthetic rubber, floor tile, wax extenders, dedusting agents, pesticide extenders, and carbonless-reproducing paper. PCBs are still used in certain existing electrical capacitors and transformers that require enhanced electrical protection to avoid heating from sustained electric faults.

Other Designations: CAS No. 1336-36-3, Aroclor, Clophen, Chlorextol, chlorinated biphenyls, chlorinated diphenyl, chlorinated diphenylene, chloro biphenyl, chloro-1,1-biphenyl, Dykanol, Fenclor, Inerteen, Kaneclor, Montar, Noflamol, Phenoclor, Pyralene, Pyranol, Santotherm, Sovol, Therminol FR-1

R	1
I	4
S	3*
K	1

* Skin absorption

NFPA



HMIS

H	2‡
F	1
R	0
PPE*	

† See 8
‡ Chronic Effects

Cautions: PCBs are potent liver toxins that may be absorbed through skin. Potentially, chronic or delayed toxicity is significant because PCBs accumulate in fatty tissue and may reasonably be anticipated to be carcinogens. PCBs are a bioaccumulative environmental hazard. When burned, decomposition products may be more hazardous than the PCBs.

Section 2. Ingredients and Occupational Exposure Limits

PCBs, contain various levels of polychlorinated dibenzofurans and chlorinated naphthalenes as contaminants

1991 OSHA PELs, Skin
8-hr TWA (Chlorodiphenyl, 42% chlorine): 1 mg/m^3
8-hr TWA (Chlorodiphenyl, 54% chlorine): 0.5 mg/m^3

1990 DFG (Germany) MAK, Danger of Cutaneous Absorption
TWA (Chlorodiphenyl, 42% chlorine): 0.1 ppm (1 mg/m^3)
Category III: Substances with systemic effects, onset of effect > 2 hr., half-life > shift length (strongly cumulative)
Short-term Level: 1 ppm, 30 min., average value, 1 per shift
TWA (Chlorodiphenyl, 54% chlorine): 0.05 ppm (0.5 mg/m^3)
Category III (see above)
Short-term Level: 0.5 ppm, 30 min., average value, 1 per shift

1985-86 Toxicity Data*
Rat, oral, TD: 1250 mg/kg administered intermittently for 35 weeks produced liver tumors
Mammal, oral, TD_{LO}: 325 mg/kg administered to female for 30 days prior to mating and from the 1st to the 36th day of gestation produced effects on newborn (stillbirth, live birth index, viability index).

1990 NIOSH REL
TWA (Chlorodiphenyl, 42% chlorine): 0.001 mg/m^3
TWA (Chlorodiphenyl, 54% chlorine): 0.001 mg/m^3

1992-93 ACGIH TLVs, Skin *
TWA (Chlorodiphenyl, 42% chlorine): 1 mg/m^3
TWA (Chlorodiphenyl, 54% chlorine): 0.5 mg/m^3

* These guidelines offer reasonably good protection against systemic intoxication, but may not guarantee that chloroacne won't occur.
† See NIOSH, *RTECS* (TQ1350000), for additional reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data*

Boiling Point: 644-707 °F (340-375 °C)
Melting Point: 42%: -2.2 °F (-19°C), 54%: 14 °F (-10 °C)
Vapor Pressure: 1 mm Hg at 100 °F (38 °C); 10^{-6} to 10^{-3} mm at 20 °C
Molecular Weight: 188.7 to 398.5
Specific Gravity: 1.3 to 1.8 at 20 °C
Water Solubility: Low solubility (0.007 to 5.9 mg/L)
Other Solubilities: Most common organic solvents, oils, and fats; slightly soluble in glycerol and glycols.

Appearance and Odor: PCBs vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins, depending upon chlorine content

* Physical and chemical properties vary widely according to degree and to the position of chlorination.

Section 4. Fire and Explosion Data

Flash Point: 286-385 °F (141-196 °C) OC* | **Autoignition Temperature:** 464 °F (240 °C) | **LEL:** None reported | **UEL:** None reported

Extinguishing Media: Use extinguishing media suitable to the surrounding fire. Use dry chemical, foam, carbon dioxide (CO_2), or water spray. Water spray may be ineffective. Use water spray to cool fire-exposed containers or transformers. Do not scatter PCBs with high-pressure water streams. **Unusual Fire or Explosion Hazards:** Combustion products (hydrogen chloride, phosgene, polychlorinated dibenzofuraas, and furans) are more hazardous than the PCBs themselves. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Approach fire from upwind to avoid highly toxic decomposition products. Structural firefighter's protective clothing will provide *limited* protection. Do not release runoff from fire control methods to sewers or waterways. Dike for later disposal.

* Flash points shown are a range for various PCBs. Some forms do not have flash points.

Section 5. Reactivity Data

Stability/Polymerization: PCBs are very stable materials but are subject to photodechlorination when exposed to sunlight or UV (spectral region above 290 nanometers). Hazardous polymerization cannot occur. **Chemical Incompatibilities:** PCBs are chemically inert and resistant to oxidation, acids, and bases. **Conditions to Avoid:** Avoid heat and ignition sources
Hazardous Products of Decomposition: Thermal oxidative decomposition (1112-1202 °F (600-650 °C)) of PCBs can produce highly toxic derivatives, including polychlorinated dibenzo-para-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), hydrogen chloride, phosgene and other irritants.

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Section 6. Health Hazard Data

Carcinogenicity: The IARC[1987] and NTP[1991] list PCBs as an IARC probable carcinogen (overall evaluation is 2A, limited human data; sufficient animal data) and NTP anticipated carcinogen, respectively. **Summary of Risks:** PCBs are potent liver toxins that can be absorbed through unbroken skin in toxic amounts without immediate pain or irritation. PCBs have low acute toxicity, but can accumulate in fatty tissue and severe health effects may develop later. Generally, toxicity increases with a higher chlorine content; PCB-oxides are more toxic. The toxic action on the liver also increases with simultaneous exposure to other liver toxins, e.g. chlorinated solvents, alcohol, and certain drugs. Pathological pregnancies (abnormal pigmentations, abortions, stillbirths, and underweight births) have been associated with increased PCB serum levels in mothers; PCBs can be passed in breast milk. PCBs can affect the reproductive system of adults. **Medical Conditions Aggravated by Long-Term Exposure:** Skin, liver, and respiratory disease. **Target Organs:** Skin, liver, eyes, mucous membranes, and respiratory tract. **Primary Entry Routes:** Inhalation, dermal contact, ingestion. **Acute Effects:** Exposure to PCB vapor or mist is severely irritating to the skin, eyes, nose, throat, and upper respiratory tract. Intense acute exposure to high concentrations may result in eye, lung, and liver injury. Systemic effects include nausea, vomiting, increased blood pressure, fatigue, weight loss, jaundice, edema and abdominal pain. Cognitive, neurobehavior and psychomotor impairment and memory loss have also been seen after acute exposure. **Chronic Effects:** Repeated exposure to PCBs can cause chloroacne, redness, swelling, dryness, thickening and darkening of the skin and nails; swelling and burning of the eyes, and excessive eye discharge; distinctive hair follicles; gastrointestinal disturbances; neurological symptoms including headache, dizziness, depression, nervousness, numbness of the extremities, and joint and muscle pain; liver enlargement; menstrual changes in women; and chronic bronchitis. Cancer, primarily liver, is also a possible result of exposure, but data is inconclusive.

FIRST AID Eyes: *Do not* allow victim to rub or keep eyes tightly shut. Rinsing eyes with medical oil (olive, mineral) initially may remove PCB and halt irritation better than water rinsing alone. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. *Multiple soap and water washings are necessary.* Avoid the use of organic solvents to clean the skin. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** In most cases, accidental PCB ingestion will not be recognized until long after; vomiting would be of any value. Never give anything by mouth to an unconscious or convulsing person. Vomiting of the pure substance may cause aspiration. Consult a physician. **Note to Physicians:** Monitor patients for increased hepatic enzymes, chloroacne, and eye, gastrointestinal, and neurologic symptoms listed above. Diagnostic tests include blood levels of PCBs and altered liver enzymes.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, provide adequate ventilation, and isolate hazard area. Cleanup personnel should protect against vapor inhalation and skin or eye contact. For small spills, take up with sand or other noncombustible material and place into containers for later disposal. For larger spills, dike far ahead of spill to contain for later disposal. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** PCBs have been shown to bio-concentrate significantly in aquatic organisms. **Ecotoxicity:** Bluegill, TLm: 0.278 ppm/96 hr. Mallard Duck, LD_{50}: 2000 ppm. **Environmental Degradation:** In general, the persistence of PCBs increases with an increase degree of chlorination. **Soil Absorption/Mobility:** PCBs are tightly absorbed in soil and generally do not leach significantly in most aqueous soil systems. However, in the presence of organic solvents, PCBs may leach rapidly through the soil. Volatilization of PCBs from soil may be slow, but over time may be significant. **Disposal:** Approved PCB disposal methods include: incineration with scrubbing, high-efficiency boilers, landfills, and EPA-approved alternative disposal methods. Each disposal method has various criteria. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
RCRA Hazardous Waste (40 CFR 261.33): Not listed
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ): 1 lb (0.454 kg) [* per CWA, Sec. 311(b)(4) and 307(a)]

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Minimum respiratory protection should include a combination dust-fume-mist and organic vapor cartridge or canister or air-supplied, depending upon the situation. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent all skin contact. Butyl rubber, neoprene, Teflon, and fluorocarbon rubber have break through times greater than 8 hrs. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[1983] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Segregate contaminated clothing in such a manner so that there is no direct contact by laundry personnel. Implement quality assurance to ascertain the completeness of the cleaning procedures. Remove this material from your shoes and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in a closed, labelled, container in a ventilated area with appropriate air pollution control equipment. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. **Administrative Controls:** Inform employees of the adverse health effects associated with PCBs. Limit access to PCB work areas to authorized personnel. Consider preplacement and periodic medical examinations with emphasis on the skin, liver, lung, and reproductive system. Monitor PCB blood levels. Consider possible effects on the fetus. Keep medical records for the entire length of employment and for the following 30 yrs.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Polychlorinated biphenyls
DOT Hazard Class: 9
ID No.: UN2315
DOT Packing Group: II
DOT Label: CLASS 9
Special Provisions (172.102): 9, N81

Packaging Authorizations
a) **Exceptions:** 173.155
b) **Non-bulk Packaging:** 173.202
c) **Bulk Packaging:** 173.241

Quantity Limitations
a) **Passenger Aircraft or Railcar:** 100 L
b) **Cargo Aircraft Only:** 220 L

Vessel Stowage Requirements
a) **Vessel Stowage:** A
b) **Other:** 34

MSDS Collection **References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 163, 164, 168, 169, 174, 175, 180
Prepared by: MJ Wurth, BS; **Industrial Hygiene Review:** PA Roy MPH, CIH; **Medical Review:** AC Darlington, MD

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Material Safety Data Sheets Collection:
Sheet No. 316
Benzene

Issued: 11/78 Revision: E, 8/90

32

Section 1. Material Identification

Benzene (C_6H_6) Description: Derived by fractional distillation of coal tar, hydrodealkylation of toluene or pyrolysis of gasoline, catalytic reforming of petroleum, and transalkylation of toluene by disproportionation reaction. Used as a fuel, a chemical reagent; a solvent for a large number of materials such as paints, plastics, rubber, inks, oils, and fats; in manufacturing phenol, ethylbenzene (for styrene monomer), nitrobenzene (for aniline), dodecylbenzene (for detergents), cyclohexane (for nylon), chlorobenzene, diphenyl, benzene hexachloride, maleic anhydride, benzene-sulfonic acid, artificial leather, linoleum, oil cloth, varnishes, and lacquers; for printing and lithography; in dry cleaning; in adhesives and coatings; for extraction and rectification; as a degreasing agent; in the fire industry; and in shoe factories. Benzene has been banned as an ingredient in products intended for household use and is no longer used in pesticides.
Other Designations: CAS No. 0071-43-2, benzol, carbon oil, coal naphtha, cyclohexatriene, mineral naphtha, nitration benzene, phene, phenyl hydride, pyrobenzol.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*[1] for a suppliers list.

R 1
I 4
S 2*
K 4
*Skin absorption

NFPA
3
2 0
-

HMIS
H 3
F 3
R 0
PPG†
† See: 8

Cautions: Benzene is a confirmed *human carcinogen* by the IARC. *Chronic low-level exposure may cause cancer (leukemia) and bone marrow damage, with injury to blood-forming tissue.* It is also a dangerous fire hazard when exposed to heat or flame.

