

**Transmission Line Report Addendum No. 1, Rev.01**  
**Additional Investigation of Site Transmission Lines and Test Pit #4**  
**FINAL**

**Building G-1 Deconstruction and Groundwater Investigation**  
**Former Harshaw Chemical Company Site**  
**Cleveland, Ohio**  
**Formerly Utilized Sites Remedial Action Program**

**Contract No. W912P4-07-D-0005**

Prepared by:  
ECC  
110 Fieldcrest Avenue, Ste. 31  
Edison, NJ 08837

**Prepared for:**  
U.S. Army Corps of Engineers Buffalo District  
Buffalo, New York

**St. Engineers®**  
**Buffalo District**  
**BUILDING STRONG®**

March 2016

**TRANSMISSION LINE REPORT ADDENDUM No. 1, Rev. 01**  
**ADDITIONAL INVESTIGATION OF SITE TRANSMISSION LINES AND**  
**TEST PIT #4**  
**BUILDING G-1 DECONSTRUCTION AND GROUNDWATER INVESTIGATION**  
**FORMER HARSHAW CHEMICAL COMPANY SITE**  
**CLEVELAND, OHIO**

This Transmission Line Report Addendum No. 1, Rev. 01 (Addendum) summarizes the findings and activities associated with additional investigations of transmission lines and Test Pit #4 at the Former Harshaw Chemical Company Site (the Harshaw Site). The lines and test pits are in the vicinity of Building G-1. The U.S. Army Corps of Engineers (USACE) Buffalo District is addressing the Harshaw Site under the Formerly Utilized Sites Remedial Action Program (FUSRAP). This Addendum supports the Building G-1 Deconstruction and Groundwater Investigation ECC performed under contract to the USACE Buffalo District (Contract No. W912P4-07-D-0005). ECC submitted the Transmission Line Report (TLR) in support of Building G-1 deconstruction. (ECC. December 2014).

Field activities covered in this Addendum included investigating the source of the water observed upwelling from the Test Pit #4 location. Activities also included verifying that all transmission lines entering the Harshaw Site have been located and terminated, if necessary. Activities associated with transmission line termination involved separating, plugging, grouting and/or backfilling transmission lines and associated valves, manholes/vaults and flanges.

## INTRODUCTION

The information in this Addendum was derived from the following activities:

- Coordinating with local water authorities to confirm the location and status of transmission lines that enter the Harshaw Site.
- Investigating, excavating and backfilling the concrete vault at Test Pit #4.
- Tracing and terminating transmission lines, if required.

The scope of work for these field activities was based on the findings of a previous geophysical survey, a utility location event and a records search of the Harshaw Site's transmission lines, as summarized in the TLR (ECC. December 2014). These activities are a modification to the original project contract scope of work.

ECC conducted these field activities between May 6, 2015 and June 2, 2015. Field activities associated with deconstructing Building G-1, such as groundwater sampling, soil borings and debris removal, were performed concurrently with the activities summarized in this Addendum. A photographic log documenting the field activities associated with this Addendum is included as Attachment 1. Daily Quality Control Reports (DQCRs), which recorded the project-related field activities performed at the Harshaw Site, are included as Attachment 2.

It should be noted that ECC abandoned select portions of the site sanitary and storm sewer systems as part



of Building G-1 deconstruction. In addition, the site owner, BASF Corporation (BASF), has removed more than half of the remaining stormwater conveyances on site and backfilled the trenches with very coarse gravel to cobble-sized limestone that act as stormwater collection and dissipation trenches. Some of the activities from these other project-related tasks are reflected in the DQCRs. However, reports summarizing ECC's work and findings are provided under separate covers.

Figure 1 depicts the following:

- Location of Test Pit #4.
- Approximate location of the 2-inch diameter steel line north of Building G-1.
- Associated utility access vaults, including the fire suppression utility vault along Harvard Avenue where transmission lines were terminated.

### CONFIRMATION OF TRANSMISSION LINE LOCATIONS

To determine transmission line locations, ECC coordinated with both the Cleveland Water Department (CWD) and the owner of the project site, BASF. ECC representatives met with BASF personnel on multiple occasions and acquired Harshaw Site knowledge regarding former service lines and the location of replacement service lines.

The CWD was on site May 12, 2015, to meet with ECC site staff and USACE personnel. The CWD traced and confirmed the water main locations along Harvard Avenue (see Figure 1). One main connection was identified at the southwest corner of the BASF property, where a 6-inch diameter transmission line had previously originated. The 6-inch diameter transmission line had been removed by others. BASF installed a new 2-inch diameter plastic transmission line originating from that connection to its current operating facilities (see photo 1 in Attachment 1).

The CWD confirmed that no transmission lines entering the Harshaw Site originated from Jennings Road, which is west of the Harshaw Site. The CWD confirmed the location of an 8-inch diameter main coming from north of the Harshaw Site, which originated at a 24-inch diameter water main that runs along Denison Avenue (see Figure 1). The 8-inch diameter line was previously terminated by BASF by removing the valve and flange at the utility access vault beneath the Harvard-Denison Bridge. The CWD and field personnel confirmed this termination by physically checking the utility access vault. Figures in the TLR illustrate the records of known water transmission lines but only illustrate the lines originating from Denison Avenue. The CWD described a former historical connection from the 24-inch diameter Denison Avenue supply line into an 8-inch diameter service main to the Harshaw Site (refer to "2<sup>nd</sup> Denison Avenue Main" in Figure 1).

The CWD could not locate or confirm the location of a possible second transmission line west of the vault where the 8-inch diameter main from Denison Avenue was terminated. The CWD suspected this possible second transmission line supplied the 2-inch diameter steel line encountered in the northern portion of the Harshaw Site that connected to Building G-1. When ECC terminated and plugged the 2" steel line on December 2, 2014, it found that the line wasn't under pressure and only standing water remained in the pipe (Photo 2). It was, therefore, considered successfully terminated.

The Harshaw Site's known transmission line connections are illustrated in the water distribution system schematic in Attachment 3. This schematic excludes the 2-inch diameter line encountered north of Building G-1. The schematic is marked up at the locations where CWD and BASF confirmed lines were terminated. It also includes a note regarding the termination of the 6-inch diameter fire suppression service line in the utility access vault along Harvard Avenue that ECC did as part of the May and June 2015 field work described in this report.

This 6-inch diameter fire suppression service line was reported to have been terminated in 2014 (by others) before the start of the Building G-1 deconstruction. However, after inspecting the fire suppression service line utility access vault, it appeared that only the valves for the fire suppression line had been turned off.

The geophysical survey report attached to the TLR describes and illustrates the results of the ground penetrating radar (GPR) and electromagnetic (ER) sweeps to discover subsurface voids and linear features. The geophysical survey was used to confirm the locations of features described in the TLR's record search. Test pits were used to further investigate anomalous areas, especially those surrounding Building G-1, where vaults and linear pipe features may lie.

The geophysical survey was performed in November 2014 and used to guide the test pitting efforts. The excavation of Test Pit #4 revealed features that are germane to this report. The location is illustrated in Figure 1 for reference. Test Pit #4 revealed a concrete vault adjacent to Building G-1. Details of the investigation and backfilling of this concrete vault are described in the next section.

#### TEST PIT #4, VAULT INVESTIGATION

In the fall/winter of 2014, as part of the Building G-1 deconstruction work, ECC excavated test pits along the northern and eastern sides of Building G-1 to confirm the subsurface utility features. ECC performed this work to ensure that it had located and terminated all water supply and sewer lines associated with Building G-1 before starting deconstruction.

Representatives of ECC and the USACE observed water upwelling from the vicinity of Test Pit #4 in January 2015 and speculated that this water may be a contributing factor to the groundwater high located in this area of the site. In the spring of 2015, representatives of ECC and the USACE observed a void forming on the ground surface in the vicinity of Test Pit #4. The USACE determined that an additional investigation was required to verify if there are any previously unidentified/unknown lines along the west property that may feed to the Test Pit #4 area and the vault-like structure.

Further investigation of Test Pit #4 revealed a previously unidentified concrete vault at the location where the observed void and upwelling water was observed (see Photo 3 in Attachment 1). It was initially speculated that the vault may contain an unknown transmission line; however, no transmission lines were discovered.

The photographic log in Attachment 1 provides a record (Photos 4 through 9) of the excavation and dewatering of the vault such that it could be inspected for any existing transmission lines. Investigative excavation of Test Pit #4 began on May 7, 2015. ECC completely excavated the contents of the vault, including a conveyor system and scrap (motors/gears), to allow for a topside inspection on May 11, 2015.

The inspection confirmed the vault was of concrete construction; its dimensions were 23 feet long by 9 feet wide by 12 feet deep. The concrete was in sound condition; there had been no significant deterioration of the walls or floor of the structure. ECC found no water transmission lines in the vault structure and didn't observe any water recharge.

During excavation activities, ECC removed 6,125 gallons of water from the excavation and containerized them in an on-site fractionation tank. The containerized water was characterized and managed in accordance with the Project's Waste Management, Transportation and Disposal Plan.

Per instruction from USACE (see e-mail correspondence in Attachment 4), following the inspection, ECC placed all excavated material and debris back into the vault. ECC personnel used crushed stone to backfill the remaining void; this brought the level of backfill in the vault up to 1.5 feet below subgrade. A layer of geotextile fabric was installed and a 1.5 foot layer of brown clay was placed to minimize surface water infiltration. ECC completed backfilling the vault on May 12, 2015.

The vault was later determined to be a conveyor vault for the fluorspar processing activities that once took place at the site. The vault had been backfilled or partially backfilled and capped with concrete at some unknown date. Surface water and groundwater most likely collected in the structure over time; as the concrete cap deteriorated, it exposed a void below. The upwelling water USACE representatives observed was mostly likely the result of pore pressure within the vault due to the amount of construction activity and heavy construction traffic in the area at the time.

#### TRACING, TERMINATION, AND REMOVAL OF TRANSMISSION LINES

ECC trenched and terminated all known transmission lines that entered and exited Building G-1 as part of the original contract scope and documented such activities in the TLR dated December 2014. Upwelling water observed at Test Pit #4 on January 28, 2015, raised concerns that an unknown transmission line may exist in the area. ECC utilized Grumman Exploration services on May 6, 2015 and May 7, 2015, to provide additional on-site geophysics that would indicate the locations of utilities and candidate locations for additional exploratory test-pitting and trenching to trace any potential transmission lines. The Grumman Supplemental Geophysics Survey Report is included as Attachment 5. These geophysical efforts confirmed that all transmission lines entering Building G-1 had been terminated. These efforts also revealed that the 2-inch diameter steel pipe terminated along the northern edge of Building G-1's slab extended northward. The geophysics and trenching efforts conducted by ECC confirmed the presence of the terminated 8-inch diameter transmission line on the eastern side of Building G-1; ECC also confirmed the location of the utility vault (shown as M-17 on Attachment 3). All excavated soils were placed back into the excavation area and proper decontamination was completed as per approved Project work plans.

The 2-inch diameter steel supply line was the only transmission line encountered on the north side of Building G-1. All other transmission lines originated elsewhere. ECC conducted exploratory trenching / test pitting of the 2-inch diameter plastic water line beginning on May 28, 2015 and concluded May 29, 2015. This effort began on the south side of the Project site along Harvard Avenue and proceeding north towards Building G-1 to verify the 2" water line installed by others was intact and connected to the original 6-inch tap off the city water line (Photos 1, 10, 11 and 12). This line ends at the BASF operated groundwater treatment unit. Several test pits were completed with the last one documented in Photo 12, located between

the Boiler House and Foundry.

Based on the information obtained from BASF and the CWD, ECC determined that the only transmission line that remained uncertain as to its termination status was the 8-inch diameter fire suppression supply line, which entered the site from Harvard Avenue, at the southwest corner of the “warehouse” building (see Figure 1). ECC observed that the two valves in the vault to this line had been shut off; it could not verify that the valves didn’t leak, or if the line was still active. Blind flanges were subsequently installed to terminate this line.

Work proceeded on June 1, 2015 and June 2, 2015. It involved pumping out the vault, performing a confined space entry to remove a portion of the line, and installing two 8” diameter steel blind flanges. The removed portion of the line was left inside the vault. The existing water inside the vault was determined to be chlorinated drinking water (verified by CWD); it appeared to be originating from an adjacent leaking fire hydrant. The water was discharged to a storm sewer located on Harvard Avenue, which was authorized by the CWD. Photos 13, 14 and 15 in Attachment 1 detail portions of this work. The confined space entry permits for the two days of work are provided in Attachment 6.

#### SUMMARY OF FINDINGS

This additional investigation of the Site’s transmission lines resulted in the following findings:

- The only physical transmission line termination work that occurred as part of this additional scope was the termination of the 8-inch diameter fire suppression supply line within the utility vault along Harvard Avenue.
- Trenching and tracing of the water supply lines only occurred south of Building G-1; this traced the aforementioned 2-inch diameter plastic water supply line installed by others which services the BASF Water treatment facility.
- There were no transmission lines found in the vault structure at Test Pit #4; there was no evidence of water recharge within the structure before backfilling.

## **FIGURE**

Figure 1      Site Layout

## **ATTACHMENTS**

Attachment 1      *Field Work Photographic Log*

Attachment 2      *Daily Quality Control Reports*

Attachment 3      *Water Distribution System Diagram and Termination Locations*

Attachment 4      *May 11, 2015, USACE Email Correspondence*

Attachment 5      *Grumman Supplemental Geophysical Survey*

Attachment 6      *Confined Space Entry Permits*

**FIGURE**



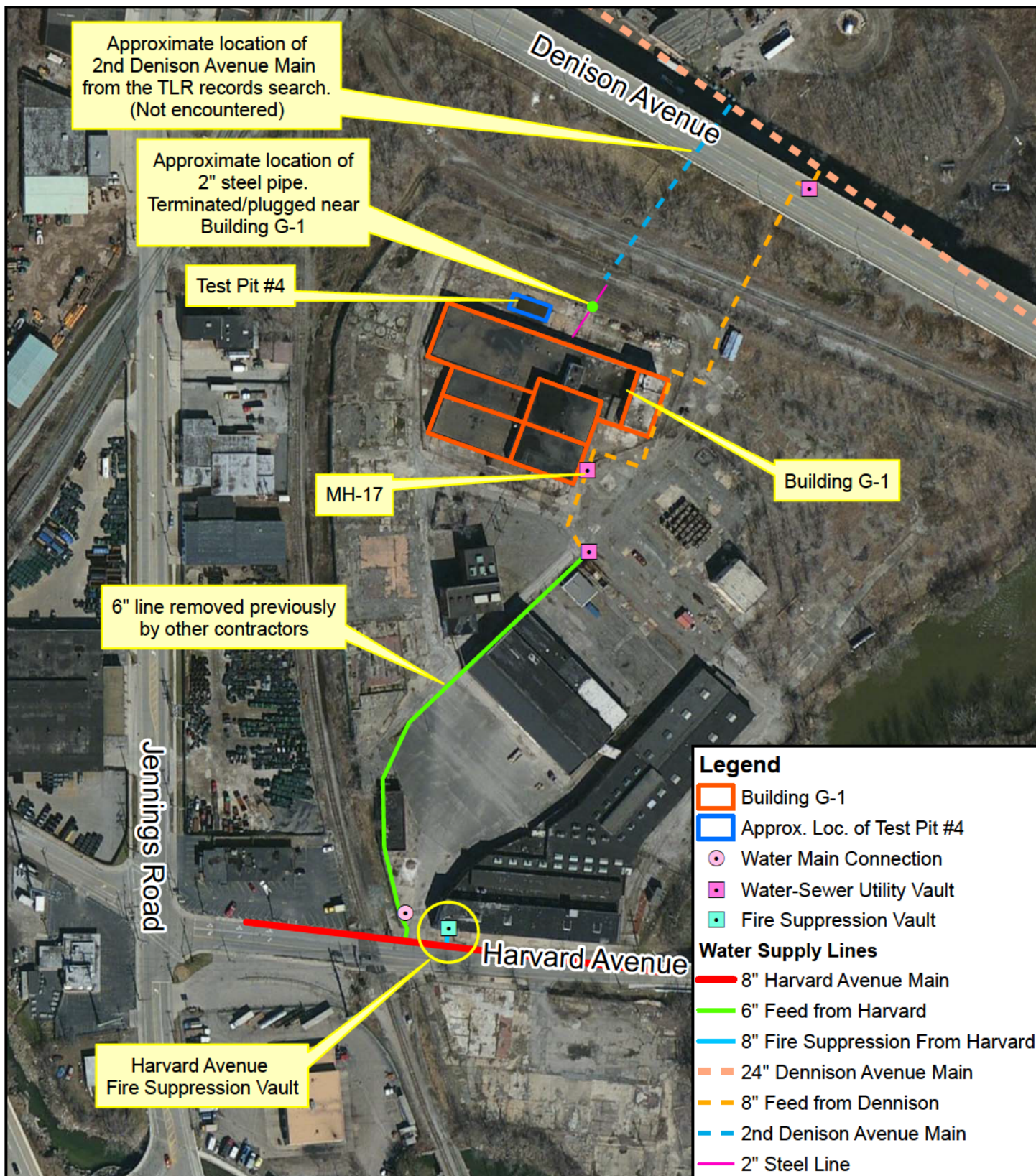


Figure 1  
Location of Known Harvard Ave Transmission Lines and Test Pit #4

Further Investigation of Site Water Lines and Test Pit #4  
Addendum,  
Building G-1 Deconstruction and Groundwater Investigation  
Cleveland, Ohio



1 inch = 200 feet

Projection/Coordinate System:  
UTM Z17N, WGS84



0 100 200 400  
Feet

## **Attachment 1**

### ***Field Work Photographic Log***



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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2014: View of water main connection (shut off valve) at Harvard Avenue where the water enters the Site from the municipal source. Photo shows the new water main connection made by BASF, after the old transmission line was removed.



## **Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log**

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12/2/2014: This photo is of the 2" steel water line terminated on the north side of Building G-1. The line appeared to run northward towards Denison Avenue. The line was left in place after termination. This was terminated prior to the start of the Building G-1 deconstruction work.

## **Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log**

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1/28/2015: Photo of the upwelling water above the Test Pit #4 area prior to excavation.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/07/2015: Excavation and dewatering of Test Pit #4.



## **Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log**

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05/08/2015: Removal of debris from the vault structure found in Test Pit #4.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/08/2015: Photo of accumulated debris removed from vault.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/11/2015: Dewatering of vault and additional debris removal.



## **Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log**

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05/11/2015: Photo of vault with contents removed.



## **Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log**

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05/11/2015: Progress on the backfilling of the vault at Test Pit #4.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/26/2015: Test pit activities conducted in the southwest portion of the Site to locate the 2" plastic water line.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/26/2015: Continued tracing/trenching of the 2" plastic waterline.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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05/28/2015: Continued investigation of the 2" water line that runs to the BASF water treatment facility.  
Photo of pipe located between Boiler House and Foundry.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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06/01/2015: Water line utility vault for fire-suppression lines located along Harvard Avenue. Confined space permit required for entry to terminate fire suppression lines to the site. Vault was dewatered prior to entry.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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06/01/2015: Entry into confined space to perform the inspection and termination of the fire suppression transmission lines.



## Additional Investigation of Site Transmission Lines and Test Pit #4 – Photographic Log

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06/02/2015: Continued termination of fire suppression lines. Blank flanges installed and all sections of removed pipe / valves were left in the vault.

## **Attachment 2**

### ***Daily Quality Control Reports***



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 272 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 06 May 2015 - Wednesday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 51 °F, Max 57 °F; 0.19 IN Precipitation; 4 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL, Grumman Exploration.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafix supports geoprobe soil borings. Outgoing survey performed on truck scales and shack next to truck scales. Incoming survey performed on geophysical equipment.

Crew complete decontamination of excavator. Workers place fabric and rock North of G-1 slab in areas of crumbled concrete. 6 loads of rock received. Approx 180' x 20' area completed this date.

Brechbuhler Sacles on site to disassemble truck scales.

Gruman Exploration on site to begin geophysical survey in areas South and West of the worksite. Begins work on Southern portion of site along Harvard Avenue.

HGL / TTL collect 9 soil borings (SB-51, SB-53, SB-56, SB-57, SB-55, SB-52, SB-46, SB-42, SB-24).

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)

**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**

**No activities were started or finished today**

**QC REQUIREMENTS**

**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

**No QC Deficiency items were issued today**

**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)

**No contractors had their first or last day on site today**

**LABOR HOURS**

**The following labor hours were Reported today:**

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	1.0	11.0
Gruman Exploration	CONTRACTOR	1.0	8.5
HGL	CONTRACTOR	1.0	9.0
PERMA FIX	CONTRACTOR	3.0	29.0
Renuke	CONTRACTOR	2.0	17.0

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
272 Page 2 of 2

DATE  
06 May 2015 - Wednesday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

TTL CONTRACTOR

Total hours worked to date: 11,150.8

	2.0	18.0
Total	10.0	92.5

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,585.00		Total 0.00	32.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION

On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC

DATE  
5-7-15

SUPERINTENDENT'S INITIALS

DATE  
5-7-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 273 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 07 May 2015 - Thursday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 52 °F, Max 73 °F; No Precipitation; 3 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL, Grumman Exploration.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafix supports geoprobe soil borings. Outgoing survey performed on excavator. Weekly survey of support zone and equipment performed.

ECC/ Renuke crew removes silt fence along northern portion of work site. Silt fence placed in lined super sack due to potential of coming in contact with contaminated soil.

ECC removes lid from Test Pit 04 vault. Vault is assessed as conditions are unknown. Workers pump approx 2805 gallons of water from vault to see if vault recharges over night.

Gruman Exploration completes geophysical survey in areas South and West of the worksite.

HGL / TTL collect 9 soil borings (SB-13, SB-16, SB-10, SB-08, SB-02, SB-04, SB-07, SB-11, SB-01).

OEPA on site this date.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)

**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**

**No activities were started or finished today**

**QC REQUIREMENTS**

**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

**No QC Deficiency items were issued today**

**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)

**No contractors had their first or last day on site today**

**LABOR HOURS**

**The following labor hours were Reported today:**

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	1.0	10.5
Gruman Exploration	CONTRACTOR	1.0	8.0
HGL	CONTRACTOR	1.0	8.5
PERMA FIX	CONTRACTOR	3.0	28.0

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
273 Page 2 of 2

DATE  
07 May 2015 - Thursday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

Renuke	CONTRACTOR	2.0	17.0
TTL	CONTRACTOR	2.0	17.0
Total hours worked to date:	11,239.8	Total	10.0 89.0

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date:	3,617.00	Total	0.00 32.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

5-8-15

SUPERINTENDENT'S INITIALS

DATE

5-8-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 274 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 08 May 2015 - Friday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 68 °F, Max 82 °F; No Precipitation; 9 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafex supports geoprobe soil borings. Workers perform outgoing survey of dust track perimeter air monitors. Workers grid out remainder of G-1 grid.

ECC discharges remaining water under discharge permit. 2-393. (Approx. 165 gallons)

ECC performs additional investigation work along Test Pit 4. Vault size is estimated to be 23' x 9' x 10'. A conveyor system is removed from vault and a concrete floor is discovered in the bottom. A sediment layer covers the bottom. Crew pump and additional 2188 gallons of water from vault. Water is contained in frac tank for future profile sampling.

Brechtbuhler Scale on site to pick up scale. Workers lift scale components with Link Belt Crane. Components are loaded on flatbed truck and transported off site. Permafex and USACE inspect crane prior to use. Crane certs and inspection documented and to be posted on project portal.

HGL / TTL collect 2 soil borings (SB-6, SB-5 and begin SB-36).

OEPA on site this date.