Section 2. Ingredients and Occupational Exposure Limits

Benzene, ca 100%*

1989 OSHA PELs
(29 CFR 1910.1000, Table Z-1-A)
8-hr TWA: 1 ppm, 3 mg/m³
15-min STEL: 5 ppm, 15 mg/m³

(29 CFR 1910.1000, Table Z-2)
8-hr TWA: 10 ppm
Acceptable Ceiling Concentration: 25 ppm
Acceptable Maximum Peak: 50 ppm (10 min)†

1989-90 ACGIH
TLV-TWA: 10 ppm, 32 mg/m³

1988 NIOSH RELs
TWA: 0.1 ppm, 0.3 mg/m³
Ceiling: 1 ppm, 3 mg/m³

1985-86 Toxicity Data‡
Man, oral, LD_{Lo}: 50 mg/kg: no toxic effect noted
Man, inhalation, TC_{Lo}: 150 ppm inhaled intermittently over 1 yr in a number of discrete, separate doses affects the blood (other changes) and nutritional and gross metabolism (body temperature increase)
Rabbit, eye: 2 mg administered over 24 hr produces severe irritation

* OSHA 29 CFR 1910.1000, Subpart Z, states that the final benzene standard in 29 CFR 1910.1028 applies to all occupational exposures to benzene except in some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply.
† Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift.
‡ See NIOSH, *RTECS* (CY1400000), for additional irritative, mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 176 °F (80 °C)
Melting Point: 42 °F (5.5 °C)
Vapor Pressure: 100 mm Hg at 79 °F (26.1 °C)
Vapor Density (Air = 1): 2.7
Evaporation Rate (Ether = 1): 2.8

Molecular Weight: 78.11
Specific Gravity (15 °C/4 °C): 0.8787
Water Solubility: Slightly (0.180 g/100 g of H_2O at 25 °C)
% Volatile by Volume: 100
Viscosity: 0.6468 mPa at 20 °C

Appearance and Odor: A colorless liquid with a characteristic sweet, aromatic odor. The odor recognition threshold (100% of panel) is approximately 5 ppm (unfatigued) in air. Odor *is not* an adequate warning of hazard.

Section 4. Fire and Explosion Data

Flash Point: 12 °F (-11.1 °C), CC | **Autoignition Temperature:** 928 °F (498 °C) | **LEL:** 1.3% v/v | **UEL:** 7.1% v/v

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish benzene fires. Water may be ineffective as an extinguishing agent since it can scatter and spread the fire. Use water spray to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.
Unusual Fire or Explosion Hazards: Benzene is a Class 1B flammable liquid. A concentration exceeding 3250 ppm is considered a potential fire explosion hazard. Benzene vapor is heavier than air and can collect in low lying areas or travel to an ignition source and flash back. Explosive and flammable benzene vapor-air mixtures can easily form at room temperature. Eliminate all ignition sources where benzene is used, handled, or stored.
Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective equipment. Structural firefighter's protective clothing provides limited protection. Stay out of low areas. Be aware of runoff from fire control methods. Do not release to sewers or waterways. Runoff to sewer can create pollution, fire, and explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Benzene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Benzene explodes on contact with diborane, permanganic acid, bromine pentafluoride, peroxodisulfuric acid, and peroxomonosulfuric acid. It ignites on contact with dioxygen difluoride, dioxygenyl tetrafluoroborate, iodine heptafluoride, and sodium peroxide + water. Benzene forms sensitive, explosive mixture with iodine pentafluoride, ozone, liquid oxygen, silver perchlorate, nitryl perchlorate, nitric acid, and arsenic pentafluoride + potassium methoxide (explodes above 30 °C). A vigorous or incandescent reaction occurs with bromine trifluoride, uranium hexafluoride, and hydrogen + Raney nickel [above 410 °F (210 °C)]. Benzene is incompatible with oxidizing materials.
Conditions to Avoid: Avoid heat and ignition sources.
Hazardous Products of Decomposition: Thermal oxidative decomposition of benzene can produce toxic gases and vapors such as carbon monoxide.

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Section 6. Health Hazard Data

Carcinogenicity: The ACGIH, OSHA, and IARC list benzene as, respectively, a suspected human carcinogen, a cancer hazard, and, based on sufficient human and animal evidence, a human carcinogen (Group 1).
Summary of Risks: Prolonged skin contact or excessive inhalation of benzene vapor may cause headache, weakness, appetite loss, and fatigue. The most important health hazards are cancer (leukemia) and bone marrow damage with injury to blood-forming tissue from chronic low-level exposure. Higher level exposures may irritate the respiratory tract and cause central nervous system (CNS) depression.
Medical Conditions Aggravated by Long-Term Exposure: Exposure may worsen ailments of the heart, lungs, liver, kidneys, blood, and CNS.
Target Organs: Blood, central nervous system, bone marrow, eyes, upper respiratory tract, and skin.
Primary Entry Routes: Inhalation, skin contact.
Acute Effects: Symptoms of acute overexposure include irritation of the eyes, nose, and respiratory tract, breathlessness, euphoria, nausea, drowsiness, headache, dizziness, and intoxication. Severe exposure may lead to convulsions and unconsciousness. Skin contact may cause a drying rash (dermatitis).
Chronic Effects: Long-term chronic exposure may result in many blood disorders ranging from aplastic anemia (an inability to form blood cells) to leukemia.
FIRST AID
Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.
Skin: *Quickly* remove contaminated clothing. Immediately rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.
Inhalation: Remove exposed person to fresh air. Emergency personnel should protect against inhalation exposure. Provide CPR to support breathing or circulation as necessary. Keep awake and transport to a medical facility.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, *do not induce vomiting* since aspiration may be fatal. Call a physician immediately.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Physician's Note: Evaluate chronic exposure with a CBC, peripheral smear, and reticulocyte count for signs of myelotoxicity. Follow up any early indicators of leukemia with a bone marrow biopsy. Urinary phenol conjugates may be used for biological monitoring of recent exposure. Acute management is primarily supportive for CNS depression.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: *Design and practice a benzene spill control and countermeasure plan (SCCP).* Notify safety personnel, evacuate all unnecessary personnel, eliminate all heat and ignition sources, and provide adequate ventilation. Cleanup personnel should protect against vapor inhalation, eye contact, and skin absorption. Absorb as much benzene as possible with an inert, noncombustible material. For large spills, dike far ahead of spill and contain liquid. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of confined spaces such as sewers, watersheds, and waterways because of explosion danger. Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33), Hazardous Waste No. U019.
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 1000 lb (454 kg) [*] per Clean Water Act, Sec. 307 (a) 311 (b)(4), 112; and per RCRA, Sec. 3001].
SARA Extremely Hazardous Substance (40 CFR 355): Not listed.
Listed as SARA Toxic Chemical (40 CFR 372.65).
OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Tables Z-1-A and Z-2).

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.
Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations at least below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[1,9,5]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Never wear contact lenses in the work area; soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in tightly closed containers in a cool, dry, well-ventilated area away from all heat and ignition sources and incompatible materials. *Caution! Benzene vapor may form explosive mixtures in air.* To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations in production and storage areas. When opening or closing benzene containers, use nonsparking tools. Keep fire extinguishers readily available.
Engineering Controls: Because OSHA specifically regulates benzene (29 CFR 1910.1028), educate workers about its potential hazards and dangers. Minimize all possible exposures to carcinogens. If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if absolutely essential. Avoid vapor inhalation and skin and eye contact. Use only with adequate ventilation and appropriate personal protective gear. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Designate regulated areas of benzene use (see legend in the box below) and label benzene containers with "DANGER, CONTAINS BENZENE, CANCER HAZARD."
Other Precautions: Provide preplacement and periodic medical examinations with emphasis on a history of blood disease or previous exposure.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Benzene (*benzol*)
DOT Hazard Class: Flammable liquid
ID No.: UN1114
DOT Label: Flammable liquid
DOT Packaging Exceptions: 173.118
DOT Packaging Requirements: 173.119

IMO Shipping Name: Benzene
IMO Hazard Class: 3.2
ID No.: UN1114
IMO Label: Flammable liquid
IMDG Packaging Group: II

DANGER
BENZENE
CANCER HAZARD
FLAMMABLE-NO SMOKING
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

MSDS Collection **References:** 1, 2, 12, 26, 73, 84-91, 100, 101, 103, 109, 124, 126, 127, 132, 134, 136, 138, 139, 143
Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** MJ Upfal, MD, MPH; **Edited by:** JR Stuart, MS

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Material Safety Data Sheet

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No. 317
TOLUENE
(Revision D)

Issued: August 1979
Revised: April 1986

SECTION 1. MATERIAL IDENTIFICATION

MATERIAL NAME: TOLUENE 20

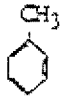
OTHER DESIGNATIONS: Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C_7H_8, CAS #108-88-3

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219, Columbus, OH; Telephone: (614) 889-3344

HMIS
H: 2
F: 3
R: 0
PPE*
*See sect. 8

R 1
I 3
S 2
K 4

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Toluene 	ca 100	8-hr TLV: 100 ppm, or 375 mg/m³* (Skin)** Man, Inhalation, TCLo: 100 ppm: Psychotropic*** Rat, Oral, LD_{50}: 5000 mg/kg Rat, Inhalation, LC: 4000 ppm/4 hrs. Rabbit, Skin, LD_{50}: 14 gm/kg Human, Eye: 300 ppm

* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

** Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

*** Affects the mind.

SECTION 3. PHYSICAL DATA

Boiling Point _ 231°F (111°C)
Vapor Pressure @ 20°C, mm Hg _ 22
Water Solubility @ 20°C, wt. % _ 0.05
Vapor Density (Air = 1) _ 3.14

Evaporation Rate (BuAc = 1) _ 2.24
Specific Gravity (H_2O = 1) _ 0.866
Melting Point _ -139°F (-95°C)
Percent Volatile by Volume _ ca 100
Molecular Weight _ 92.15

Appearance and odor: Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER
40°F (4°C) CC	896°F (480°C)	% by Volume	1.27	7.1

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

UNUSUAL FIRE/EXPLOSION HAZARDS: This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

SECTION 5. REACTIVITY DATA

CHEMICAL INCOMPATIBILITIES: Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetraoxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

CONDITIONS TO AVOID: Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

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SECTION 6. HEALTH HAZARD INFORMATION /TLV

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. SUMMARY OF HEALTH: Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. FIRST AID: EYE CONTACT: Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.* SKIN CONTACT: Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.* INHALATION: Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.* INGESTION: Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. * GET MEDICAL ASSISTANCE - In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL/LEAK: Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). WASTE DISPOSAL: Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. COMMENTS: Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 lfm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm.
Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION: Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. SPECIAL HANDLING/STORAGE: Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. ENGINEERING CONTROLS: Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene.
COMMENTS: Emptied containers contain product residues. Handle accordingly!
Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294.
Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 34, 81, 82. CR

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Indust. Hygiene/Safety [signature] 10-86
Medical Review [signature] Oct 86

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Material Safety Data Sheets Collection:

Sheet No. 385
Ethylbenzene

Issued: 8/78 Revision: B, 9/92

Section 1. Material Identification

Ethylbenzene ($C_6H_5C_2H_5$) Description: Derived by heating benzene and ethylene in presence of aluminum chloride with subsequent distillation, by fractionation directly from the mixed xylene stream in petroleum refining, or dehydrogenation of naphthenes. Used as a solvent, an antiknock agent in gasoline; and as an intermediate in production of synthetic rubber, styrene, cellulose acetate, diethylbenzene, acetophenone, ethyl anthraquinone, propyl oxide, and α-methylbenzol alcohol.

Other Designations: CAS No. 100-41-4, ethylbenzol, EB, phenylethane, NCI-C56393.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[1] for a suppliers list.

NFPA
R 1
I 3
S 2*
K 4
* Skin absorption

HMIS
H 2*
F 3
R 0
PPE - Sec. 8
* Chronic effects

Cautions: Ethylbenzene is a skin and mucous membrane irritant considered the most irritating of the benzene series. Inhalation causes acute and chronic central nervous system (CNS) effects. It is highly flammable and forms explosive mixtures with air.

Section 2. Ingredients and Occupational Exposure Limits

Ethylbenzene, ca >99.0%. Impurities include ~ 0.1% *meta* & *para* xylene, ~ 0.1% cumene, and ~ 0.1% toluene.

1991 OSHA PELs
8-hr TWA: 100 ppm (435 mg/m^3)
15-min STEL: 125 ppm (545 mg/m^3)
Action Level: 50 ppm (217 mg/m^3)

1990 IDLH Level
2000 ppm

1990 NIOSH REL
TWA: 100 ppm (435 mg/m^3)
STEL: 125 ppm (545 mg/m^3)

1992-93 ACGIH TLVs
TWA: 100 ppm (434 mg/m^3)
STEL: 125 ppm (545 mg/m^3)

1990 DFG (Germany) MAK
TWA: 100 ppm (440 mg/m^3)
Category 1: local irritants
Peak Exposure Limit: 200 ppm, 5 min momentary value, max of 8/shift
Danger of cutaneous absorption

1985-86 Toxicity Data*
Human, inhalation, TC_{Lo}: 100 ppm/8 hr caused eye effects, sleep, and respiratory changes.
Human, lymphocyte: 1 mmol/L induced sister chromatid exchange.
Rat, oral, LD_{50}: 3500 mg/kg; toxic effects not yet reviewed.
Rat (female), inhalation, TC_{Lo}: 1000 ppm/7 hr/day, 5 days/wk, for 3 wk prior to mating and daily for 19 days of gestation produced pups with high incidence of extra ribs.[179]

* See NIOSH, *RTECS* (DA0700000), for additional irritation, mutation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 277 °F (136 °C)
Melting Point: -139 °F (-95 °C)
Surface Tension: 31.5 dyne/cm
Ionization Potential: 8.76 eV
Viscosity: 0.64 cP at 77 °F (25 °C)
Refraction Index: 1.4959 at 68 °F (20 °C)
Relative Evaporation Rate (ether = 1): 0.0106
Bulk Density: 7.21 lb/Gal at 77 °F (25 °C)
Critical Temperature: 651 °F (343.9 °C)
Critical Pressure: 35.6 atm

Molecular Weight: 106.16
Density: 0.863 at 77 °F (25 °C)
Water Solubility: Slightly, 14 mg/100 mL at 59 °F (15 °C)
Other Solubilities: Miscible in alcohol, ether; soluble in carbon tetrachloride, benzene, sulfur dioxide, and many organic solvents; insoluble in ammonia
Odor Threshold: 2.3 ppm
Vapor Pressure: 7.1 mm Hg at 68 °F (20 °C); 10 mmHg at 78.62 °F (25.9 °C); 100 mm Hg 165.38 °F (74.1 °C)
Saturated Vapor Density (Air = 0.075 lb/ft^3 or 1.2 kg/m^3): 0.0768 lb/ft^3 or 1.2298 kg/m^3

Appearance and Odor: Colorless, flammable liquid with a pungent odor.

Section 4. Fire and Explosion Data

Flash Point: 64 °F (18 °C) CC	**Autoignition Temperature:** 810 °F (432 °C)	**LEL:** 1.0% v/v	**UEL:** 6.7% v/v

Extinguishing Media: Class 1B Flammable liquid. For small fires, use dry chemical, carbon dioxide, or 'alcohol-resistant' foam. For large fires, use fog or 'alcohol-resistant' foam. Use water only if other agents are unavailable; EB floats on water and may travel to an ignition source and spread fire. **Unusual Fire or Explosion Hazards:** Burning rate = 5.8 mm/min. Vapors may travel to an ignition source and flash back. Container may explode in heat of fire. EB poses a vapor explosion hazard indoors, outdoors, and in sewers. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Cool container sides with water until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if impossible, withdraw from area and let fire burn. Withdraw immediately if you hear rising sound from venting safety device or notice any tank discoloration due to fire. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Ethylbenzene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Reacts vigorously with oxidizers.
Conditions to Avoid: Exposure to heat and oxidizers.
Hazardous Products of Decomposition: Thermal oxidative decomposition of EB can produce acrid smoke and irritating fumes.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list EB as a carcinogen. **Summary of Risks:** Occupational exposure to EB alone is rare since it is usually present together with other solvents. EB is irritating to the eyes, skin, and respiratory tract. Vapor inhalation produces varying degrees of CNS effects depending on concentration. The liquid is absorbed through the skin but vapors are not. 56 to 64% of inhaled ethylbenzene is retained and metabolized. Urinary metabolites following exposure to 23 to 85 ppm for 8 hr are mandelic acid (64%), phenylglyoxylic acid (25%), and methylphenylcarbinol/1-phenyl ethanol (5%). Concurrent exposure to xylene and ethylbenzene causes slower excretion of EB metabolites. Based on the rat LD_{50}, one manufacturer gives 3 to 4 oz. as the lethal dose for a 100 lb person.

Continued on next page

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Section 6. Health Hazard Data

Medical Conditions Aggravated by Long-Term Exposure: Skin and CNS diseases and impaired pulmonary function (especially obstructive airway diseases). **Target Organs:** Eyes, respiratory system, skin, CNS, blood. **Primary Entry Routes:** Inhalation, skin and eye contact. **Acute Effects:** Vapor inhalation of 200 ppm caused transient eye irritation; 1000 ppm caused eye irritation with profuse watering (tolerance developed rapidly); 2000 ppm caused severe and immediate eye irritation and watering, nasal irritation, chest constriction, and vertigo; 5000 ppm was intolerable and caused eye and nose irritation. Inhalation of high concentrations may cause narcosis, cramps, and death due to respiratory paralysis. Skin exposed to pure ethylbenzene for 10 to 15 min absorbed 22 to 33 mg/cm^2/hr. Immersion of hand in solutions of 112 & 156 mg/L for 1 hr absorbed 118 & 215.7 µg/cm^2/hr, respectively. **Chronic Effects:** Repeated skin contact may cause dryness, scaling, and fissuring. Workers chronically exposed to > 100 ppm complained of fatigue, sleepiness, headache, and mild irritation of the eyes and respiratory tract. Repeated vapor inhalation may result in blood disorders, particularly leukopenia (abnormally low level of white blood cells) and lymphocytosis.

FIRST AID

Eyes: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center and unless otherwise advised, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute. *Do not* induce vomiting! Aspiration of even a small amount of EB in vomitus can cause severe damage since its low viscosity and surface tension will cause it to spread over a large area of the lung tissue.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: BEI = mandelic acid in urine (1.5 g/g of creatinine), sample at end of shift at workweeks end. Since this test is not specific, test for EB in expired air for confirmation.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel. Isolate and ventilate area, deny entry and stay upwind. Shut off all ignition sources. Cleanup personnel should protect against vapor inhalation and skin/eye contact. Take up small spills with earth, sand, vermiculite, or other absorbent, noncombustible material and place in suitable container. Dike far ahead of large spill for later reclamation or disposal. Report any release >1000 lb. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** If released to soil, EB partially evaporates into the atmosphere, with a half-life of hrs to wks, and some leaches into groundwater, especially in soil with low organic carbon content. Biodegradation occurs with a half-life of 2 days. Some EB may absorb to sediment or bioconcentrate in fish. Evidence points to slow biodegradation in groundwater. In air, it reacts with photochemically produced hydroxyl radicals with a half-life of hrs to 2 days. Additional amounts may be removed by rain. **Ecotoxicity Values:** Shrimp (*Mysidopsis bahia*), LC_{50} = 87.6 mg/L/96 hr; sheepshead minnow (*Cyprinodon variegatus*) LC_{50} = 275 mg/L/96 hr; fathead minnow (*Pimephales promelas*) LC_{50} = 42.3 mg/L/96 hr in hard water & 48.5 mg/L/96 hr in softwater. **Disposal:** A candidate for rotary kiln incineration at 1508 to 2912°F (820 to 1600°C), liquid injection incineration at 1202 to 2912°F (650 to 1600°C), and fluidized bed incineration at 842 to 1796°F (450 to 980°C). Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

Listed as a RCRA Hazardous Waste (40 CFR 261.21); No. D001
Listed as a SARA Toxic Chemical (40 CFR 372.65)
SARA Extremely Hazardous Substance (40 CFR 355), TPQ: Not listed
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4); Final Reportable Quantity (RQ), 1000 lb (454 kg) [* per CWA, Sec. 311 (b)(4) & CWA, Sec. 307 (a)]

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For < 1000 ppm, use a powered air-purifying respirator with an appropriate organic vapor cartridge, a supplied-air respirator (SAR), SCBA, or chemical cartridge respirator with appropriate organic vapor cartridge. For < 2000 ppm, use a SAR or SCBA with a full facepiece. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets made of Viton or polyvinylchloride to prevent skin contact. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[1003] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Remove this material from your shoes and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in a cool, dry, well-ventilated area away from ignition sources and oxidizers. Outside or detached storage is preferred. If inside, store in a standard flammable liquids cabinet. Containers should have flame-arrester or pressure-vacuum venting. To prevent static sparks, electrically ground and bond all equipment used with ethylbenzene. Install Class I, Group D electrical equipment. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain levels as low as possible. Purge and ventilate reaction vessels before workers are allowed to enter for maintenance or cleanup. **Administrative Controls:** Consider preplacement and periodic medical exams of exposed workers that emphasize the CNS, skin, blood, and respiratory system.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Ethylbenzene
DOT Hazard Class: 3
ID No.: UN1175
DOT Packing Group: II
DOT Label: Flammable liquid
Special Provisions (172.102): T1

Packaging Authorizations
a) Exceptions: 173.150
b) Non-bulk Packaging: 173.202
c) Bulk Packaging: 173.242

Quantity Limitations
a) Passenger Aircraft or Railcar: 5L
b) Cargo Aircraft Only: 60 L

Vessel Stowage Requirements
a) Vessel Stowage: B
b) Other: –

MSDS Collection **References:** 26, 73, 100, 101, 103, 124, 126, 127, 132, 133, 136, 139, 140, 148, 153, 159, 162, 163, 166, 167, 168, 171, 176, 179
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** D Wilson, CIH; **Medical Review:** W Silverman, MD

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Material Safety Data Sheets Collection:

Sheet No. 318
Xylene *(Mixed Isomers)*

Issued: 11/80 Revision: E, 9/92 Errata: 12/94

Section 1. Material Identification

Xylene (Mixed Isomers) (C_8H_{10}) Description: The commercial product is a blend of the three isomers (*ortho-(o-)*, *meta-(m-)*, *para-(p-)*) with the largest proportion being *m-* xylene. Xylene is obtained from coal tar, toluene by transalkylation, and pseudocumene. Used in the manufacture of dyes, resins, paints, varnishes, and other organics, as a general solvent for adhesives, a cleaning agent in microscope technique, as a solvent for Canada balsam microscopy; as a fuel component in aviation gasoline, protective coatings, sterilizing catgut, hydrogen peroxide, perfumes, insect repellants, pharmaceuticals, and the leather industry; in the production of phthalic anhydride, isophthalic, and terephthalic acids and their dimethyl esters which are used in the manufacture of polyester fibers; and as an indirect food additive as a component of adhesives. Around the home, xylene is found as vehicles in paints, paint removers, degreasing cleaners, lacquers, glues and cements and as solvent/vehicles for pesticides.

Other Designations: CAS No. 1330-20-7 [95-47-6; 108-38-3; 106-42-3 (*o-*, *m-*, *p-*isomers)]; dimethylbenzene, methyltoluene, NCI-C55232, Violet 3, xylol

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: Xylene is an eye, skin, and mucous membrane irritant and may be narcotic in high concentrations. It is a dangerous fire hazard.

R	1
I	2
S	2
K	3

NFPA: 3 / 2 / 0 / -

HMIS:
H 2*
F 3
R 0
PPE †

* Chronic Effects
† See 8

Section 2. Ingredients and Occupational Exposure Limits

Xylene (mixed isomers): the commercial product generally contains ~40% *m*-xylene; 20% each of *o*-xylene, *p*-xylene, and ethylbenzene; and small quantities of toluene. Unpurified xylene may contain pseudocumene.

1991 OSHA PELs
8-hr TWA: 100 ppm (435 mg/m³)
15-min STEL: 150 ppm (655 mg/m³)

1990 IDLH Level
1000 ppm

1990 NIOSH RELs
TWA: 100 ppm (435 mg/m³)
STEL: 150 ppm (655 mg/m³)

1992-93 ACGIH TLVs
TWA: 100 ppm (434 mg/m³)
STEL: 150 ppm (651 mg/m³)
BEI (Biological Exposure Index): Methylhippuric acids in urine at end of shift: 1.5 g/g creatinine

1990 DFG (Germany) MAK
TWA: 100 ppm (440 mg/m³)
Category II: Substances with systemic effects
Half-life: < 2 hr
Peak Exposure: 200 ppm, 30 min, average value, 4 peaks per shift

1985-86 Toxicity Data*
Human, inhalation, TC_{Lo}: 200 ppm produced olfaction effects, conjunctiva irritation, and other changes involving the lungs, thorax, or respiration.
Man, inhalation, LC_{Lo}: 10000 ppm/6 hr; toxic effects not yet reviewed
Human, oral, LD_{Lo}: 50 mg/kg; no toxic effect noted.
Rat, oral: LD_{50}: 4300 mg/kg; toxic effect not yet reviewed
Rat, inhalation, LC_{50}: 5000 ppm/4 hr; toxic effects not yet reviewed

* See NIOSH, *RTECS* (XE2100000), for additional toxicity data.

Section 3. Physical Data

Boiling Point Range: 279 to 284 °F (137 to 140 °C)*
Boiling Point: *ortho*: 291 °F (144 °C); *meta*: 281.8 °F (138.8 °C); *para*: 281.5 °F (138.5 °C)
Freezing Point/Melting Point: *ortho*: -13 °F (-25 °C); *meta*: -53.3 °F (-47.4 °C); *para*: 55 to 57 °F (13 to 14 °C)
Vapor Pressure: 6.72 mm Hg at 70 °F (21 °C)
Saturated Vapor Density (Air = 1.2 kg/m³): 1.23 kg/m³, 0.077 lbs/ft³
Molecular Weight: 106.16
Specific Gravity: 0.864 at 20 °C/4 °C
Water Solubility: Practically insoluble
Other Solubilities: Miscible with absolute alcohol, ether, and many other organic liquids.
Octanol/Water Partition Coefficient: logKow = 3.12-3.20
Odor Threshold: 1 ppm
Viscosity: <32.6 SUS

Appearance and Odor: Clear, sweet-smelling liquid

* Materials with wider and narrower boiling ranges are commercially available.