<b>PREP/INITIAL DATES</b> (Preparatory and initial dates held and advance notice) <b>No preparatory or initial inspections were held today</b>
<b>ACTIVITY START/FINISH</b> <b>No activities were started or finished today</b>
<b>QC REQUIREMENTS</b> <b>No QC requirements were completed today</b>
<b>QA/QC DEFICIENCY</b> (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected) <b>No QC Deficiency items were issued today</b> <b>No Deficiency items were corrected today</b>
<b>CONTRACTORS ON SITE</b> (Report first and/or last day contractors were on site) <b>No contractors had their first or last day on site today</b>

**LABOR HOURS**

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	1.0	8.0
Gruman Exploration	CONTRACTOR	1.0	8.0

<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 274 <span style="float: right;">Page 2 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 08 May 2015 - Friday	
CONTRACT NUMBER W912P4-07-D-0005 0005			

HGL	CONTRACTOR	1.0	8.5
PERMA FIX	CONTRACTOR	3.0	28.0
Renuke	CONTRACTOR	2.0	17.0
TTL	CONTRACTOR	2.0	17.0
Total hours worked to date: 11,326.3		Total	10.0      86.5

**EQUIPMENT HOURS**  

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,649.00		Total	0.00      32.00

**ACCIDENT REPORTING** (Describe accidents)  
 No accidents reported today

CONTRACTOR CERTIFICATION	On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.
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QC REPRESENTATIVE'S SIGNATURE <div style="background-color: black; width: 150px; height: 20px; margin-top: 5px;"></div>	DATE 5-11-15	SUPERINTENDENT'S INITIALS <div style="background-color: black; width: 100px; height: 20px; margin-top: 5px;"></div>	DATE 5-11-15
--	-----------------	--	-----------------



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 277 <div style="text-align: right;">Page 1 of 2</div>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 11 May 2015 - Monday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 64 °F, Max 88 °F; 0.86 IN Precipitation; 10 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafix supports geoprobe soil borings.

ECC performs additional investigation work along Test Pit 4. Crew pump and additional 800 gallons of water from vault. Vault sediment is removed and placed within a rock lined berm. Size of vault is confirmed to be 23' x 9' x 12'. Vault conditions are documented by ECC and USACE. Following documentation and internal discussion, USACE authorizes backfill. ECC places removed material from vault back inside vault as discussed in work plan. Material is placed in layers and compacted with excavator bucket to prevent settling. 3 loads of rock with rock are added and mixed with the material to stabilize it and fill remaining voids. Brown clay will seal the top of the material.

HGL / TTL collect 2 soil borings (SB-36 is completed, SB-38 is started and completed).

USACE gives guidance on non-impacted straw bales used for erosion control. ECC is to acquire letter of acceptance from facility where straw bales will be accepted. Should letter not be obtained, straw bales to go to US Ecology.

ECC, USACE and Geosyntec (Jim Culp) walk along Harvard Ave. to review the water lines entering the site. Geosyntec shows ECC and USACE location of water treatment discharge line and water main. To Geosyntec's knowledge, no other lines enter the site. Line on north side had been terminated. No additional lines West or Sout. (River is on East) The fire suppression line was turned off.

<b>PREP/INITIAL DATES</b> (Preparatory and initial dates held and advance notice) <b>No preparatory or initial inspections were held today</b>												
<b>ACTIVITY START/FINISH</b> <b>No activities were started or finished today</b>												
<b>QC REQUIREMENTS</b> <b>No QC requirements were completed today</b>												
<b>QA/QC DEFICIENCY</b> (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected) <b>No QC Deficiency items were issued today</b> <b>No Deficiency items were corrected today</b>												
<b>CONTRACTORS ON SITE</b> (Report first and/or last day contractors were on site) <b>No contractors had their first or last day on site today</b>												
<b>LABOR HOURS</b> <div style="margin-top: 10px;"> <p>The following labor hours were Reported today:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Employer</th> <th style="text-align: left; border-bottom: 1px solid black;">Labor Classification</th> <th style="text-align: right; border-bottom: 1px solid black;">Number of Employees</th> <th style="text-align: right; border-bottom: 1px solid black;">Hours Worked</th> </tr> </thead> <tbody> <tr> <td>ECC</td> <td>CONTRACTOR</td> <td style="text-align: right;">2.0</td> <td style="text-align: right;">23.0</td> </tr> <tr> <td>HGL</td> <td>CONTRACTOR</td> <td style="text-align: right;">1.0</td> <td style="text-align: right;">7.0</td> </tr> </tbody> </table> </div>	Employer	Labor Classification	Number of Employees	Hours Worked	ECC	CONTRACTOR	2.0	23.0	HGL	CONTRACTOR	1.0	7.0
Employer	Labor Classification	Number of Employees	Hours Worked									
ECC	CONTRACTOR	2.0	23.0									
HGL	CONTRACTOR	1.0	7.0									

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
277 Page 2 of 2

DATE  
11 May 2015 - Monday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

PERMA FIX	CONTRACTOR	3.0	33.0
Renuke	CONTRACTOR	2.0	17.0
TTL	CONTRACTOR	2.0	16.0
Total hours worked to date: 11,422.3		Total 10.0	96.0

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,681.00		Total 0.00	32.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE  
5-12-15

SUPERINTENDENT'S INITIALS

DATE  
5-12-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 278 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 12 May 2015 - Tuesday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 53 °F, Max 68 °F; No Precipitation; 16 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafix supports geoprobe soil borings. Workers screen control point contents. Conex box used for control point pressure washed and surveyed.

ECC / Renuke add brown clay to top of test pit 4. Workers place approx 180' x20' of fabric and rock along the pad N of the G-1 slab. Crew also place approx. 20' x 40' along the area east of the G-1 slab that had high soil readings. (readings based on initial gamma walk over)

HGL / TTL install two remaining monitoring wells on G-1 slab. (IA03-TW-0005 and IA03-TW-0006) Highest RAD levels of project documented in this phase of work. Levels were expected and proper controls were in place. Equipment used will be properly decontaminated prior to use elsewhere.

ECC, USACE and Cleveland Water Department meet and walk along Harvard Ave. to review the water lines entering the site. City of Cleveland explain that water main terminates at fire hydrant. The City has plans to cap the line up gradient from hydrant. Date of termination undetermined. City of Cleveland confirm that only two water lines enter the site. One on the north side beneath Harvard Denison Bridge and one on the south side near the Harvard site entrance. No lines enter along the railroad right of way. ECC requested documentation. ECC and USACE confirm the North water main termination based on what The City of Cleveland described. (Blocked at hot box under bridge) Photos were taken of the water line termination on the north side of the site.

<b>PREP/INITIAL DATES</b> (Preparatory and initial dates held and advance notice) <b>No preparatory or initial inspections were held today</b>												
<b>ACTIVITY START/FINISH</b> <b>No activities were started or finished today</b>												
<b>QC REQUIREMENTS</b> <b>No QC requirements were completed today</b>												
<b>QA/QC DEFICIENCY</b> (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected) <b>No QC Deficiency items were issued today</b> <b>No Deficiency items were corrected today</b>												
<b>CONTRACTORS ON SITE</b> (Report first and/or last day contractors were on site) <b>No contractors had their first or last day on site today</b>												
<b>LABOR HOURS</b> The following labor hours were Reported today: <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Employer</th> <th style="text-align: left;">Labor Classification</th> <th style="text-align: right;">Number of Employees</th> <th style="text-align: right;">Hours Worked</th> </tr> </thead> <tbody> <tr> <td>ECC</td> <td>CONTRACTOR</td> <td style="text-align: right;">2.0</td> <td style="text-align: right;">21.0</td> </tr> <tr> <td>HGL</td> <td>CONTRACTOR</td> <td style="text-align: right;">1.0</td> <td style="text-align: right;">9.0</td> </tr> </tbody> </table>	Employer	Labor Classification	Number of Employees	Hours Worked	ECC	CONTRACTOR	2.0	21.0	HGL	CONTRACTOR	1.0	9.0
Employer	Labor Classification	Number of Employees	Hours Worked									
ECC	CONTRACTOR	2.0	21.0									
HGL	CONTRACTOR	1.0	9.0									

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
278 Page 2 of 2

DATE  
12 May 2015 - Tuesday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

PERMA FIX	CONTRACTOR	3.0	29.5
Renuke	CONTRACTOR	2.0	17.0
TTL	CONTRACTOR	2.0	17.0
Total hours worked to date: 11,515.8		<u>Total</u>	<u>10.0</u> <u>93.5</u>

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,713.00		<u>Total</u>	<u>0.00</u> <u>32.00</u>

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION      On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

5-13-15

SUPERINTENDENT'S INITIALS

DATE

5-13-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 279 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 13 May 2015 - Wednesday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 46 °F, Max 53 °F; No Precipitation; 12 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-Fix, Renuke, HGL, TTL.

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers perform daily air sample walk down and control point survey. Permafix supports geoprobe soil borings. Crew perform weekly survey of support zone and equipment. Workers screen straw bales used for erosion control. Non impacted bales staged in designated pile. Impacted bales staged in secondary pile. Steel road plates surveyed. Walkover survey completed on pad north of G-1 slab.

ECC / Renuke place rock and fabric on pad north of G-1 slab. Place material in a 50' x 20' section and 80' x 50' section, approximately. Remaining rock is also placed over the elevated soil east of the G-1 slab. Renuke decontaminates pad around monitoring well locations. By close of day, pad is ready to confirm clean with smear samples.

HGL / TTL spend morning decontaminating equipment. In the afternoon SB-43 is collected.

OEPA on site this date.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)  
**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**  
**No activities were started or finished today**

**QC REQUIREMENTS**  
**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)  
**No QC Deficiency items were issued today**  
**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)  
**No contractors had their first or last day on site today**

**LABOR HOURS**

**The following labor hours were Reported today:**

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	2.0	21.0
HGL	CONTRACTOR	1.0	9.0
PERMA FIX	CONTRACTOR	3.0	29.0
Renuke	CONTRACTOR	2.0	17.0
TTL	CONTRACTOR	2.0	17.0
Total hours worked to date: 11,608.8		Total 10.0	93.0

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
279 Page 2 of 2

DATE  
13 May 2015 - Wednesday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
160134	Off Road Drill Rig	0.00	0.00
246100147	PC-200	0.00	8.00
7822	Geoprobe	0.00	8.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,745.00		Total 0.00	32.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

5-14-15

SUPERINTENDENT'S INITIALS

DATE

5-14-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 294 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 28 May 2015 - Thursday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 61 °F, Max 71 °F; No Precipitation; 7 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-fix, HGL

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

ECC conducts weekly progress meeting.

ECC conducts prep phase meeting for Groundwater Sampling.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

ECC begins test pitting as described in contract modification. Workers excavate soils along BASF potable water line. Two test pits excavated this date. Locate 2" HDPE water line and tie in of water line at 6" valve. No leaks found at tie in. There was minimal water in the pipe bedding material, no flow was noted. The former 6" water line was not located in this day's test pits.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers support ECC test pit operation.

HGL develops wells IA03-TW-0005R and G-1-3. Well development complete. Ground wter monitoring to begin June 1st.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)  
**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**  
**No activities were started or finished today**

**QC REQUIREMENTS**  
**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)  
**No QC Deficiency items were issued today**  
**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)  
**No contractors had their first or last day on site today**

**LABOR HOURS**

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	2.0	20.0
HGL	CONTRACTOR	1.0	8.5
PERMA FIX	CONTRACTOR	2.0	20.5
Total hours worked to date:	12,212.3	Total 5.0	49.0

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
294 Page 2 of 2

DATE  
28 May 2015 - Thursday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
240-02-0086	Mini Excavator	0.00	8.00
246100147	PC-200	0.00	0.00
800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total		0.00	24.00

Total operating hours to date: 3,963.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE  
5-29-15

SUPERINTENDENT'S INITIALS

DATE  
5-29-15

<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 295 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 29 May 2015 - Friday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 47 °F, Max 81 °F; No Precipitation; 8 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-fix, HGL

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

ECC continues test pitting as described in contract modification. Workers excavate addition soils along BASF potable water line. Two additional test pits excavated. Find section of former 6" water main in first test pit, pipe has been broken and contains no water inside. Pipe is plugged with concrete and excavation backfilled. 2" HDPE line is located in 2nd test pit, however, no indication of former line is present. Excavation is backfilled. No additional test pitting required per USACE.

ECC complete one punchlist item this date.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers support ECC test pit operation. Workers continue gamma walkover of 15 meter grid and truck haul route.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)  
**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**  
**No activities were started or finished today**

**QC REQUIREMENTS**  
**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)  
**No QC Deficiency items were issued today**  
**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)  
**No contractors had their first or last day on site today**

**LABOR HOURS**

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	2.0	18.5
HGL	CONTRACTOR	0.0	0.0
PERMA FIX	CONTRACTOR	2.0	19.0
Total hours worked to date: 12,249.8		Total 4.0	37.5

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours



**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
295 Page 2 of 2

DATE  
29 May 2015 - Friday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

800-02-7204	4000 Gallon Water Truck	0.00	8.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,979.00		Total	24.00

**ACCIDENT REPORTING** (Describe accidents)  
**No accidents reported today**

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

6-1-15

SUPERINTENDENT'S INITIALS

DATE

6-1-15



<b>CONTRACTORS QUALITY CONTROL REPORT (QCR)</b> <b>DAILY LOG OF CONSTRUCTION</b>		REPORT NUMBER 298 <span style="float: right;">Page 1 of 2</span>	
PROJECT Harshaw Building G-1 Deconstruction		DATE 01 Jun 2015 - Monday	
CONTRACTOR Environmental Chemical Corporation		CONTRACT NUMBER W912P4-07-D-0005 0005	
WEATHER Weather Caused No Delay Temperature Min 48 °F, Max 55 °F; No Precipitation; 14 MPH Wind			

**QC NARRATIVES**

**Prime and Subcontractors on Site**  
 Environmental Chemical Corporation, Perma-fix, HGL

**Work Performed This Date**  
 ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

Heavy weekend rains have cause large pools of standing water to be present on work site.

ECC dewaterers fire suppression vault as part of work outlined in contract modification. Earthlink Environmental arrives and goes through site orientation. Following site orientation, workers begin preparing for confined space entry to install blind flange which will eliminate possibility of water charging former fire suppression lines.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers support ECC test pit operation. Workers support work in fire suppression vault. Workers complete gamma walkover of work site. Final Gamma walkover diagram to be generated and posted on project portal. Results show that no contamination spread as a result of building G-1 deconstruction.

Road plates demobilized from job site. Only two remain to support remaining site operations.

HGL begins groundwater sampling. Attempt to low flow sample G-1-6 and IA03-TW0002R. Both wells recharge slowly and will require bailer sampling. Collect low flow sample from G-1-8. Sample processed and ship to ALS labs.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)

**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**

**No activities were started or finished today**

**QC REQUIREMENTS**

**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

**No QC Deficiency items were issued today**

**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)

**No contractors had their first or last day on site today**

**LABOR HOURS**

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	2.0	22.5
Earthlink	CONTRACTOR	2.0	13.0
HGL	CONTRACTOR	1.0	8.0
PERMA FIX	CONTRACTOR	2.0	19.0
<b>Total</b>		7.0	62.5

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
298 Page 2 of 2

DATE  
01 Jun 2015 - Monday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

Total hours worked to date: 12,312.3

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
246-02-0686	Mini Excavator	0.00	0.00
246100147	PC-200	0.00	0.00
800-02-7204	4000 Gallon Water Truck	0.00	0.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 3,995.00		Total 0.00	8.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION

On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

6-2-15

SUPERINTENDENT'S INITIALS

DATE

6-2-15



**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
299 Page 1 of 2

DATE  
02 Jun 2015 - Tuesday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

CONTRACTOR  
Environmental Chemical Corporation

WEATHER  
Weather Caused No Delay  
Temperature Min 53 °F, Max 61 °F; No Precipitation; 12 MPH Wind

**QC NARRATIVES**

**Prime and Subcontractors on Site**

Environmental Chemical Corporation, Perma-fix, HGL

**Work Performed This Date**

ECC on site to oversee and coordinate work activities.

- 0 loaded intermodals off site to US Ecology.
- 0 end dumps off site to US Ecology
- 0 empty intermodals received.
- 0 intermodals filled.

ECC Earthlink continue removal of pit piping components belonging to the former site fire suppression system. Permafix oversees confined space entry. Flange bolts are cut off and removed. Backflow preventer on city side is removed and blind flanges added to terminate pipe run. Water continues to flow from site side.

ECC begins packing files into file boxes.

Perma-Fix on site to oversee Radiological work activities inside and outside building G1 work area. Workers support ECC test pit operation. Workers support work in fire suppression vault. Workers continue screening of site materials and begin packing up instruments.

200 excavator is demobilized from job site.

HGL continues groundwater sampling. Collect low flow samples from wells G-1-9 and G-1-7.

**PREP/INITIAL DATES** (Preparatory and initial dates held and advance notice)

**No preparatory or initial inspections were held today**

**ACTIVITY START/FINISH**

**No activities were started or finished today**

**QC REQUIREMENTS**

**No QC requirements were completed today**

**QA/QC DEFICIENCY** (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

**No QC Deficiency items were issued today**

**No Deficiency items were corrected today**

**CONTRACTORS ON SITE** (Report first and/or last day contractors were on site)

**No contractors had their first or last day on site today**

**LABOR HOURS**

**The following labor hours were Reported today:**

Employer	Labor Classification	Number of Employees	Hours Worked
ECC	CONTRACTOR	2.0	22.0
Earthlink	CONTRACTOR	2.0	12.0
HGL	CONTRACTOR	1.0	9.0
PERMA FIX	CONTRACTOR	2.0	22.0
Total hours worked to date:	12,377.3	Total 7.0	65.0

**CONTRACTORS QUALITY CONTROL REPORT (QCR)  
DAILY LOG OF CONSTRUCTION**

REPORT NUMBER  
299 Page 2 of 2

DATE  
02 Jun 2015 - Tuesday

PROJECT  
Harshaw Building G-1 Deconstruction

CONTRACT NUMBER  
W912P4-07-D-0005 0005

**EQUIPMENT HOURS**

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
246-02-0686	Mini Excavator	0.00	1.00
246100147	PC-200	0.00	0.00
800-02-7204	4000 Gallon Water Truck	0.00	0.00
RL-1614016	Bobcat skid steer	0.00	8.00
Total operating hours to date: 4,004.00		Total 0.00	9.00

**ACCIDENT REPORTING** (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

QC REPRESENTATIVE'S SIGNATURE

DATE

6-3-15

SUPERINTENDENT'S INITIALS

DATE

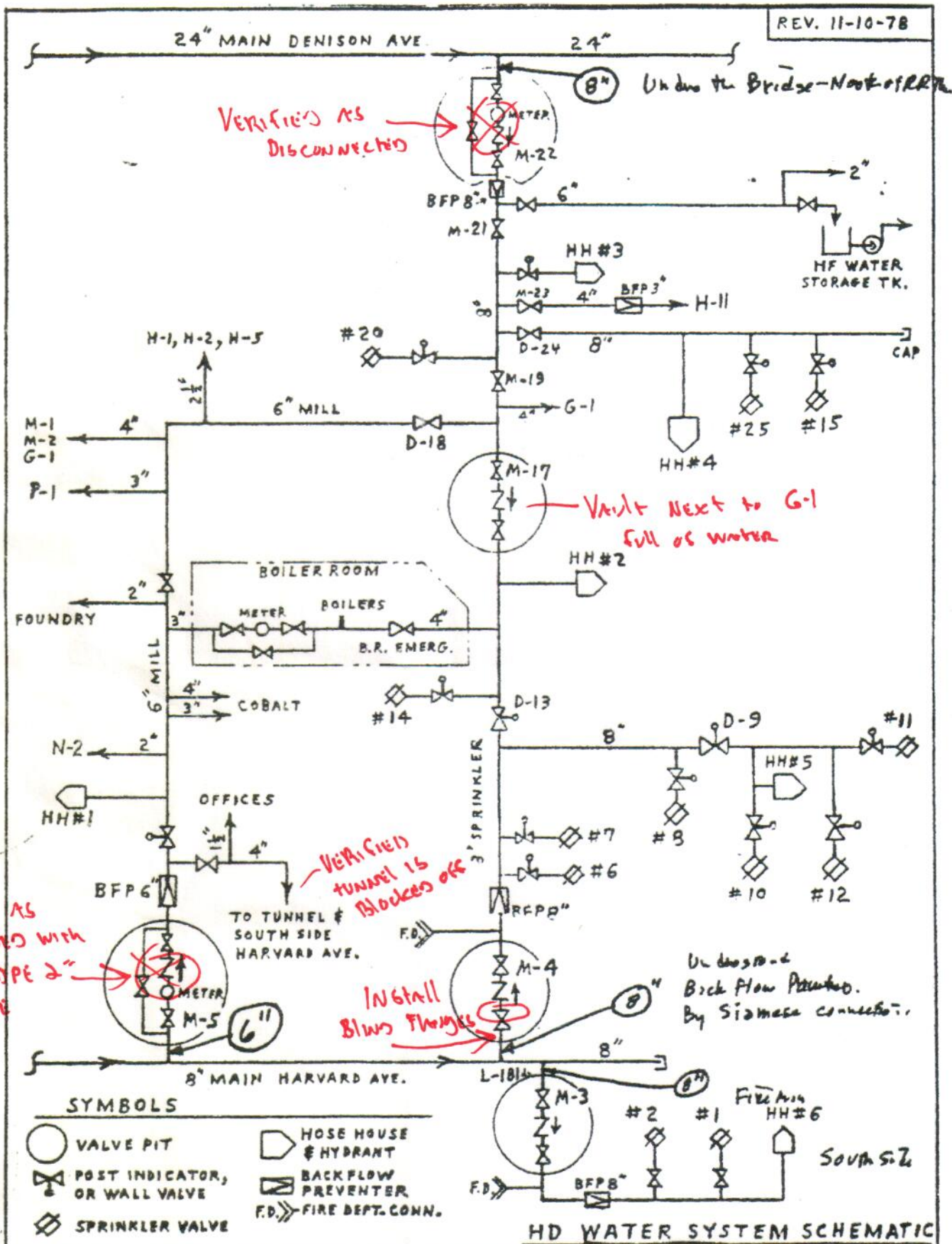
6-3-15



### **Attachment 3**

#### ***Water Distribution System Diagram and Termination Locations***

REV. 11-10-78



HD WATER SYSTEM SCHEMATIC

THE HARSHAW CHEMICAL COMPANY

H.D. PLANT

DIVISION OF KEWANEE OIL CO.

1000 HARVARD AVENUE

CLEVELAND, OHIO

BY	RCP	SKETCH NO.
DEPT.	0405	405-102577



**Attachment 4**

***May 11, 2015, USACE Email Correspondence***

**Alex Scott**

---

**From:** [REDACTED]  
**Sent:** Monday, May 11, 2015 3:42 PM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Re: [EXTERNAL] Harshaw - TP # 4

[REDACTED]  
That sounds right. The clay will be used to cap the top off. We will probably also want to go over the top of the clay with fabric & layer of stone like adjacent area.

HP's : do we have to do anything special with the clay? Gamma walk-over, sample?

[REDACTED]  
----- Original Message -----

**From:** [REDACTED]  
**Sent:** Monday, May 11, 2015 02:02 PM Central Standard Time  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** [EXTERNAL] Harshaw - TP # 4

Afternoon -

I understand we have concluded that no pipes or drains exist based on the attached photo / field observations and we are in the process of backfilling the vault.

Just to confirm, we are placing all the material (steel, gear boxes, deteriorated drums, soil / muck) back into the hole and off site stone will be required to bring the vault back to subgrade and once complete, the onsite "brown clay" will be placed on the surface.

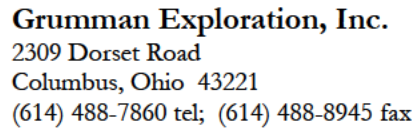
Please confirm this is the path forward.

Thank You.



## **Attachment 5**

### ***Grumman Supplemental Geophysical Survey***



## Non-destructive Subsurface Exploration Near-surface Geophysics

May 18, 2015

ECC

110 Fieldcrest Ave Suite 31  
Edison, NJ, 08837

RE: Report of Supplemental Geophysical Surveys at the Former Harshaw Chemicals Site  
Located at 1000 Harvard Avenue, Cleveland, Ohio; GEI Project No. 01-35031

Dear

Grumman Exploration, Inc. has completed the follow-up geophysical surveys and data analysis for the above referenced project. Grumman Exploration has appreciated this opportunity to be of service to ECC. If you have any questions or comments regarding this report please do not hesitate to contact us.