Section 4. Fire and Explosion Data

Flash Point: 63 to 77 °F (17 to 25 °C) CC; **Autoignition Temperature:** 982 °F (527 °C) (*m-*); **LEL:** 1.1 (*m-*, *p-*); 0.9 (*o-*) **UEL:** 7.0 (*m-*, *p-*); 6.7 (*o-*)

Extinguishing Media: For small fires, use dry chemical, carbon dioxide (CO_2), water spray or regular foam. For large fires, use water spray, fog or regular foam. Water may be ineffective. Use water spray to cool fire-exposed containers. **Unusual Fire or Explosion Hazards:** Xylene vapors or liquid (which floats on water) may travel to an ignition source and flash back. The heat of fire may cause containers to explode and/or produce irritating or poisonous decomposition products. Xylene may present a vapor explosion hazard indoors, outdoors, or in sewers. Accumulated static electricity may occur from vapor or liquid flow sufficient to cause ignition. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing will provide limited protection. If feasible and without risk, move containers from fire area. Otherwise, cool fire-exposed containers until well after fire is extinguished. Stay clear of tank ends. Use unmanned hose holder or monitor nozzles for massive cargo fires. If impossible, withdraw from area and let fire burn. Withdraw immediately in case of any tank discoloration or rising sound from venting safety device. Do not release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Xylene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Xylene is easily chlorinated, sulfonated, or nitrated. **Chemical Incompatibilities:** Incompatibilities include strong acids and oxidizers and 1,3-dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin). Xylene attacks some forms of plastics, rubber, and coatings. **Conditions to Avoid:** Avoid heat and ignition sources and incompatibles. **Hazardous Products of Decomposition:** Thermal oxidative decomposition of xylene can produce carbon dioxide, carbon monoxide, and various hydrocarbon products.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[184] do not list xylene as a carcinogen. **Summary of Risks:** Xylene is an eye, mucous membrane, and respiratory tract irritant. Irritation starts at 200 ppm; severe breathing difficulties which may be delayed in onset can occur at high concentrations. It is a central nervous system (CNS) depressant and at high concentrations can cause coma. Kidney and liver damage can occur with xylene exposure. With prolonged or repeated cutaneous exposure, xylene produces a defatting dermatitis. Chronic toxicity is not well defined, but is less toxic than benzene. Prior to the 1950s, benzene was often found as a contaminant of xylene and the effects attributed to xylene such as blood dyscrasias are questionable. Since the late 1950s, xylenes have been virtually benzene-free and blood dyscrasias have not been associated with xylenes. Chronic exposure to high concentrations of xylene in animal studies have demonstrated mild reversible decrease in red and white cell counts as well as increases in platelet counts.

Continue on next page

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Section 6. Health Hazard Data, *continued*

Menstrual irregularity was reported in association with workplace exposure to xylene perhaps due to effects on liver metabolism. Xylene crosses the human placenta, but does not appear to be teratogenic under conditions tested to date. **Medical Conditions Aggravated by Long-Term Exposure:** CNS, respiratory, eye, skin, gastrointestinal (GI) , liver and kidney disorders. **Target Organs:** CNS, eyes, GI tract, liver, kidneys, and skin. **Primary Entry Routes:** Inhalation, skin absorption (slight), eye contact, ingestion. **Acute Effects:** Inhalation of high xylene concentrations may cause dizziness; nausea, vomiting, and abdominal pain; eye, nose, and throat irritation; respiratory tract irritation leading to pulmonary edema (fluid in lung); drowsiness; and unconsciousness. Direct eye contact can result in conjunctivitis and corneal burns. Ingestion may cause a burning sensation in the oropharynx and stomach and transient CNS depression. **Chronic Effects:** Repeated or prolonged skin contact may cause drying and defatting of the skin leading to dermatitis. Repeated eye exposure to high vapor concentrations may cause reversible eye damage, peripheral and central neuropathy, and liver damage. Other symptoms of chronic exposure include headache, fatigue, irritability, chronic bronchitis, and GI disturbances such as nausea, loss of appetite, and gas.

FIRST AID *Emergency personnel should protect against exposure.* **Eyes:** *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. Carefully dispose of contaminated clothing as it may pose a fire hazard. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. Monitor exposed person for respiratory distress. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center and unless otherwise advised, *do not induce vomiting!* If spontaneous vomiting should occur, keep exposed person's head below the hips to prevent aspiration (breathing liquid xylene into the lungs). *Aspiration of a few millimeters of xylene can cause chemical pneumonitis, pulmonary edema, and hemorrhage.* **Note to Physicians:** Hippuric acid or the ether glucuronide of *ortho*-toluic acid may be useful in diagnosis of *meta*-, *para*- and *ortho*-xylene exposure, respectively. Consider gastric lavage if a large quantity of xylene was ingested. Proceed gastric lavage with protection of the airway from aspiration; consider endotracheal intubation with inflated cuff.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove all heat and ignition sources, and ventilate spill area. Cleanup personnel should protect against vapor inhalation and skin or eye contact. If feasible and without undue risk, stop leak. Use appropriate foam to blanket release and suppress vapors. Water spray may reduce vapor, but does not prevent ignition in closed spaces. For small spills, absorb on paper and evaporate in appropriate exhaust hood or absorb with sand or some non-combustible absorbent and place in containers for later disposal. For large spills dike far ahead of liquid to contain. Do not allow xylene to enter a confined space such as sewers or drains. On land, dike to contain or divert to impermeable holding area. Apply water spray to control flammable vapor and remove material with pumps or vacuum equipment. On water, contain material with natural barriers, booms, or weirs; apply universal gelling agent; and use suction hoses to remove spilled material. Report any release in excess of 1000 lb. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** Little bioconcentration is expected. Biological oxygen demand 5 (after 5 days at 20 °C): 0.64 (no stated isomer). **Ecotoxicity values:** LD_{50}, Goldfish, 13 mg/L/24 hr, conditions of bioassay not specified, no specific isomer. **Environmental Degradation:** In the atmosphere, xylenes degrade by reacting with photochemically produced hydroxyl radicals with a half-life ranging from 1-1.7 hr. in the summer to 10-18 hr in winter or a typical loss of 67-86% per day. Xylenes are resistant to hydrolysis. **Soil Absorption/Mobility:** Xylenes have low to moderate adsorption to soil and when spilled on land, will volatilize and leach into groundwater. **Disposal:** As a hydrocarbon, xylene is a good candidate for controlled incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
Listed as a RCRA Hazardous Waste (40 CFR 261.33): No. U239, F003 (spent solvent)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1000 lb (454 kg) [* per Clean Water Act, Sec. 311(b)(4); per RCRA, Sec. 3001]

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For concentrations >1000 ppm, use any chemical cartridge respirator with organic vapor cartridges; any powered, air-purifying respirator with organic vapor cartridges; any supplied-air respirator; or any self-contained breathing apparatus. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent all skin contact. With breakthrough times > 8 hr, consider polyvinyl alcohol and fluorocarbon rubber (Viton) as materials for PPE. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes. Launder contaminated work clothing before wearing. Remove this material from your shoes and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in clearly labelled, tightly closed, containers in a cool, well-ventilated place, away from strong oxidizing materials and heat and ignition sources. During transferring operations, electrically ground and bond metal containers. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. Use hermetically sealed equipment, transfer xylene in enclosed systems, avoid processes associated with open evaporating surfaces, and provide sources of gas release with enclosures and local exhaust ventilation. Use Class I, Group D electrical equipment. **Administrative Controls:** Establish air and biological monitoring programs and evaluate regularly. Consider preplacement and periodic medical examinations including a complete blood count, a routine urinalysis, and liver function tests. Consider hematologic studies if there is any significant contamination of the solvent with benzene. If feasible, consider the replacement of xylene by less toxic solvents such as petrol (motor fuel) or white spirit. Before carrying out maintenance and repair work, steam and flush all equipment to remove any xylene residues.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Xylenes
DOT Hazard Class: 3
ID No.: UN1307
DOT Packing Group: II
DOT Label: Flammable Liquid
Special Provisions (172.102): T1

Packaging Authorizations
a) Exceptions: 173.150
b) Nonbulk Packaging : 173.202
c) Bulk Packaging: 173.242

Quantity Limitations
a) Passenger, Aircraft, or Railcar: 5L
b) Cargo Aircraft Only: 60L

Vessel Stowage Requirements
a) Vessel Stowage: B
b) Other: –

MSDS Collection **References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 139, 140, 148, 149, 153, 159, 163, 164, 167, 171, 174, 176, 180.
Prepared by: MJ Wurth, BS; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** W Silverman, MD

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Material Safety Data Sheets Collection:
Sheet No. 382
Vinyl Chloride
Issued: 7/78 Revision: C, 9/92

Section 1. Material Identification

Vinyl Chloride (C_2H_3Cl) Description: Derived from ethylene dichloride and alcoholic potassium, by reaction of acetylene and hydrogen chloride (as gas or liquids), or by oxychlorination where ethylene reacts with hydrochloric acid and oxygen. Inhibitors such as butyl catechol, hydroquinone, or phenol are added to prevent polymerization. Used in the plastics industry for the production of polyvinyl chloride resins, in organic synthesis and formerly as a refrigerant, extraction solvent, and propellant (banned in 1974 because of its carcinogenic activity).

Other Designations: CAS No. 75-01-4, chloroethylene, chloroethene, ethylene monochloride, Trovidur, VC, VCM.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[1] for a suppliers list.

Cautions: Vinyl chloride is a confirmed human carcinogen. Vapor inhalation leads to central nervous system (CNS) depression. The liquid can cause frostbite. It is a flammable gas at room temperature and polymerizes on exposure to air or sunlight. Avoid exposure to VC through engineering controls and wearing PPE.

NFPA
H 2
I 4
S 4
K 4

HMIS
H 3*
F 4
R 2
PPE: Sec. 8
* Chronic effects

Section 2. Ingredients and Occupational Exposure Limits

Vinyl Chloride, ca 98 to 99%. Impurities include water, acetaldehyde, hydrogen chloride, hydrogen peroxide, methyl chloride, butane, 1,3-butadiene, chloroprene, diacetylene, vinyl acetylene, and propine.

1991 OSHA PELs
8-hr TWA: 1 ppm
Ceiling: 5 ppm; OSHA-X

1990 NIOSH REL
NIOSH-X

1992-93 ACGIH TLV
TWA: 5 ppm (13 mg/m^3)
TLV-A1

1990 DFG (Germany) TRK*
Existing Installations: 3 ppm
MAK-A1

1985-86 Toxicity Data†
Man, inhalation, TC_{Lo}: Intermittent exposure to 200 ppm for 11 yr caused liver tumors.
Man, inhalation, TC_{Lo}: 30 mg/m^3/5 yr caused spermatogenesis.
Human, inhalation, TC: Continuous exposure to 300 mg/m^3 for an undetermined number of weeks caused blood tumors.
Rat, oral, LD_{50}: 500 mg/kg; toxic effects not yet reviewed.

* TRK (technical exposure limit) is used in place of MAK when a material is a carcinogen. Unlike an MAK below which no adverse effects are expected, the TRK is a limit set below which adverse effects may still occur. This is based on the theory that 1 molecule of a carcinogenic substance may still produce a tumor. The TRK is set to allow for an acceptable risk (for example, 1 tumor in 1 million persons may be an acceptable risk).
† See NIOSH, *RTECS* (KU9625000), for additional mutation, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 7 °F (-13.9 °C)
Freezing Point: -245 °F (-159.7 °C)
Molecular Weight: 62.5
Specific Gravity: 0.9106 at 68 °F (20 °C)
Ionization Potential: 9.99 eV
Refraction Index: 1.370 at 20 °C/D
Surface Tension: 23.1 dyne/cm at -4 °F (-20 °C)
Odor Threshold: 2000 to 5000 ppm*
Vapor Density (Air = 1): 2.155
Water Solubility: Slightly soluble, 0.1% at 77 °F (25 °C)
Other Solubilities: alcohol, benzene, carbon tetrachloride, ether, hydrocarbon and oils
Vapor Pressure: 2530 mm Hg at 68 °F (20 °C), 400 mm Hg at -18.4 °F (-28 °C)
Critical Temperature: 304.7 °F (151.5 °C)
Critical Pressure: 56.8 atm
Viscosity: 0.01072 cP at 68 °F (20 °C), *gas*; 0.28 cP at -4 °F (-20 °C), *liquid*
Appearance and Odor: A gas at room temperature. Usually found as a compressed/cooled liquid. The colorless liquid forms a vapor with a pleasant ethereal odor.

*The actual vapor concentration that can be detected by humans has not been adequately determined and varies from one individual to another, from impurities, and probably from exposure duration. The odor threshold is not an accurate warning of exposure.