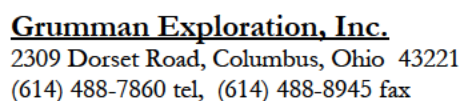
Sincerely,

Grumman Exploration, Inc.

President/Geophysicist

Attachments:

Report of Geophysical Surveys at the Former Harshaw Chemicals Site  
1000 Harvard Avenue, Cleveland, Ohio  
Figures 1 through 5





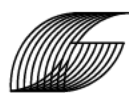
# **Report of Supplemental Geophysical Surveys at the Former Harshaw Chemicals Site 1000 Harvard Avenue Cleveland, Ohio**

## **1.0 Introduction and Summary**

Geophysical surveys using Electromagnetic (EM) Induction Profiling and Ground-penetrating Radar (GPR) scans were performed in supplemental areas along the west side of the former Harshaw Chemicals property located in Cleveland, Ohio. The geophysical surveys augment the previous surveys conducted during the Fall of 2014 which are summarized in a report dated November 25, 2014. A summary of the site conditions and survey objectives is provided in the earlier report. The current round of geophysical surveys were proposed to provide additional information regarding subsurface conditions and potential buried piping along the west and south sides of the Harshaw site.

The objectives of the surveys were to non-destructively investigate subsurface conditions along the west and south sides of the site and, in particular, help assess the presence of undocumented piping that may cross into the property from offsite areas. The investigation area consisted of open and accessible regions on the western edge of the site from Harvard Avenue to the northwest corner of the property, and a narrow strip along Harvard Avenue. This report summarizes the results and interpretations of geophysical surveys performed at this property.

The EM survey identified possible pipe, conduit, trench and/or foundation structures in open asphalt paved areas in the southwest corner of the property. Various shallow pipes and conduits were noted on the GPR records along the Harvard Avenue frontage and in unpaved areas along the west side. Most of the interpreted pipes appear to known utility lines that served the facility. None of the pipes detected can be clearly identified as undocumented water or sewer pipes. Based on the large presence of multiple former buildings and process structures along the west side of the site, there appears to be only a limited number of areas on the west and south sides where undocumented water or sewer lines could enter the property. These include the far southwest corner of the site and corridors between former buildings along the west side. Strong EM and GPR interference effects were observed over the extensive reinforced pavement sections and floor slabs along the west side. The reinforced



**Grumman Exploration, Inc.**  
2309 Dorset Road, Columbus, Ohio 43221  
(614) 488-7860 tel, (614) 488-8945 fax

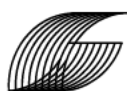
structures and pavement sections, some of which are elevated several feet above the surrounding ground surface, rendered the EM and GPR results inconclusive over these areas. Consequently, the GPR and EM results over areas with extensive reinforced pavement were generally not helpful in providing further characterization of the subsurface in these areas.

## **2.0 Project Overview**

According to information available to ECC, the property located at 1000 Harvard Avenue has long history of commercial usage that extends into the early 20<sup>th</sup> century. Elevated groundwater conditions within the footprint of the former primary Harshaw Chemicals building suggests that an undocumented pipe, such as water or sewer, or other water migration pathway may be contributing to the artificially high groundwater mound. According to ECC, all known water and sewer pipes and other potential pathways have been located, removed or/or plugged, although it is considered possible that an additional undocumented pipe(s) may connect to the building area.

The shallow subsurface along the west and south sides is believed to be comprised by a veneer of demolition debris, remnants of former buildings, pipes, floor slabs, process tank pads/foundations, various waste materials and native soils such as sand and gravel. Specific targets of interest include possible undocumented piping associated with the former Harshaw Chemicals facility operations. The follow-up EM and GPR profiling surveys were chosen to help further explore, characterize and map subsurface conditions in some of the areas not scanning during the Fall of 2014.

The supplemental Harshaw Chemicals geophysical investigation area spanned an approximate 2.5-acre area located along the Harvard Avenue frontage and the west side of the Harshaw property. The overall site is a cluster of former industrial buildings, several of which are undergoing demolition. Other structures and obstructions within the investigation area included storage containers, two project office trailers, a tanker trailer, dumpsters, fences, large sections of reinforced pavement and raised floor slabs, and a large demolition debris pile in the southwest sector. Figure 1 illustrates the overall investigation area, site features and an outline of the limits of the supplemental EM and GPR surveys. Areas along the railroad tracks and west of the property were partially cleared of vegetation by ECC to help accommodate the performance of the geophysical surveys. Cooperation with USACE and ECC help to minimize complications from parked cars, vehicle traffic and material storage although some areas could not be cleared. A description of the EM and GPR methods and its limitations was included in the Fall 2014 survey report. The following paragraphs briefly summarize the methodology and survey parameters used.



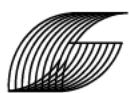


### **3.0 Methods Overview**

#### **EM Induction Profiling**

Frequency-Domain Electromagnetic (FDEM or EM) induction profiling surveys have been used for decades to non-destructively explore, map and characterize subsurface conditions on the basis of different electrical conductivity responses that can occur between natural and man-made materials in the subsurface. The GSSI GEM-300 and EMP-400 induction profiling FDEM instrumentation makes two measurements useful for environmental site investigations: (1) soil electrical conductivity (quadrature-phase) and (2) in-phase (high-conductivity or metal sensitive). Induced EM conductivity is a useful measurement for mapping spatial variations in soil and fill types based on contrasts in electrical conductivity. Low conductivity ( $\sigma$ ) earth materials, such as a sand and gravel ( $\sigma \cong 1$  to 20 mS/m typical), can often be distinguished from higher conductivity silts or clays ( $\sigma \cong 20$  to 70 mS/m). Moisture or water saturation strongly influences a material's conductivity. Many industrial fill types, such as slag, foundry sand, cinders, etc. exhibit elevated EM conductivity levels. The GSSI GEM-300, EMP-400 and similar instrumentation (e.g. Geonics, Ltd. EM-31 and Geophex, Inc. GEM-2) are often used to help define fill, contaminant and excavation boundaries based on differences in electrical conductivity between excavated, filled areas, some high or low conductivity substances, and natural, undisturbed areas. The in-phase measurement is most sensitive to buried metallic objects and can be used to locate and map buried reinforced steel structures, underground storage tanks, 55-gallon barrels, utility lines and other buried metallic structures or highly conductive debris. EM Induction conductivity surveys have been used for decades as a reconnaissance-level environmental site investigation tool.

The EM instrumentation operates using specially configured transmitting and receiving coils. A receiving coil measures the subsurface response to EM eddy currents that are induced in the subsurface by the transmitting coils. The induced EM response provides an estimate of the bulk electrical conductivity of a subsurface region centered below the EM instrument. The depth of exploration depends on the coil orientation, operating frequency, target size and host material and target electrical properties. Lower frequencies will penetrate deeper into the subsurface and the *skin-depth* is often used as a guide to the actual penetration distance. According to GSSI [1998], the skin-depth can be summarized as “the depth at which the power in the original signal drops to a predetermined percentage (usually  $1/e = 36\%$ ) of the power at the surface” for a uniform half-space and without taking any layering into account. Using a skin-depth nomogram provided in GSSI [1998], the estimated exploration depths over a uniform half-space given a conductivity of 100 mS/m for 4,410 Hz, 9810 Hz, and 15,030 Hz are approximately 12.3 m, 10.5 m and 7.0 m, respectively. The GEM-300 allows up to 16 selectable frequency measurements at each survey station that can range from 325 Hz up to 19,975 Hz. Similarly, the lateral resolution of the EM instrumentation will depend in part on the survey station and line spacing, target size, depth and the electrical conductivity of the target and surrounding media. Under normal circumstances it is often difficult to infer accurate target depth estimates from the EM results although some general depth



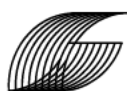
determinations can be made depending on available information regarding site, geologic and target properties. In general, the majority of the EM response is derived from the shallowest 10-ft to 12-ft of the subsurface.

The GEM-300 and EMP-400 instruments are lightweight and portable and require one field operator. The EM response can be monitored in the field, either numerically or graphically, and recorded electronically. The data are easily downloaded to a PC and both data channels (conductivity and in-phase) can be contoured using a commercially available contouring program. The EMP-400 allows a direct connection to a GPS device and can record real-time positioning for the field measurements. The EM conductivity readings are reported as relative units in terms of milli-Siemens/meter (mS/m) and the in-phase in parts-per-million (ppm). The conductivity measurements are considered somewhat relative since no actual calibration location was available on site to corroborate these measurements. The in-phase results are also considered relative and only large deviations (positive or negative) should be considered meaningful for interpreting the presence of metal objects. In the absence of nearby conductive buried objects, the in-phase response should be centered around zero.

Limitations to the use of EM profiling arise from a variety of electrical interference sources that include: ambient electrical noise such as occurs in urban or densely developed areas, thunderstorms and nearby metallic objects at or above the ground surface such as fences, overhead power lines, parked cars, reinforced concrete, metal structures and debris, etc. The presence of various metallic surface obstructions can limit or even preclude any interpretation of the EM data in the vicinity of these obstructions. Areas of a site that may be difficult or impossible to survey include: excessively steep slopes, water covered areas, and densely overgrown, wooded or obstructed areas, and areas with a rough, uneven ground surface.

#### Ground-Penetrating Radar

Ground-Penetrating Radar (GPR) has been used as a site investigation tool for diverse applications for several decades. Ground-Penetrating Radar (GPR) operates by transmitting and receiving microwave electromagnetic impulses. By moving a broadband, dipole antenna across the ground surface, a two-dimensional cross-section representing the subsurface response can be displayed on the GPR system unit in real-time. GPR can be described as a kind of pulse-echo device, not unlike sonar or an acoustic fish-finder. In contrast to these acoustic devices, GPR operates by using electromagnetic impulses that are governed by the principles of electromagnetic wave propagation through the subsurface. Transmitted GPR impulses propagate downward through the subsurface, reflect off buried target boundaries and return to the receiver antenna. Contrasts in the electrical properties of a target will cause some of the GPR signal to reflect back toward the ground surface. Interfaces between electrically distinctive materials such as sand and clay, backfill and steel, concrete and soil, and even the water table can be detected using GPR under favorable survey conditions.





Important limitations to the performance of GPR include difficulty detecting deeply buried and small targets, and penetrating dense or multi-layered reinforced or conductive pavement sections. The most commonly encountered limitation for GPR is the presence of clay or highly conductive industrial fill in the shallow subsurface. Moist clay, silty clay, weathered shale, mud, standing water, and/or other electrically conductive fill materials (e.g. slag, foundry sand, cinders, salt, etc.) can severely increase GPR signal attenuation, and thus reduce the signal penetration. The presence of any of these conditions may restrict or even preclude the effective penetration of the GPR signal beyond a few feet. The most significant limitation for GPR at this site was the heavily reinforced concrete pavement and floor slabs.

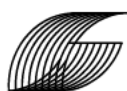
#### **4.0      Field and Data Analysis Procedures**

Grumman Exploration, Inc. conducted the follow-up EM Induction profiling and GPR surveys at the Former Harshaw Chemicals Site on May 5 and 6, 2015. Figure 1 illustrates the existing site conditions and summarizes the EM and GPR survey findings. Figure 2 presents the EM Induction survey results for the southwestern sector of the site, which was the only area where a gridded EM profiling survey could be performed over a significantly large area. Figure 3 shows a diagram and GPR results for the narrow Harvard Avenue right-of-way (ROW). Figures 4 and 5 illustrate the GPR survey coverage and selected, annotated GPR records for accessible areas along the west side of the investigation area, including outside of the property fence. A local field survey grid was established over the southwest sector of investigation area as specified by representatives of ECC. The local field survey grid was established using the southwest corner of a former process building as the grid origin and the west wall of the building as the survey grid baseline (see Figures 1 and 4).

The field grid was established using fiberglass measuring tapes, metal pin flags and marking paint. Following the field survey, the positions of designated EM and GPR field grids and other site features were measured using a Trimble GeoXH hand-held GPS system with Zephyr antenna. The approximate positions of features including fences, manhole covers, hydrants, valves, utility poles, foundation walls, concrete pads, and previously marked piping alignments where visible, were also recorded with the GPS. The GPS coordinates were used to convert (rotate and translate) the geophysical field grid coordinates to the Ohio North State-Plane geospatial grid.