Section 4. Fire and Explosion Data

Flash Point: -108.4 °F (-78 °C) OC **Autoignition Temperature:** 882 °F (472 °C) **LEL:** 3.6% v/v **UEL:** 33% v/v

Extinguishing Media: For small fires, use dry chemical or carbon dioxide. For large fires, use water spray, fog, or regular foam. **Unusual Fire or Explosion Hazards:** Large fires can be practically inextinguishable. Vapors may travel to an ignition source and flash back. VC may polymerize in cylinders or tank cars and explode in heat of fire. Vapors pose an explosion hazard indoors, outdoors, and in sewers. VC decomposes in fire to hydrogen chloride, carbon monoxide, carbon dioxide, and phosgene. Burning rate = 4.3 mm/min. **Special Fire-fighting Procedures:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Stop gas leak if possible. Let tank, tank car, or tank truck burn unless leak can be stopped. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if this is impossible, withdraw from area and let fire burn. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire. *Do not* release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Long term exposure to air may result in formation of peroxides which initiates explosive polymerization of the chloride. VC can polymerize on exposure to light or in presence of a catalyst. **Chemical Incompatibilities:** VC can explode on contact with oxide of nitrogen, may liberate hydrogen chloride on exposure to strong alkalies, and is incompatible with copper, oxidizers, aluminum, and peroxides. In the presence of moisture, VC attacks iron and steel. **Conditions to Avoid:** Exposure to sunlight, air, heat, and incompatibles. **Hazardous Products of Decomposition:** Thermal oxidative decomposition of vinyl chloride can produce carbon oxides, and chloride gas.

Section 6. Health Hazard Data

Carcinogenicity: Vinyl chloride is listed as a carcinogen by the IARC (Class 1, *sufficient human evidence*),[16,17] NTP (Class 1, *sufficient human evidence*),[16,59] NIOSH (Class X, *carcinogen defined without further categorization*),[16,5] ACGIH (TLV-A1, *confirmed human carcinogen*),[16,3] DFG (MAK-A1, *capable of inducing malignant tumors in humans*),[15,5] and OSHA (Class X, *carcinogen defined without further categorization*).[16,4] Liver tumors (angiosarcomas) are confirmed from VC exposure. Other tumors of the CNS, respiratory system, blood, and lymphatic system have occurred from exposure to the polyvinyl chloride manufacture process but VC itself may not be the causative agent. **Summary of Risks:** Vapor inhalation causes varying degrees of CNS depression with noticeable anesthetic effects at levels of 1% (10,000 ppm). Studies have shown loss of libido and sperm in men exposed to VC and in Russian studies, 77% of exposed women experienced ovarian dysfunction, benign uterine growths, and prolapsed genital organs. However, no teratogenic effects have been seen in offspring of exposed workers.

Continue on next page

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Section 6. Health Hazard Data, *continued*

It appears that metabolism is necessary before many of VC's toxic effects occur. Some vinyl chloride is exhaled unchanged but most is metabolized to chloroacetaldehyde. Skin absorption may occur if liquid is confined on skin but absorbed amount would be small. It is possible that the phenol inhibitor may be absorbed as well. The compressed liquid can cause frostbite. Vapors are severely irritating to the eyes. Chronic exposure can cause cancer and a triad of syndromes known as *vinyl chloride disease*. **Medical Conditions Aggravated by Long-Term Exposure:** Liver, cardiac, pulmonary, and connective tissue disorders. **Target Organs:** Liver, CNS, respiratory and lymphatic systems, bone, and connective tissue of the skin. **Primary Entry Routes:** Inhalation, skin/eye contact. **Acute Effects:** CNS effects include fatigue, headache, vertigo, ataxia, euphoria, visual disturbances, dulling of auditory cues, numbness and tingling in the extremities, narcosis, unconsciousness, and death due to respiratory failure. Respiratory problems include dyspnea, asthma, and pneumonoconiosis. **Chronic Effects:** Repeated exposure has lead to liver cancer; confirmed because of the otherwise rarity of its type (angiosarcoma). Tumors in other organs have occurred in the polyvinyl chloride industry but agents other than VC may be responsible; authorities are still debating this issue. A triad of other effects are associated with VC exposure. Acro-osteolysis is associated with hand cleaning of polymerization vessels and characterized by dissolution of bone in the hands, especially when associated with resorption. Raynaud's Phenomenon is a vascular disorder marked by recurrent spasm of the capillaries and especially those of the fingers and toes on exposure to cold. This is usually accompanied by pain and in severe cases may progress to local gangrene. Sclerodermatous skin changes (affecting the dorsal hands and distal forearms) are seen and described as a slowly progressive disease marked by deposition of fibrous connective tissue in the skin. The skin becomes thickened and raised nodules appear. Arthralgias (pain in one or more joints) and blood changes with decreased platelet number and capillary abnormalities may also occur.
FIRST AID Eyes: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. For frostbite, immerse affected area in 107.6 °F (42 °C) water until completely rewarmed. *Do not* use dry heat. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Unlikely! VC is a gas above 7 °F (-14°C). **Note to Physicians:** Endotracheal intubation may be required if significant CNS or respiratory depression occur. Diagnostic test: thiodiglycolic acid in urine (normally < 2 mg/g creatinine).

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. If possible without risk, stop gas flow. Shut off ignition sources. Report any release > 1 lb. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** VC reacts with hydroxyl radicals in the trophosphere with a half-life of 1.2 days. The half-life = a few hr in photochemical smog. Reaction products in the air include chloroacetaldehyde, hydrogen chloride, chloroethylene, epoxide, formaldehyde, formyl chloride, formic acid, and carbon monoxide. In soil, VC rapidly volatilizes. What does not evaporate will be highly mobile and may leach into groundwater. In water, VC is not expected to hydrolyze, bioconcentrate, or absorb to sediment. It will rapidly volatilize with an estimated half-life of 0.805 hr for evaporation from a river 1 meter deep with a current of 3 meter/sec and a wind velocity of 3 meter/sec. In waters containing photosensitizers such as humic acid, photodegradation will be rapid. **Soil Absorption/Mobility:** From an estimated solubility of 2,700 ppm, a Koc of 56 is established for VC which indicates high soil mobility and potential to leach into groundwater. **Disposal:** Dilute any waste compressed liquid to a 1% solution and remove phenol inhibitor as sodium. Pour onto vermiculite, sodium bicarbonate, or a sand & soda ash mixture (90/10). Add slaked lime if fluoride is present. Mix in paper boxes, place in incinerator, cover with scrap wood and paper, and ignite with excelsior train. Another method is to dissolve waste in a flammable solvent and spray in incinerator firebox equipped with an afterburner and alkali scrubber. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33): No. U043
SARA Extremely Hazardous Substance (40 CFR 355), TPQ: Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1 lb (0.454 kg) [* per CWA, Sec. 307 (a); CAA, Sec. 112, & RCRA, Sec. 3001]

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. According to NIOSH[148], for any detectable concentration use a SCBA or supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode. See 29 CFR 1910.1017 for detailed OSHA respirator recommendations. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets made of Viton or chlorinated polyethylene to prevent skin contact. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL's (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate work clothes from street clothes, launder before reuse and clean PPE. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in a cool, dry, well-ventilated area in clearly labeled containers. Outside or detached storage is preferred. Large amounts should be stored in steel containers under pressure. Keep separate from incompatibles (Sec. 5). Venting, under pressure should be safety relief. At atm, venting should be pressure vacuum. Regularly monitor inhibitor levels. To avoid static sparks, electrically ground and bond all equipment used with VC. Avoid open flames, spark formation and electric discharges around VC. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. Install Class 1, Group D electrical equipment. **Administrative Controls:** Inform VC exposed personnel of hazards associated with its use. Preplacement and periodic medical exams of workers exposed above the action level is mandatory under OSHA 29 CFR (1910.1017). Monitor for liver cancer, scleroderma, pneumonitis, clotting abnormalities, and acro-osteolysis.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Vinyl Chloride
DOT Hazard Class: 2.1
ID No.: UN1086
DOT Packing Group: --
DOT Label: Flammable Gas
Special Provisions (172.102): B44

Packaging Authorizations
a) Exceptions: 173.306
b) Non-bulk Packaging: 173.304
c) Bulk Packaging: 173.314 & 173.315

Quantity Limitations
a) Passenger Aircraft or Railcar: Forbidden
b) Cargo Aircraft Only: 150 kg

Vessel Stowage Requirements
a) Vessel Stowage: B
b) Other: 40

***MSDS Collection* References:** 26, 73, 100, 101, 103, 124, 126, 127, 132, 133, 136, 140, 148, 149, 153, 159, 162, 163, 164, 167, 168, 171, 174, 175
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** AC Darlington, MPH, MD

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Material Safety Data Sheet

Version 4.5
Revision Date 01/17/2012
Print Date 04/18/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Benzo[*a*]pyrene
Product Number	:	B1760
Brand	:	Sigma
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

Target Organs

Lungs, Skin

GHS Classification
Skin irritation (Category 3)
Respiratory sensitization (Category 1)
Germ cell mutagenicity (Category 1B)
Carcinogenicity (Category 1B)
Reproductive toxicity (Category 1B)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H316	Causes mild skin irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.

P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	3
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 3,4-Benzpyrene
3,4-Benzopyrene
Benzo[def]chrysene

Formula : $C_{20}H_{12}$

Molecular Weight : 252.31 g/mol

Component		Concentration
Benzo[a]pyrene		
CAS-No.	50-32-8	-
EC-No.	200-028-5	
Index-No.	601-032-00-3	

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen			
Benzo[a]pyrene	50-32-8	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 177 - 180 °C (351 - 356 °F) - lit.
Boiling point	495 °C (923 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.35 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 5.97
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Subcutaneous - rat - 50 mg/kg

Skin corrosion/irritation
Skin - mouse - Mild skin irritation

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Chronic exposure may cause dermatitis.

May cause sensitization by inhalation.

Germ cell mutagenicity
May alter genetic material.
In vivo tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)
NTP:	Reasonably anticipated to be human carcinogens. (Benzo[a]pyrene)
	Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)

Reproductive toxicity

May cause reproductive disorders.

Teratogenicity

May cause congenital malformation in the fetus.

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

Synergistic effects
no data available

Additional Information
RTECS: DJ3675000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

Persistence and degradability
no data available

Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 48 h Bioconcentration factor (BCF): 3,208

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Benzo[a]pyrene)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Benzo[a]pyrene	50-32-8	1990-01-01

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Material Safety Data Sheet

Date Printed: 12/06/2005
Date Updated: 10/28/2004

Section 1 - Product and Company Information

Catalog Number:	R430720 (Reorder Product by this No.)
Product Name:	BENZO (A) ANTHRACENE
Street Address:	595 North Harrison Road
City, State, Zip, Country:	Bellefonte, PA 16823-0048 USA
Fax (MSDS Dept.):	814-359-5930
Emergency Phone:	800-521-8956 EXT 2143
CHEMTREC:	800-424-9300

Section 2 - Composition/Information on Ingredient(s)

Substance Name: BENZO(A)ANTHRACENE
CAS#: 56-55-3
SARA 313: No
Ingredients:
Formula: C18H12
Chemical Name:
BENZ{A}ANTHRACENE
Synonym(s):
1,2-BENZANTHRACENE
RTECS Number: CV9275000
MSDS Dictionary:
CAS=Chemical Abstract Service; %=Percentage of Composition; TLV=Threshold Limit Value; SARA=Superfund Amendments and Reauthorization Act of 1986; TSCA=Toxic Substances Control Act; N/A=Not Available.

Section 3 - Hazards Identification

Emergency Overview:
Stable.
Reported mutagen.
Reported animal carcinogen.
Reported cancer hazard.
To the best of our knowledge, the chemical, physical, & toxicological properties have not been thoroughly investigated.
See Section 11 for toxicological data.

Section 4 - First Aid Measures

Oral Exposure:
Contact a physician.
Inhalation Exposure:
Immediately move to fresh air.
Contact a physician.
Give oxygen if breathing is labored.
If breathing stops, give artificial respiration.
Dermal Exposure:
Remove contaminated clothing and shoes.

Section 4 - First Aid Measures

Flush skin with large volumes of water.

Eye Exposure:
Flush eyes with water for 15 minutes.

Additional Information:
Contact a physician.

Section 5 - Fire Fighting Measures

Flammable Hazards:

Explosion Hazards:

Thermal Decomposition Components:
N/A

Extinguishing Media:

Suitable:
C02.
Foam.
Dry chemical.

Firefighting

Protective Equipment:
Wear self-contained breathing apparatus when fighting a chemical fire.

Specific Hazard(s):

	Value:	Method:
Flash Point (F):	N/A	
Autoignition Temperature:		
	Lower:	Upper:
Explosion Limits:	N/A	

Additional Information:

Section 6 - Accidental Release Measures

Procedure to be followed in case of Leak or Spill:
Ventilate area.
Sweep up material.
Avoid generating dust.

Procedure(s) of Personal Precaution(s):
Wear dust mask.
Avoid generating dust.
Avoid eye or skin contact.
Wear protective glasses.
Wear rubber gloves.

Methods for Cleaning Up:

Additional Information:

Section 7 - Handling and Storage

Handling

User Exposure:
Avoid generating dust.
Avoid eye or skin contact.

Storage

Suitable:
Keep away from oxidizers.
Store in sealed container in cool, dry location.

Additional Information:
Reported cancer hazard.

Section 8 - Exposure Controls/PPE

Engineering Controls:
Use only in well-ventilated area.
Personal Protective Equipment
Respiratory:
Hand:
Wear rubber gloves.
Eye:
Wear dust mask.
Wear protective glasses.
Additional Equipment:
General Hygiene Measures:
Avoid eye or skin contact.
Additional Information:

Section 9 - Physical and Chemical Properties

Appearance:
Colorless to light yellow crystals
Odor:
Molecular Weight: 228
pH:

	Value:	Method:
Boiling Point Range:	438° C	N/A
Melting Point Range:	157° C	
Vapor Pressure:	N/A	
Vapor Density:	N/A	
Volatile %:	N/A	
Specific Gravity/Density:	N/A	
Evaporation Rate:	N/A	
	Value:	Method:
Flash Point (F):	N/A	
	Lower:	Upper:
Explosion Limits:	N/A	
Solubility in Water:	N/A	

Refractive Index:
Autoignition Temperature:
Additional Information:
N/A = Not Available

Section 10 - Stability and Reactivity

Stability:
Stable:
Stable.
Materials to Avoid:
Oxidizing agents.
Conditions to Avoid:
N/A
Hazardous Decomposition Products:
N/A
Hazardous Polymerization:
Will not occur.
Additional Information:

Section 11 - Toxicological Information

Route of Exposure
Skin Contact:
Skin Absorption:
Eye Contact:
Inhalation:
Ingestion:
Critical Effects:

Section 11 - Toxicological Information

Reported mutagen.
Reported animal carcinogen.

Additional Possible Effects:
Target Organ(s) or System(s):
Signs and Symptoms of Exposure:
Conditions Aggravated by Exposure:
Additional Information:
Reported cancer hazard.

Toxicity Data (LD50):	>200 mg/kg	Intravenous Rat
	Limit	Range
TLV:	N/A	
PEL:	N/A	

Section 12 - Ecological Information

Ecotoxicity:
No Data Available.

Section 13 - Disposal Information

Appropriate Method of Disposal of Substance or Preparation:
Comply with all applicable federal, state, or local regulations.
Contact a licensed professional waste disposal service to dispose of this material.

Section 14 - Transport Information

DOT	
Proper Shipping Name:	N/A
UN#:	N/A
Class:	N/A
Packing Group:	N/A
Hazard Label:	N/A
PIH:	N/A
IATA	
Proper Shipping Name:	N/A
IATA UN Number:	N/A
Hazard Class:	N/A
Packing Group:	N/A
Hazard Label:	N/A
PIH:	N/A

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: T
Indication of Danger:
Toxic
Risk Statements: R: 45
May cause cancer.
Safety Statements: S: 45 53
In case of accident or if you feel unwell, seek medical advice immediately.
Avoid exposure - obtain special instructions before use.

US Classification and Label Text
Indication of Danger:
Risk Statements:
Safety Statements:
US Statements:

United States Regulatory Information
SARA Listed: No

Section 15 - Regulatory Information

Deminimis:
Notes:
Classified by IARC as a Class 2A carcinogen.
Classified by NTP as a Group B carcinogen.
TSCA Inventory Item: Yes
United States - State Regulatory Information
California Prop-65:
Contains material(s) known to the state of California to cause cancer.
Contains material(s) known to the state of California to cause cancer.
Canada Regulatory Information
WHMIS Classification:
Carcinogenicity (CPR 48).
Class D - Division 1 - Poisonous and infectious materials.
DSL:
NDSL:
Additional Information:
Reported cancer hazard.

Section 16 - Other Information

Disclaimer:
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Warranty:
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Supelco, shall not be held liable for any damage resulting from handling or from contact with the above product. Copyright 2005 Supelco. License granted to make unlimited paper copies for internal use only.

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Material Safety Data Sheet Collection

Mercury **MSDS No. 26**

Date of Preparation: 1/77 Revision: D, 6/94

Section 1 - Chemical Product and Company Identification 44

Product/Chemical Name: Mercury
Chemical Formula: Hg
CAS No.: 7439-97-6
Synonyms: colloidal mercury, hydrargyrum, liquid silver, Quicksilver
Derivation: Obtained by roasting cinnabar (mercury sulfide) and purified by distillation, or as a by-product of gold mining.
General Use: Used in agricultural poisons, anti-fouling paint, dental amalgams, mining amalgamation (to remove gold and other metals from ore), thermometers, barometers, dry cell batteries, chlorine and caustic soda production, electrical apparatus, and as a neutron absorber in nuclear power plants.
Vendors: Consult the latest *Chemical Week Buyers' Guide.* (73)

Section 2 - Composition / Information on Ingredients

Mercury, ca 100 %wt

OSHA PEL
Ceiling: 0.1mg/m^3 (vapor and inorganic Hg)
8-hr TWA: 0.05 mg/m^3 (vapor), skin; (Vacated 1989 Final Rule Limit)

ACGIH TLVs
TWA: 0.025 mg/m^3 (inorganic compounds), skin

NIOSH REL
10-hr TWA: 0.05 mg/m^3 (vapor), skin

DFG (Germany) MAK
TWA: 0.01 ppm (0.1 mg/m^3)
Category III: Substances with systemic effects
Onset of Effect: > 2 hr
Half-life: > shift length (strongly cumulative)

Peak Exposure Limit:
0.1 ppm (1 mg/m^3), 30 min. average value, 1/shift

IDLH Level
28 mg/m^3

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Mercury exists as a heavy, odorless, silver-white liquid metal. It is highly toxic by both acute and chronic exposure. Exposure can cause corrosion of the eyes, skin, and respiratory tract and may result in irreversible nervous system damage. It readily forms amalgamations with most metals except iron.

Wilson Risk Scale
R 1
I 4
S 2*
K 1
*Skin absorption

HMIS
H 4*
F 0
R 0
*Chronic effects
PPE†
†Sec. 8

Potential Health Effects

Primary Entry Routes: Inhalation, eye and skin contact/absorption.
Target Organs: Central nervous system, eyes, skin, respiratory system, liver, kidneys.
Acute Effects
Inhalation: Exposure to high vapor concentrations can cause severe respiratory damage. Other symptoms include wakefulness, muscle weakness, anorexia, headache, ringing in the ear, headache, diarrhea, liver changes, fever, gingivitis, chest pain, difficulty breathing, cough, inflammation of the mouth (stomatitis), salivation, bronchitis, and pneumonitis. Acrodynia (pink or Swifts disease), characterized by redness and peeling of the skin on the toes and fingers, was commonly seen in children in the 1950s and is still *infrequently* seen in workers.
Eye: Irritation and corrosion.
Skin: Skin can become severely irritated if allowed to remain in contact with mercury. Skin absorption will occur at 2.2% of the rate of absorption through the lungs.
Ingestion: Mercury generally passes through the digestive tract uneventfully. However, large amounts may get caught up in the intestine and require surgical removal. If an abscess or other perforation is present along the digestive tract, absorption into the blood stream with subsequent mercury poisoning is possible.
Carcinogenicity: IARC, NTP, and OSHA do not list mercury as a carcinogen.
Medical Conditions Aggravated by Long-Term Exposure: Central nervous system disorders.
Chronic Effects: Chronic exposure appears more common than acute and is primarily associated with central nervous system damage which can be permanent (ex. paresthesia of the hands, lips, feet). Early signs of toxicity include weakness, fatigue, anorexia, weight loss, and gastrointestinal disturbances. If exposure levels are high, characteristic tremors of the fingers, eyelids, and lips occur with progression to generalized tremors of the entire body. Psychic disorders are noticeable and characterized by behavior and personality changes, increased excitability, memory loss, insomnia, and depression. In severe cases, delirium and hallucinations may occur. Kidney damage is observed with oliguria (decreased urine output) progressing to anuria (urine cessation) and may require dialysis. The cornea and lens of the eyes may take on a brownish discoloration and the extraocular muscles may be damaged. This syndrome has been termed *Asthenic-Vegetative Syndrome* or *Micromercurialism.* Chronic symptoms occur increasingly with exposures to 0.1 mg/m^3 or higher. *Mutation:* Aneuploidy and other chromosomal aberrations

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have been observed in the lymphocytes from whole blood cultures in workers exposed to mercury. *Reproductive:* Mercury has been detected in stillborn babies of women treated with mercury for syphilis. In a study of six men acutely exposed (occupationally) to mercury levels as high as 44 mg/m^3, all suffered impaired sexual function. Repeated skin contact may cause allergic dermatitis in some individuals.

NOTE: Spilled mercury will release sufficient vapor over time to produce chronic poisoning.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water and then wash exposed area with soap. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. In general, mercury will pass through the digestive tract uneventfully.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: BEI: *blood* (15 µg/L), *urine*: (35 µg/g creatinine). Extremely high urine levels of 0.5 to 0.85 mg Hg/L are indicative of polyneuropathy. 0.4 to 22 µg/L is reported to be the human lethal blood level. Obtain urinalysis including at a minimum: albumin, glucose, and a microscopic examination of centrifuged sediment. Use BAL or 2, 3-dimercaptosuccinic acid as chelators. *Do not* use calcium sodium EDTA because of nephrotoxicity. An electromyograph may determine extent of nerve dysfunction. It has been noted that exposure to mercury may predispose persons to development of carpal tunnel syndrome.

Section 5 - Fire-Fighting Measures

Genium

Flash Point: Nonflammable

Autoignition Temperature: Nonflammable

LEL: None reported.

UEL: None reported.

Extinguishing Media: Use agents suitable for surrounding fire.

Unusual Fire or Explosion Hazards: None reported.

Hazardous Combustion Products: Toxic mercury vapor and mercuric oxide.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.

Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Spill /Leak Procedures: Keep a mercury spill kit readily available in areas where mercury is used. Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind.

Small and Large Spills: Follow instructions on mercury spill kit. Most kits come with an aspiration-driven vacuum trap with a mercury "sweeper" (copper or copper-plated brush). Wash spill area with a dilute calcium sulfide or nitric acid solution. If spill cannot be taken up readily, dust the top of the spill with flowers of sulfur or preferably, calcium polysulfide. This will produce a surface coating of mercury sulfide which will reduce mercury vapor dispersion into the air.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Use appropriate PPE when working with mercury. *Do not* use on porous work surfaces (wood, unsealed concrete, etc.) to prevent spills from lodging in cracks.

Storage Requirements: Store in a cool, dry, well-ventilated area away from heat and incompatibles (Sec. 10). Store on non-porous floors and wash them regularly with a dilute calcium sulfide solution. Because mercury will form amalgamations with most metals except iron, metal shelves should be painted with a sufficiently thick coating to prevent this from happening.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Wherever possible, enclose processes to prevent mercury vapor dispersion into work area.

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.(103)

Administrative Controls: Consider pre-placement and periodic medical exams of exposed workers with emphasis on the skin, eyes, central nervous system, liver, and kidneys.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For ≤ 0.5 mg/m^3, use any chemical cartridge respirator with cartridges providing protection against mercury and equipped with an ESLI (end of service life indicator), any SCBA, or any SAR (supplied-air respirator). For ≤ 1.25 mg/m^3, use any SAR operated in continuous-flow mode, any PAPR (powered, air-purifying respirator) with an ESLI. For ≤ 2.5 mg/m^3, use any SCBA or SAR with a full facepiece, any SAR with a tight-fitting facepiece and operated in continuous-flow mode, or any chemical cartridge respirator with a full facepiece, chemical

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cartridges providing protection against mercury, and equipped with an ESLI. For ≤28 mg/m^3, use any SAR operated in pressure-demand or other positive-pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA with full facepiece and operated in pressure-demand or other positive pressure mode. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets made of butyl rubber, nitrile rubber, fluorocarbon rubber, neoprene rubber, polyvinyl chloride, chlorinated polyethylene, or polycarbonate to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Liquid metal
Appearance and Odor: Silvery-white, odorless
Vapor Pressure: 0.0018 mm Hg at 77 °F (25 °C)
Formula Weight: 200.59
Density (H_2O=1): 13.534 g/cm^3 at 77 °F (25 °C)
Boiling Point: 674.09 °F (356.72 °C)
Freezing Point: -37.97 °F (-38.87 °C)
Viscosity: 15.5 mP at 77 °F (25 °C)
Electrical Resistivity: 95.76 µohm at 68 °F (20 °C)

Water Solubility: 0.28 µmol/L at 77 °F (25 °C)
Other Solubilities: Soluble in boiling sulfuric acid, nitric acid (reacts); slightly in lipids, and 2.7 mg/L in pentane. Insoluble in alcohol, ether, cold sulfuric acid, hydrogen bromide, and hydrogen iodide.
Surface Tension: 484 dyne/cm at 77 °F (25 °C)
Critical Temperature: 2664 °F (1462 °C)
Critical Pressure: 1587 atm

Section 10 - Stability and Reactivity

Stability: Mercury does not tarnish at ordinary temperatures but when heated to near its boiling point, it slowly oxidizes to mercuric oxide.

Polymerization: Hazardous polymerization does not occur.

Chemical Incompatibilities: Mercury forms alloys (amalgamates) with most metals except iron. It is incompatible with oxidizers such as bromine, 3-bromopropyne, methylsilane + oxygen, chlorine, chlorine dioxide, nitric acid, or peroxyformic acid; tetracarbonyl nickel + oxygen, alkynes + silver perchlorate, ethylene oxide, acetylenic compounds (explosive), ammonia (explosive), boron phosphodiiodide, methyl azide, nitromethane, and ground sodium carbide.