#### **EM Induction Conductivity Profiling**

The Geophysical Survey Systems, Inc. (GSSI) GEM-300 multi-frequency electromagnetic induction profiling system was used over the southwestern sector and area west of the site fence (RR frontage). Vertical dipole quadrature-phase (proportional to conductivity) and in-phase (metal sensitive) measurements using a single coil alignment. Three survey frequencies were recorded simultaneously at each measurement station. For the GEM-300, the selected



instrument frequencies were: 4,410 Hz[deep], 9,810 Hz [intermediate depth - same as used by the Geonics, Ltd. EM-31 instrumentation], and 15,0303 Hz [shallow].

In the southwest sector of the investigation area, the EM transect spacing was 5-ft. The EM measurement interval was approximately 2.2.-ft. Areas with extensive reinforced floor slabs, pavement and other metal obstructions rendered the EM inconclusive and consequently the west-central and northwest sectors of the site were not scanned using EM profiling. Informal, reconnaissance-level EM scans were conducted along the narrow strip between the site fence and the railroad tracks to the west. The actual coverage in these areas depended on ground surface conditions, obstructions and access. Some wooded or overgrown areas west of the boundary fence were cleared by ECC although some zones remained inaccessible.

The field measurements were recorded electronically within the EM instrument. A "continuous survey" mode was used in the north, northeast and eastern areas. In this survey mode, data are acquired at a fixed time interval while the operator walks along a survey line at a steady pace. In these areas, reference marks at measured distance intervals (50-ft reference lines) were incorporated into the data during acquisition to "fix" the survey transects to known positions on site. A computer program was used later to adjust the station positions with respect to the local coordinate system used on site. The EM responses were informally observed during acquisition and elevated and anomalous responses, if any, were noted.

Following the survey, the data were downloaded onto a laptop computer and prepared for contouring. The EM data were contoured using a commercially available program (Surfer, Golden Software, Inc.). A generalized site diagram was superimposed on the contoured results to help identify the positions of various EM responses and anomalies. The results for the 4,410 and 15,000 Hz measurements were generally similar to that for 9,810 Hz data and as a result contour diagrams for these two frequencies (highest and lowest) are not presented herein.

The units for the EM induction conductivity response are in terms of milli-Siemens per meter (mS/m) and are considered somewhat relative since no actual conductivity calibration location was available on site. The in-phase units are reported in parts per million (ppm). Typically, the relative spatial variation in and the magnitude of the in-phase response are considered the most meaningful parameters for interpretation. The in-phase response is a relative measurement and generally should be centered around zero when not in the vicinity of electrically conductive or metallic objects. Buried conductive metallic objects will tend to induce strong positive conductivity and in-phase responses. However, highly conductive and metallic objects that are located at or close to the ground-surface (less than ~1-ft), generally appear with an erratic, strongly 'negative' in-phase response. Such structures include reinforced pavement and floor slabs and metal plates at the ground surface, examples of which are apparent on Figure 2.

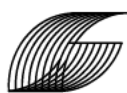




### Ground-Penetrating Radar

The GPR system used was a GSSI SIR-3000 in conjunction with a 400 MHz antenna. The resolution 400 MHz antenna was selected for its enhanced target resolution, low signal attenuation, reasonable depth penetration, and ability to penetrate some reinforced concrete slabs at this site. It is unlikely that a lower frequency would have provided significantly improved depth penetration given the shallow soil/fill conditions and a lower frequency antenna would not be able to penetrate and reinforced pavement sections. In the southwest sector, the GPR scans were performed along 5-ft spaced transects, with 10-ft spaced north south transects. Irregularly spaced GPR scans were used over the Harvard Avenue, west-central and northwest areas where access was more complicated or even impossible in localized areas. GPR scans were not performed on raised former floor or pavement sections where it was unlikely that the GPR signal could penetrate the additional distance created by the elevated structures. The GPR survey was focused on areas of interest to ECC based on historical information and the location of possible undocumented piping entering the site on the west and south sides. 152 GPR records were acquired at the former Harshaw Chemicals Site. Only selected GPR records that illustrate important GPR subsurface responses, conditions or interpretations are presented herein. Figure 4 illustrates the positions of selected west side GPR profiles that are presented on Figures 4 through 5. Informal GPR scans were performed also in some areas on site where formal gridded GPR coverage was not acquired and where interpreted buried piping was marked on the ground surface and recorded using the GPS system.

The time window used was 80 nanoseconds (ns) for the 400 MHz antenna used at this site. Electrical permittivity (dielectric) and conductivity determine the GPR signal depth penetration and attenuation. Only the contrast in permittivities between adjacent materials will cause a GPR reflection to occur. For an assumed electrical permittivity value of 12, the maximum estimated exploration depth range for the 400 MHz antenna would be approximately 8-ft for the 80 ns time window. However, it is unlikely that the 8-ft exploration depth was attained over most of the areas scanned using GPR at this site. The 3-ft to 6-ft depth range may be a more realistic effective exploration depth range for GPR at this site. By assuming an intermediate permittivity value of 12, an estimated depth scale is shown on the GPR transects (Figures 3 through 5). However, the actual depth penetration may vary across the former Harshaw Chemicals site depending on actual electrical properties of the soil and fill. The effective GPR exploration depth will critically depend on the actual permittivity and electrical conductivity levels and distribution thereof in the shallow subsurface on site. Lower permittivity often allows greater depth penetration with reduced signal attenuation, and is considered more favorable for GPR surveys. Lower electrical permittivity is more typical for correspondingly low conductivity materials such as sand, gravel, crushed aggregate, concrete and some rubble/demolition debris. In contrast, materials such as clay, silt and industrial fill such as cinders, slag, fly ash, salts, metal particulates, etc. typically show much higher



permittivity levels which in turn will severely increase signal attenuation and reduce depth penetration. In areas with wet clay or weathered shale or other conductive fill, an effective exploration depth for the 400 MHz antenna may only be on the order of 2-ft to 4-ft, or possibly less. It is more common that a mix of materials with different permittivities occurs in the subsurface at a complex site such as the former Harshaw Chemicals site. In general, it only takes a small fraction of higher permittivity material (e.g. wet clay or slag) to severely diminish GPR signal penetration and increase attenuation. Because it is likely that the soil and fill types vary along the length of a typical GPR transect at this site, the effective exploration depth may also vary. As a result, the depth scale shown on the GPR transects may be unreliable and should be used with caution. GPR signal penetration through reinforced concrete is less certain and may range from no penetration to up to 4-ft feet under favorable circumstances. Strong signal attenuation ('static noise') and antenna 'ringing' effects over reinforced concrete often indicates very poor or even no effective GPR signal penetration.

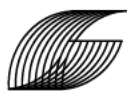
A survey wheel was used to acquire distance-based GPR data at the density of approximately 10.0 GPR traces per foot (~1 trace every inch). The GPR distance wheel was calibrated prior to start of the GPR survey in accordance with manufacturer's instructions. Band-pass filters were applied to all of the GPR records to help reduce extraneous interference. Preliminary interpretations regarding the presence of excavations, pipes and anomalous buried structures and objects were made as the GPR data were acquired. The data were recorded electronically on an internal hard disk in the field and later transferred to a desktop PC computer and a computer workstation for subsequent processing, display and analysis. Although some of the significant GPR features were apparent on the raw GPR field records, supplemental data processing was performed to enhance the interpretation and presentation of these features. The data processing consisted of bandpass filtering and spatial filtering (f-k) to suppress horizontal banding (antenna coupling) within the GPR records.

## **5.0 Results and Interpretations**

The EM and GPR survey results identified possible pipes and buried structures in a few locations on site, although few appear to be associated with undocumented pipes. Figures 1 through 4 summarize GPR and EM results over the west and south side investigation areas. Figures 2, 4 and 5 present GPR transects that were acquired over targeted locations on site. A general summary and interpreted of typical EM and GPR responses at this site can be found in the November 2014 geophysical survey report. The following paragraphs summarize the results of the investigations for targeted areas.

### **Harvard Avenue Frontage (Figure 3)**

The narrow strip along Harvard Avenue appears to be congested with multiple utility lines including water, gas, sewer and communication lines. GPR scans in the vicinity of a water service vault directly south of the southwestern building corner shows several pipes entering





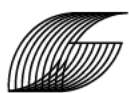
and exiting the vault. It is likely that the water vault connects to the fire hydrant and valves (3 total) located along the Harvard Avenue frontage. However, the GPR records were not able to show whether any of these water lines enter the building (Figure 3). The immediate area closest to the southwest building corner appears to be partially congested with many pipes including gas, communication and water lines.

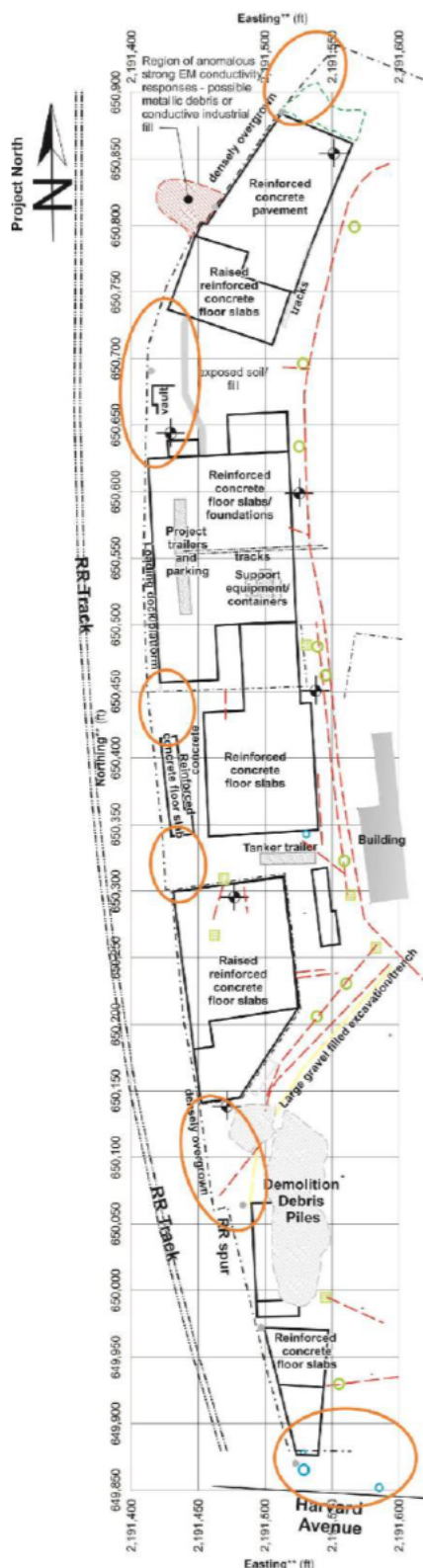
GPR scans show pipes buried within three asphalt patched zones along the Harvard Avenue frontage west of the southwest building corner. The patched areas may represent former pipe repairs. The westernmost of these zones is associated with the fire water valve. The middle-east patched area (~75-ft) appears related to a storm drain pipe that connects to a grate along the Harvard Avenue curb. This storm drain appears to be open and may connect to piping within the building. The purpose of the pipe within the west-central patched area (Figure 3b.1 and 4, near 53-ft) could not be determined, and further investigation or record review may be desired to identify the purpose of this pipe. The use of EM and metal detector scans in this area was prevented by the proximity of the building walls, fencing, guard rail, buried pipes and other interference sources.

GPR scans over the site entrance area, and in particular in the vicinity of a water meter manhole, did not clearly show piping leading from the water meter into the former Harshaw site. However, it is considered possible that a large water line could lead into the property from the water meter but that the pipe(s) are undetectable using GPR. EM scans over this area were inconclusive due to the limited working area and nearby sources of interference (fencing, reinforced concrete pad, railroad signals, other known/marked pipes). The vicinity of the site entrance gate would appear to be a likely location for undocumented piping, such as former water or sewer lines, to enter the property.