Conditions to Avoid: Exposure to high temperatures, metal surfaces or incompatibles.

Hazardous Decomposition Products: Thermal oxidative decomposition of mercury can produce mercuric oxide.

Section 11- Toxicological Information

Toxicity Data:*

Reproductive:
Rat, inhalation: 890 ng/m^3/24 hr for 16 weeks prior to mating had an effect on spermatogenesis.

Acute Dermal Toxicity:
Man, skin, TD_{Lo}: 129 mg/kg for 5 continuous hours caused ringing in the ears, headache, and allergic dermatitis.

Acute Oral Toxicity:
Man, oral, TD_{Lo}: 43 mg/kg caused tremor and jaundice or other liver changes.

Acute Inhalation Effects:
Woman, inhalation, TC_{Lo}: 150 µg/m^3/46 days caused anorexia, diarrhea, and wakefulness.
Man, inhalation, TC_{Lo}: 44300 µg/m^3/8 hr caused muscle weakness, liver changes, and increased body temperature.

Chronic Effects:
Rat, inhalation: 1 mg/m^3/ 24 hr for 5 continuous weeks caused proteinuria.

* See NIOSH, *RTECS* (OV4550000), for additional toxicity data.

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Section 12 - Ecological Information

Ecotoxicity: Catfish, LC_{50} = 0.35 mg/L/96 hr; mollusk (*Modiolus carvalhoi*), LC_{50} = 0.19 ppm/96 hr: tadpole (*Rana hexadactyla*), LC_{50} = 0.051 ppm/96 hr. Mercury is transformed to methyl mercury by bacteria in the environment and undergoes bioaccumulation readily. BCF for freshwater fish = 63,000; for saltwater fish = 10,000; and for marine and freshwater invertebrates = 100,000.

Environmental Degradation: Mercury is expected to volatilize rapidly when deposited on soil surfaces. Once in the air, it can be transported long distances before being redeposited on soil or in water. In water, mercury appears to bind to particulates where it eventually becomes deposited on the bed sediment. In general, mercury entering the environment can be deposited and revolatilized several times.

Section 13 - Disposal Considerations

Disposal: Incineration is *not* an appropriate disposal method. Wastewater may be treated by addition of chlorine to oxidize the mercury to its ionic state. The water can then be passed through an absorbent (an activated charcoal concentrate with a sulfur coating or peanut shell charcoal) to collect the ionic mercury, followed by distillation to recover the mercury. Sodium borohydride, a reducing agent, can be used to precipitate mercury from waste solutions. Bioremediation, using *Pseudomonas putida*, has also been suggested. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: Mercury
Shipping Symbols: A, W
Hazard Class: 8
ID No.: UN2809
Packing Group: III
Label: Corrosive
Special Provisions (172.102): –

Packaging Authorizations
a) Exceptions: 173.164
b) Non-bulk Packaging: 173.164
c) Bulk Packaging: 173.240

Quantity Limitations
a) Passenger, Aircraft, or Railcar: 35 kg
b) Cargo Aircraft Only: 35 kg

Vessel Stowage Requirements
a) Vessel Stowage: B
b) Other: 40, 97

Section 15 - Regulatory Information

EPA Regulations:
Listed as a RCRA Hazardous Waste (40 CFR 261.33): U151
Listed as a CERCLA Hazardous Substance (40 CFR 302.4) per RCRA, Sec. 3001; CWA, Sec. 307(a), CAA, Sec. 112
CERCLA Reportable Quantity (RQ), 1 lb (0.454 kg)
SARA 311/312 Codes: 1, 2
Listed as a SARA Toxic Chemical (40 CFR 372.65)
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed
OSHA Regulations:
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A)

Section 16 - Other Information

References: 73, 103, 124, 132, 136, 148, 149, 159, 167, 176, 187, 189

Prepared By ..... M Gannon, BA
Industrial Hygiene Review ..... RE Langford, PhD, CIH
Medical Review ..... T Thoburn, MD, MPH

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Material Safety Data Sheets Collection:

Sheet No. 713
Lead (Inorganic)

Issued: 8/90

Section 1. Material Identification

32

Lead (Inorganic) (Pb) Description: Exists widely throughout the world in a number of ores. Its main commercial source is galena (lead sulphide). Lead mineral is separated from crude ores by blast-furnace smelting, drossing, or electrolytic refining. Lead is used mostly in manufacturing storage batteries. Other uses are in manufacturing tetraethyllead and both organic and inorganic lead compounds in ceramics, plastics, and electronic devices; in producing ammunition, solder, cable covering, sheet lead, and other metal products (brass, pipes, caulking); in metallurgy; in weights and as ballast; as a chemical intermediate for lead alkyls and pigments; as a constuction material for the tank linings, piping, and equipment used to handle the corrosive gases and liquids used in sulfuric acid manufacturing, petroleum refining, halogenation, sulfonation, extraction, and condensation; and for x-ray and atomic radiation protection.
Other Designations: CAS No. 7439-92-1, lead oxide; lead salts, inorganic; metallic lead; plumbum.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(73) for a suppliers list.

R	0
I	4
S	-
K	0

Genium

HMIS
H 3
F 1
R 0
PPG*

* Sec. 8

Cautions: *Inorganic lead is a potent systemic poison.* Organic lead (for example, tetraethyl lead) has severe, but different, health effects. Occupational lead poisoning is due to inhalation of dust and fumes. Major affected organ systems are the nervous, blood, and reproductive systems, and kidneys. Health impairment or disease may result from a severe acute short- or long-term exposure.

Section 2. Ingredients and Occupational Exposure Limits

Lead (inorganic) fumes and dusts, as Pb, ca 100%

1989 OSHA PELs (Lead, inorganic compounds)
8-hr TWA: 50 µg/m³
Action Level TWA*: 30 µg/m³

29 CFR 1910.1025 Lead Standard
Blood Lead Level: 40 µg/100 g

1989-90 ACGIH TLV (Lead, inorganic, fumes and dusts)
TLV-TWA: 150 µg/m³

1988 NIOSH REL
10-hr TWA: <100 µg/m³

1985-86 Toxicity Data†
Human, inhalation, TC_{Lo}: 10 µg/m³ affects gastrointestinal tract and liver
Human, oral, TD_{Lo}: 450 mg/kg ingested over 6 yr affects peripheral and central nervous systems
Rat, oral, TD_{Lo}: 790 mg/kg affects multigeneration reproduction

* Action level applies to employee exposure without regard to respirator use.
† See NIOSH, *RTECS* (OF7525000), for additional mutative, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 3164 °F (1740 °C)
Melting Point: 621.3 °F (327.4 °C)
Vapor Pressure: 1.77 mm Hg at 1832 °F (1000 °C)
Viscosity: 3.2 cp at 621.3 °F (327.4 °C)
Molecular Weight: 207.20
Specific Gravity (20 °C/4 °C): 11.34
Water Solubility: Relatively insoluble in hot or cold water*

Appearance and Odor: Bluish-white, silvery, gray, very soft metal.

* Lead dissolves more easily at a low pH.

Section 4. Fire and Explosion Data

Flash Point: None reported	**Autoignition Temperature:** None reported	**LEL:** None reported	**UEL:** None reported

Extinguishing Media: Use dry chemical, carbon dioxide, water spray, or foam to extinguish fire.
Unusual Fire or Explosion Hazards: Flammable and moderately explosive in the form of dust when exposed to heat or flame.
Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective equipment. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Lead is stable at room temperature in closed containers under normal storage and handling conditions. It tarnishes on exposure to air. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Mixtures of hydrogen peroxide + trioxane explode on contact with lead. Lead is incompatible with sodium azide, zirconium, disodium acetylide, and oxidants. A violent reaction on ignition may occur with concentrated hydrogen peroxide, chlorine trifluoride, sodium acetylide (with powdered lead), ammonium nitrate (below 200 °C with powdered lead). Lead is attacked by pure water and weak organic acids in the presence of oxygen. Lead is resistant to tap water, hydrofluoric acid, brine, and solvents.
Conditions to Avoid: Rubber gloves containing lead may ignite in nitric acid.
Hazardous Products of Decomposition: Thermal oxidative decomposition of lead can produce highly toxic fumes of lead.

Section 6. Health Hazard Data

Carcinogenicity: Although the NTP and OSHA do not list lead as a carcinogen, the IARC lists it as probably carcinogenic to humans, but having (usually) no human evidence. However, the literature reports instances of lead-induced neoplasms, both benign and malignant, of the kidney and other organs in laboratory rodents. Excessive exposure to lead has resulted in neurologic disorders in infants. Experimental studies show lead has reproductive and teratogenic effects in laboratory animals. Human male and female reproductive effects are also documented.
Summary of Risks: Lead is a potent, systemic poison that affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal (GI) system. The most important way lead enters the body is through inhalation, but it can also be ingested when lead dust or unwashed hands contaminate food, drink, or cigarettes. Much of ingested lead passes through feces without absorption into the body. Adults may absorb only 5 to 15% of ingested lead; children may absorb a much larger fraction. Once in the body, lead enters the bloodstream and circulates to various organs. Lead concentrates and remains in bone for many years. The amount of lead the body stores increases as exposure continues, with possibly cumulative effects. Depending on the dose entering the body, lead can be deadly within several days or affect health after many years. Very high doses can cause brain damage (encephalopathy).
Medical Conditions Aggravated by Exposure: Lead may aggravate nervous system disorders (e.g., epilepsy, neuropathies), kidney diseases, high blood pressure (hypertension), infertility, and anemia. Lead-induced anemia and its effect on blood presssure can aggravate cardiovascular disease.

Continue on next page

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Section 6. Health Hazard Data, *continued*

Target Organs: Blood, central and peripheral nervous systems, kidneys, and gastrointestinal (GI) tract.
Primary Entry Routes: Inhalation, ingestion.
Acute Effects: An acute, short-term dose of lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are rare. Reversible kidney damage can occur from acute exposure, as well as anemia.
Chronic Effects: Symptoms of chronic long-term overexposure include appetite loss, nausea, metallic taste in the mouth, lead line on gingival (gum) tissue, constipation, anxiety, anemia, pallor of the face and the eye grounds, excessive tiredness, weakness, insomnia, headache, nervous irritability, fine tremors, numbness, muscle and joint pain, and colic accompanied by severe abdominal pain. Paralysis of wrist and, less often, ankle extensor muscles may occur after years of increased lead absorption. Kidney disease may also result from chronic overexposure, but few, if any, symptoms appear until severe kidney damage has occurred. Reproductive damage is characterized by decreased sex drive, impotence, and sterility in men; and decreased fertility, abnormal menstrual cycles, and miscarriages in women. Unborn children may suffer neurologic damage or developmental problems due to excessive lead exposure in pregnant women. Lead poisoning's severest result is encephalopathy manifested by severe headache, convulsions, coma, delirium, and possibly death.
FIRST AID
Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.
Skin: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Consult a physician if any health complaints develop.
Inhalation: Remove exposed person to fresh air and support breathing as needed. Consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If large amounts of lead were ingested, induce vomiting with Ipecac syrup. Consult a physician immediately.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Physician's Note: For diagnosis, obtain blood pressure, blood lead level (PbB), zinc protoporphyrin (ZPP), complete blood count for microcytic anemia and basophilic stippling, urinalysis, and blood urea nitrogen (BUN) of creatinine. Examine peripheral motor neuropathy, pallor, and gingival lead line. Use Ca-EDTA to treat poison, but *never* chelate prophylactically. Consult an occupational physician or toxicologist.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel and evacuate all unnecessary personnel immediately. Cleanup personnel should protect against inhalation of dusts or fume and contact with skin or eyes. Avoid creating dusty conditions. Water sprays may be used in large quantities to prevent the formation of dust. Cleanup methods such as vacuuming (with an appropriate filter) or wet mopping minimizes dust dispersion. Scoop the spilled material into closed containers for disposal or reclamation. Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33, Appendix II—EP Toxicity Test Procedures)
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.454 kg) [* per Clean Water Act, Sec. 307(a)]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact. Protective clothing made of man-made fibers and lacking turn-ups, pleats, or pockets retain less dust from lead.
Ventilation: Provide general and local ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[100]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially washing hands before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in tightly closed containers in a cool, dry, well-ventilated area away from all incompatible materials, direct sunlight, and heat and ignition sources.
Engineering Controls: Educate worker about lead's hazards. Follow and inform employees of the lead standard (29 CFR 1910.1025). Avoid inhalation of lead dust and fumes and ingestion of lead. Use only with appropriate personal protective gear and adequate ventilation. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Avoid creating dusty conditions. Segregate and launder contaminated clothing. Take precautions to protect laundry personnel. Practice good personal hygiene and housekeeping procedures. For a variety of reasons, the lead concentration in workroom air may not correlate with the blood lead levels in individuals.
Other Precautions: Provide preplacement and periodic medical examinations which emphasize blood, nervous system, gastrointestinal tract, and kidneys, including a complete blood count and urinalysis. Receive a complete history including previous surgeries and hospitalization, allergies, smoking history, alcohol consumption, proprietary drug intake, and occupational and nonoccupational lead exposure. Maintain records for medical surveillance, airborne exposure monitoring, employee complaints, and physician's written opinions for at least 40 years or duration of employment plus 20 years. Measurement of blood lead level (PbB) and zinc protoporphyrin (ZPP) are useful indicators of your body's lead absorption level. Maintain worker PbBs at or below 40 µg/100 g of whole blood. To minimize adverse reproductive health effects to parents and developing fetus, maintain the PbBs of workers intending to have children below 30 µg/100 g. Elevated PbBs increase your risk of disease, and the longer you have elevated PbBs, the greater your chance of substantial permanent damage.