#### Southwest Sector and West Side (Figures 2, 4 and 5)

The EM and GPR results over the southwest sector of the property show several linear structures that mostly appear to be associated with sewer and storm drain piping. Several storm/sanitary sewer lines appear to run along the driveways between the former buildings on site, including along the west side of the former boiler house. Both the EM and GPR records show two or more relatively large pipes just south of the former Nickel-Chloride building and southwest of the boiler house. These pipes pass below large debris pipes on site and may exit the property to the southwest near a rail spur visible outside the property fence. GPR and EM scans within the driveway west of the boiler house clear show at least two pipes which are believed to be storm sewer and possibly water piping. Access in the driveway west of the boiler house and former Harshaw Chemicals building was limited by above ground structures, fencing and extensive areas of reinforced concrete. Several pipes, conduits or other linear structures were detected using EM profiling (Figure 2) in the open paved area south/southwest of the boiler house and east of the large demolition debris piles. The purpose(s) of these pipes/linear structures is unclear.





A large proportion of the area along the west side of the property, including west of the boiler house and former Harshaw Chemicals building, is covered by raised former building slabs, process area floors, foundation walls and reinforced concrete pavement. Consequently, EM profiling was not performed over any areas with significant reinforced structures. Targeted GPR scans were performed over the reinforced floor and pavement areas as site conditions allowed. The GPR scans were focused over paved and unpaved corridors between former buildings, which were considered to have the greatest potential for undocumented pipes to enter the site from offsite locations. Note that the combination of elevated floor slabs and reinforced concrete either precluded or severely reduced the chances that GPR could penetrate deep enough into the underlying soil/fill to detect buried pipes below the raised slabs.

The orange circles on the site diagram to the left illustrate zones between former buildings/complexes and other areas where the likelihood of pipes entering the site is considered higher. Specific locales with an apparent greater probability for pipes to enter the site from offsite areas include:

- (1) site entrance area along Harvard Avenue, far southwest corner of property;
- (2) southwest-central area near rail spur, south of former Nickel-Chloride building;
- (3) North of former Nickel-Sulfate complex; and
- (4) Far northwest corner of property, near fence corner.

GPR and EM scans were conducted over all of these zones, although possible pipes were clearly visible only in the far southwest corner and the area south of the former Nickel-Chloride building. The smaller corridors between the Nickel-Chloride building, locker rooms/lunch building and Nickel-Sulfide building were considered as having a lower probability for detecting pipes because of the raised reinforced flooring and foundations within these areas.





For all of these zones, it is possible that buried pipes exist but are undetectable using GPR and EM because of unfavorable soil/fill conditions, reinforced pavement and/or interference effects. Older, more deeply buried pipes, non-conductive plastic, tile or concrete pipes, and/or pipes that are covered with clay or other conductive fill may be less detectable using GPR and EM profiling at this site. Non-metallic pipes (e.g. PVC, fiberglass, HDPE, clay, non-reinforced concrete, etc.) may be virtually undetectable using EM or GPR unless they are very shallow or can be detected through a response caused by the trench backfill. Further review of existing utility drawings for these areas and possibly exploratory test pits may be desired to document the presence or absence of possible pipes or buried structures.

#### West of Property Fence (Figure 4)

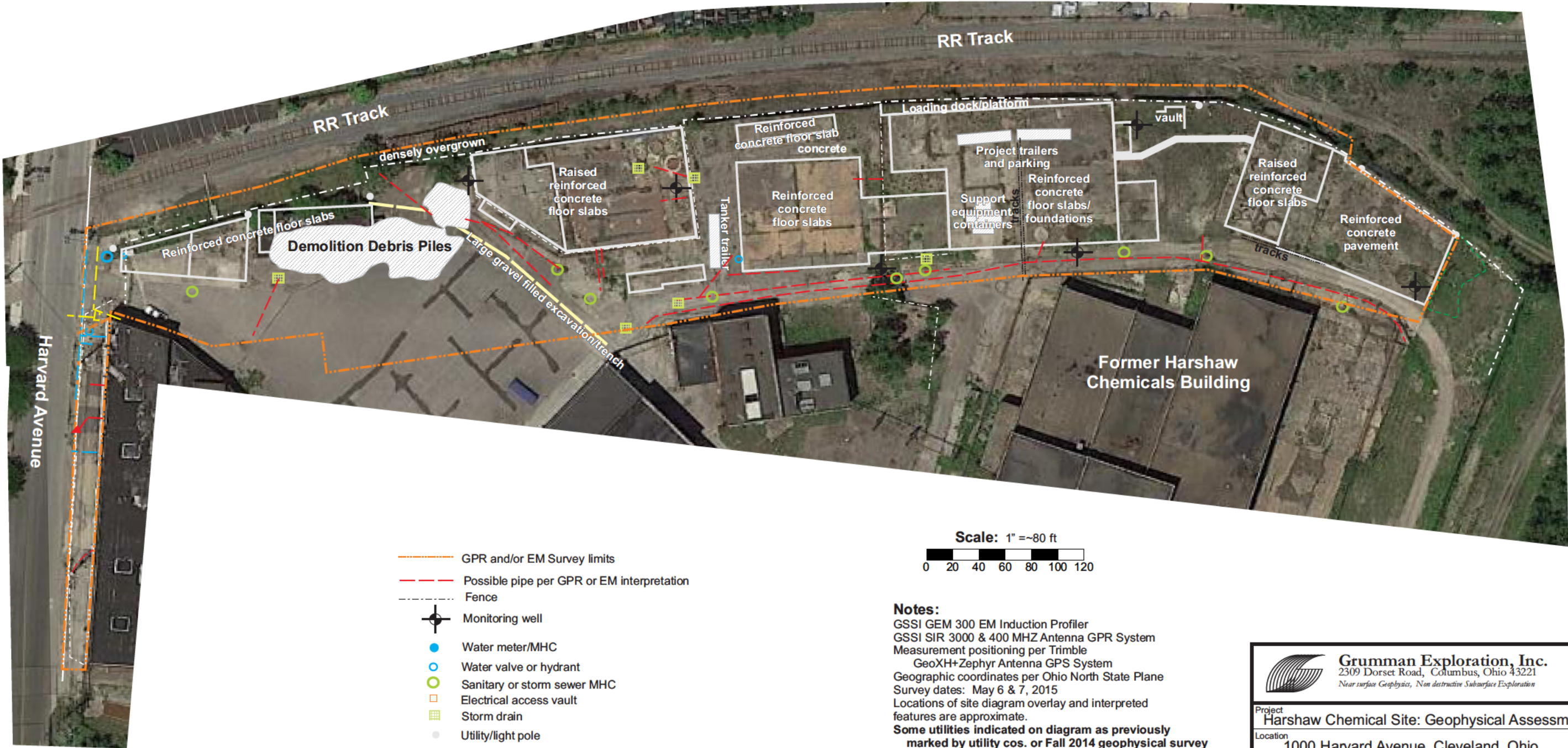
No clear indication of buried pipes or other structures was observed on any of the EM or GPR scans in accessible areas along the west side fence. The ground surface and likely shallow soil/fill conditions were generally not considered favorable for GPR signal penetration along the west side fence, and it is possible that more deeply buried piping exists in the area between the fence and railroad tracks. The EM responses along the west side of the fence were informally observed in the field but not recorded. A zone of strong EM conductivity responses was observed outside of the fence (Figure 4) just south of the northwest corner of the property fence. The EM anomaly extends over a somewhat broad area and does not appear to be attributable to buried piping. No corresponding EM in-phase ('metal') response was observed over this area. Possible explanations for the elevated EM response include a zone of highly conductive fill (e.g., slag, cinders, metal particulates, elevated salt content, etc.) or miscellaneous metallic debris associated with a rail spur or related structure. This zone was partially overgrown and was just beyond the region cleared for the GPR work.


## 6.0 General Qualifications

The EM and GPR data presented herein are interpreted. No warranty, certification, or statement of fact, either expressed or implied, regarding actual subsurface conditions within the surveyed areas is contained herein. If questions or uncertainties exist regarding the presence, absence, quantities or limits of subsurface features, such as excavations, fill, or other buried objects, based on the EM and GPR data interpretations, supplemental invasive explorations, such as test pit excavations, borings, hand digging or other geophysical tests, should be conducted to document actual subsurface conditions.



Supplemental Geophysical Surveys: Investigation Limits



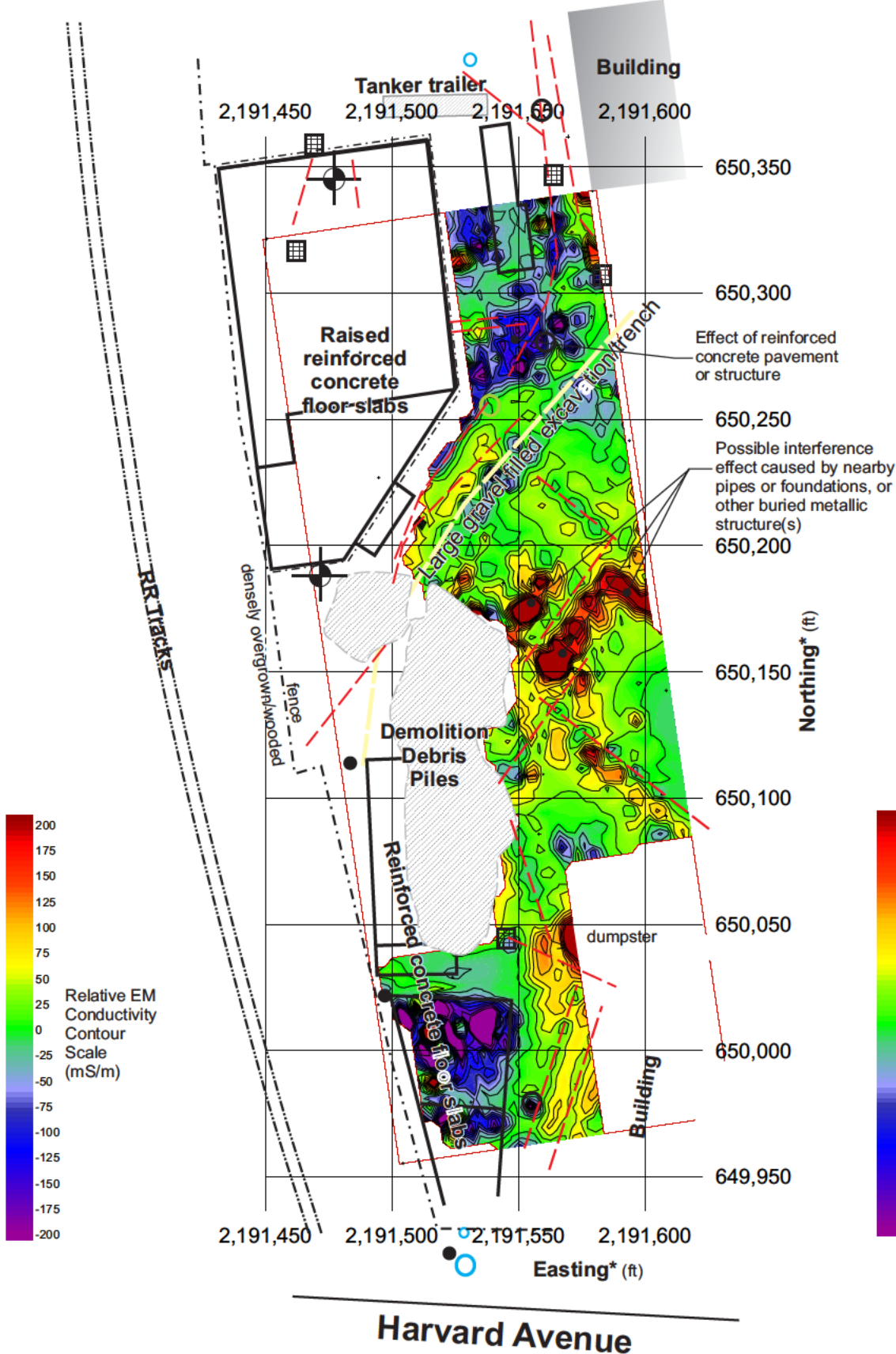


**Grumman Exploration, Inc.**  
2309 Dorset Road, Columbus, Ohio 43221  
*Near surface Geophysics, Non destructive Subsurface Exploration*