Transportation Data (49 CFR 172.102)
IMO Shipping Name: Lead compounds, soluble, n.o.s.
IMO Hazard Class: 6.1
ID No.: UN2291
IMO Label: St. Andrews Cross (**X**, Stow away from foodstuffs)
IMDG Packaging Group: III

MSDS Collection **References:** 26, 38, 73, 84, 85, 88, 89, 90, 100, 101, 103, 109, 124, 126, 132, 133, 134, 136, 138, 139, 142, 143
Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** MJ Upfal, MD, MPH; **Edited by:** JR Stuart, MS

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Material Safety Data Sheets Collection:

Sheet No. 296
Arsenic and Compounds

Issued: 4/90

Section 1. Material Identification

Arsenic Description: Obtained from flue dust of copper and lead smelters as white arsenic (arsenic trioxide). Reduction with charcoal and sublimation in an N_2 current yields pure arsenic. Metallic arsenic is used for hardening copper, lead, and alloys; as a doping agent in germanium and silicon solid-state products, special solders, and medicine; and to make gallium arsenide for dipoles and other electronic devices. Arsenic compounds are used in manufacturing certain types of glass; in textile printing, tanning, taxidermy, pharmaceuticals, insecticides and fungicides, pigment production, and antifouling paints; and to control sludge formation in lubricating oils. Arsenic trioxide is the source for 97% of all arsenic products.

Other Designations: CAS No. 7440-38-2; arsen; arsenic black; As; gray arsenic; metallic arsenic.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(73) for a suppliers list.

R	1
I	4
S	2
K	0

Genium

HMIS
H 3
F 2
R 2
PPG*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Arsenic and soluble compounds, as As

OSHA PEL
8-hr TWA: 0.5 mg/m³,* 0.01 mg/m³†

NIOSH REL, 1987
Ceiling: 0.002 mg/m³

ACGIH TLV, 1989-90
TLV-TWA: 0.2 mg/m³

Toxicity Data‡
Man, oral, TD_{Lo}: 76 mg/kg administered intermittently over a 12-year period affects the liver (tumors) and blood (hemorrhage)
Man, oral: 7857 mg/kg administered over 55 years produces gastrointestinal (in the structure or function of the esophagus), blood (hemorrhage), and skin and appendage (dermatitis) changes
Rat, oral, TC_{Lo}: 605 µg/kg administered to a 35-week pregnant rat affects fertility (pre- and post-implantation mortality)

* Organic compounds.
† Inorganic compounds.
‡ See NIOSH, *RTECS* (CG0525000), for additional mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data*

Boiling Point: sublimes at 1134 °F/612 °C
Melting Point: 1497 °F/814 °C
Vapor Pressure: 1 mm at 702 °F/372 °C (sublimes)
Atomic Weight: 74.92
Density: 5.724 at 57 °F/14 °C
Water Solubility: Insoluble†

Appearance and Odor: A brittle, crystalline, silvery to black metalloid. Odorless.

* This data pertains to arsenic only.
† Arsenic is soluble in nitric acid (HNO_3).

Section 4. Fire and Explosion Data

Flash Point: None reported	**Autoignition Temperature:** None reported	**LEL:** None reported	**UEL:** None reported

Extinguishing Media: Use dry chemical, CO_2, water spray, or foam to fight fires.
Unusual Fire or Explosion Hazards: Flammable and slightly explosive in the form of dust when exposed to heat or flame.
Special Fire-fighting Procedures: Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Arsenic is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Arsenic can react vigorously on contact with powerful oxidizers such as bromates, peroxides, chlorates, iodates, lithium, silver nitrate, potassium nitrate, potassium permanganate, and chromium (VI) oxide. This material is also incompatible with halogens, bromine azide, palladium, dirubidium acetylide, zinc, and platinum.
Hazardous Products of Decomposition: Thermal oxidative decomposition of arsenic and its compounds produces irritating or poisonous gases.

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Section 6. Health Hazard Data

Carcinogenicity: The IARC, NTP, and OSHA list arsenic as a human carcinogen (Group 1). This evaluation applies to arsenic and arsenic compounds as a whole, and not necessarily to all individual chemicals within the group. Studies report that both the trivalent and pentavalent compounds are strongly implicated as causes of skin, lung, and lymphatic cancers. Experimental studies have shown that arsenic has tumorigenic and teratogenic effects in laboratory animals.

Summary of Risks: Arsenic compounds are irritants of the skin, mucous membranes, and eyes. The moist mucous membranes are most sensitive to irritation. Prolonged contact results in local hyperemia (blood congestion) and later vesicular or pustular eruption. Epidermal carcinoma is a reported risk of exposure. Peripheral neuropathy (degenerative state of the nervous system) is common after acute or chronic arsenic poisoning. Symptoms include decreased sensation to touch, pinprick, and temperature; loss of vibration sense; and profound muscle weakness and wasting. Other complications of acute and chronic arsenic poisoning are encephalopathy (alterations of brain structure) and toxic delirium.

Medical Conditions Aggravated by Long-Term Exposure: Damage to the liver, nervous, and hematopoietic (responsible for the formation of blood or blood cells in the body) system may be permanent. Pulmonary and lymphatic cancer may also occur.

Target Organs: Liver, kidneys, skin, lungs, lymphatic system

Primary Entry Routes: Inhalation, ingestion of dust and fumes, via skin absorption.

Acute Effects: Acute industrial intoxication is more likely to arise from inhalation of arsine. However, with corrosive arsenical vapors, conjunctivitis, eyelid edema, and even corneal erosion may result. Inhalation may result in nasal irritation with perforation of the septum, cough, chest pain, hoarseness, pharyngitis, and inflammation of the mouth. If ingested, metallic or garlic taste, intense thirst, nausea, vomiting, abdominal pain, diarrhea, and cardiovascular arrhythmias (heartbeat irregularities) may occur. Symptoms generally occur within 30 minutes, but may be delayed for several hours if ingested with food. Acute poisoning may result in acute hemolysis (breakdown of red blood cells)

Chronic Effects: Chronic symptoms include weight loss, hair loss, nausea, and diarrhea alternating with constipation, palmar and plantar hyperkeratoses (thickening of the corneous layer of skin on palms and soles of feet), and skin eruptions, and peripheral neuritis (inflammation of the nerves). Leukemia, bone marrow depression, or aplastic anemia (dysfunctioning of blood-forming organs) may occur after chronic exposure

FIRST AID

Eyes: Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.

Skin: *Quickly* remove contaminated clothing. After rinsing affected skin with flooding amounts of water, wash it with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have a *conscious* person drink 1 to 2 glasses of water, then induce repeated vomiting until vomit is clear.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Physician's Note: If emesis is unsuccessful after two doses of Ipecac, consider gastric lavage. Monitor urine arsenic level. Alkalinization 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.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel of spill, evacuate all unnecessary personnel, remove all heat and ignition sources, and provide adequate ventilation. Cleanup personnel should protect against dust inhalation and contact with skin and eyes. Use nonsparking tools. With a clean shovel scoop material into a clean, dry container and cover. Absorb liquid material with sand or noncombustible inert material and place in disposal containers. Do not release to sewers, drains, or waterways. Follow applicable OSHA regulations (29 CFR 1910.120)

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations*

RCRA Hazardous Waste (40 CFR 261.33): Not listed

Listed as a CERCLA Hazardous Substance† (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.454 kg) [1 per Clean Water Act, Sec. 307(a); per Clean Air Act, Sec. 112]

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

Listed as a SARA Toxic Chemical (40 CFR 372.65)

OSHA Designations‡

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

* Designations for arsenic only.

‡ Listed as arsenic organic compounds (as As).

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

Respirator: Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

Warning: Air-purifying respirators do *not* protect workers in oxygen-deficient atmospheres.

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA PELs, ACGIH TLVs, and NIOSH REL (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[103]

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in closed, properly labeled, containers in a cool, well-ventilated area away from all incompatible materials (Sec. 5) and heat and ignition sources. Protect containers from physical damage.

Engineering Controls: Avoid inhalation or ingestion of dust and fumes, and skin or eye contact. Practice good personal hygiene and housekeeping procedures. Use only with adequate ventilation and appropriate personal protective gear. Institute a respiratory protection program with training, maintenance, inspection, and evaluation. All engineering systems should be of maximum explosion-proof design and electrically grounded and bonded. Provide preplacement and annual physical examination with emphasis on the skin, respiratory system, and blood.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Arsenic, solid
DOT Hazard Class: Poison B
ID No.: UN1558
DOT Label: Poison
DOT Packaging Requirements: 173.366
DOT Packaging Exceptions: 173.364

IMO Shipping Name: Arsenic, metallic
IMO Hazard Class: 6.1
IMO Label: Poison
IMDG Packaging Group: II
ID No.: UN1558

***MSDS Collection* References:** 7, 26, 38, 53, 73, 85, 87, 88, 89, 100, 103, 109, 123, 124, 126, 127, 130, 136, 138

Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** MJ Hardies, MD

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APPENDIX E

COMMUNITY AIR MONITORING PLAN

APPENDIX E

Community Air Monitoring Plan (CAMP)

Overview

A Community Air Monitoring Plan (CAMP) establishes real-time monitoring for designated areas when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses) from potential airborne contaminants as a direct result of work activities that disturb potentially contaminated material. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air. This CAMP provides for asbestos and particulate monitoring.

Community Air Monitoring Plan

Asbestos

In accordance with New York State Department of Labor (NYSDOL)-Asbestos Control Bureau: Industrial Code Rule 56, Asbestos (NYCRR Part 56), a NYSDOL-certified Air Sampling Technician/Project Monitor will provide asbestos project monitoring and required air sampling. Sampling will be conducted in accordance with NCYRR Part 56 and any NYSDOL Engineering Services Unit Approved Site-Specific Variances, sampling is conducted utilizing high volume vacuum pumps with stations established around the perimeter of the work area, but potentially accessible to the general public. Sampling will be conducted in accordance with NIOSH 7400 methodology, analyzed via phase contrast microscopy (PCM) for fiber concentrations in air (note: sampling is not specific for asbestos). Air samples collected on site will be accompanied by proper "chain-of-custody" documentation and submitted to New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-participating laboratory for analysis. Results will be reported in fibers per cubic centimeter of air (f/cc^2). NYCRR Part 56 identifies clearance criteria as results less than 0.01f/cc or background air samples (whichever is greater). In accordance with NYCRR Part 56, samples must be analyzed within forty-eight (48) hours of receipt at the laboratory.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work zone at temporary particulate monitoring stations. Two stations will typically be used. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all soil/waste disturbance work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings will be recorded and will be available for NYSDEC, NYSDOH and County Health personnel to review.

Fugitive Dust and Particulate Monitoring

The following fugitive dust suppression and particulate monitoring measures will be employed during demolition activities:

1. Reasonable fugitive dust suppression techniques will be employed during site activities which may generate fugitive dust;

2. Particulate monitoring will be performed using real-time particulate monitors and will monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

    a) Objects to be measured: Dust, mists or aerosols;

    b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);

    c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;

    d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);

    e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;

    f) Particle Size Range of Maximum Response: 0.1-10;

    g) Total Number of Data Points in Memory: 10,000;

    h) Logged Data: Each data point with average concentration, time/date and data point number;

    i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;

j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;

k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;

l) Operating Temperature: -10 to 50o C (14 to 122o F); and

m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

3. In order to ensure the validity of the fugitive dust measurements performed, there will be appropriate Quality Assurance/Quality Control (QA/QC). QA/QC measures will include: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

4. The action level will be established at 150 ug/m3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level will be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures will include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 6). Should the action level of 150 ug/m3 continue to be exceeded, work will stop and NYSDEC will be notified. The notification will include a description of the control measures implemented to prevent further exceedances.

5. It is recognized that the generation of dust from demolition waste that migrates off-site, has the potential for transporting contaminants off-site. Since there may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques will be employed.

6. The following techniques will be used for controlling the generation and migration of dust during remediation activities, as warranted:

a) Applying water on haul roads;

b) Wetting equipment and excavation faces;

c) Spraying water on buckets during excavation and dumping;

d) Hauling materials in properly tarped containers;

e) Restricting vehicle speeds to 10 mph or less;

f) Covering waste materials after demolition activity ceases; and

g) Reducing the demolition rate and/or the size of the work area.

7. The evaluation of weather conditions is also important for fugitive dust control. When extreme wind conditions make dust control ineffective, remedial actions may need to be suspended.

   Since Building 7 does not contain asbestos, no asbestos monitoring will be necessary. In addition, particulate monitoring for this building will use visual methods only because the building is primarily made of stacked concrete blocks and metal siding that can be removed relatively easily without generating significant dust.