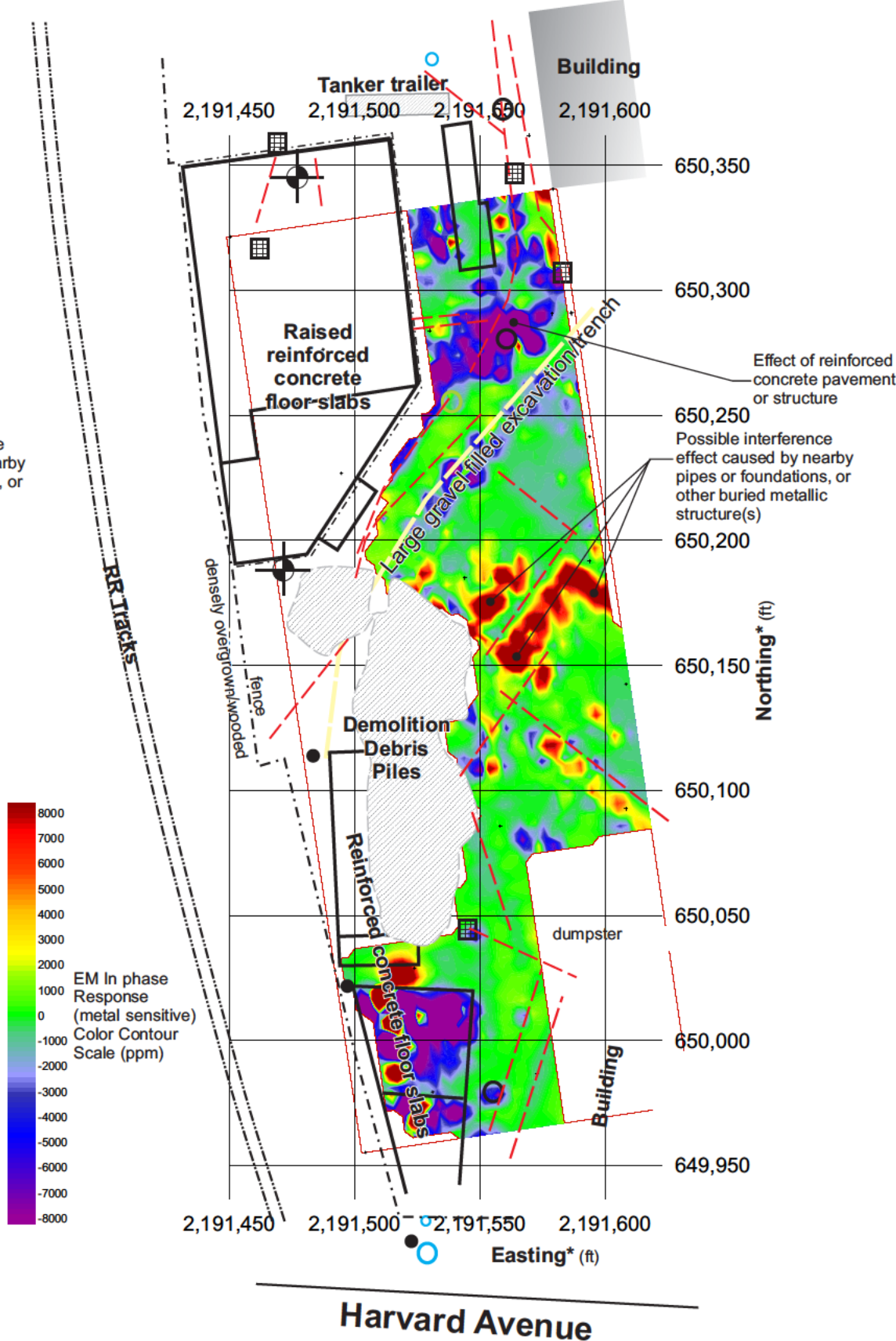
Project Harshaw Chemical Site: Geophysical Assessment		
Location 1000 Harvard Avenue, Cleveland, Ohio		
Client ECC/USACE	By [Redacted]	Date 5/11/15
Project No. 01-35031	Checked [Redacted]	Scale 1"=~80-ft



A) Relative EM Conductivity Contour Diagram: 9,810 Hz



B) EM In-Phase (metal-sensitive) Response Contour Diagram - 9,810 Hz



- Possible pipe or foundation wall per GPR or EM interpretation
- Fence
- Monitoring well
- Water meter/MHC
- Water valve or hydrant
- Sanitary or storm sewer MHC
- Electrical access vault
- Storm drain
- Utility/light pole

Scale: 1" = ~60 ft

0 20 40 60 80 100

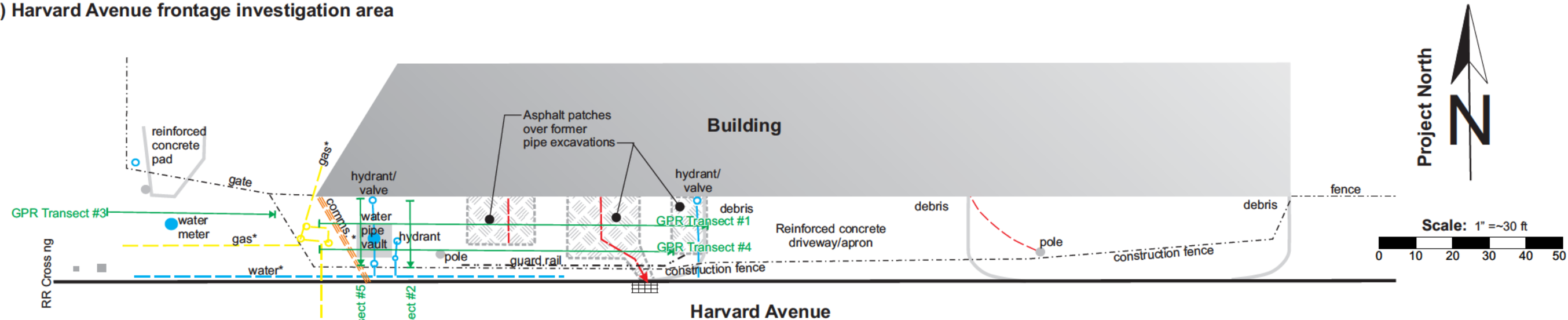
**Notes:**  
GSSI GEM 300 EM Induction Profiler  
5 ft transect spacing, ~2.2 ft station interval  
Measurement positioning per Trimble  
GeoXH+Zephyr Antenna GPS System  
\*Geographic coordinates per Ohio North State Plane  
Survey dates: May 6 & 7, 2015  
Locations of site diagram overlay and interpreted features are approximate.

**Grumman Exploration, Inc.**  
2309 Dorset Road, Columbus, Ohio 43221  
Near surface Geophysics, Non destructive Subsurface Exploration

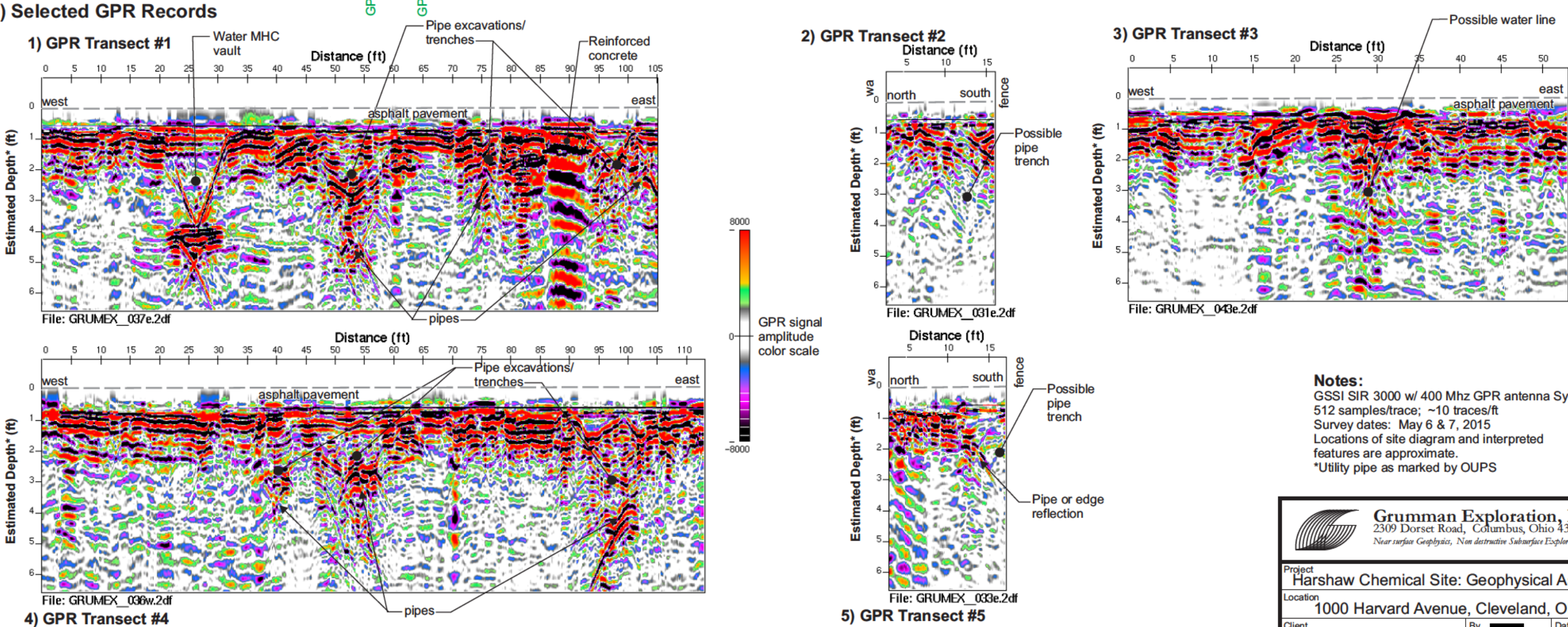
Project Harshaw Chemical Site: Geophysical Assessment			
Location 1000 Harvard Avenue, Cleveland, Ohio			
Client ECC/USACE	By [Redacted]	Date 5/13/15	
Project No. 01-35031	Checked [Redacted]	Scale 1" = ~60-ft	



A) Harvard Avenue frontage investigation area



B) Selected GPR Records



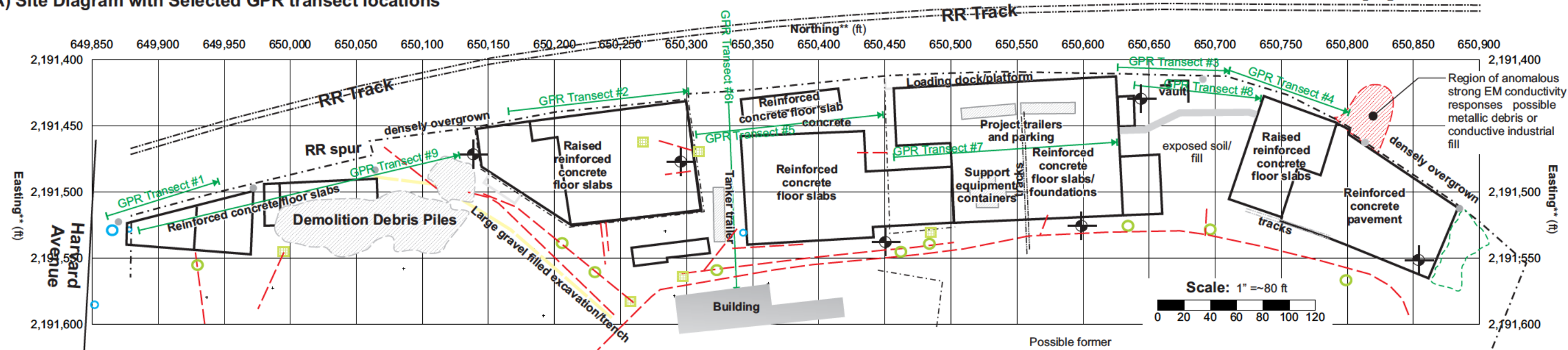
**Notes:**  
GSSI SIR 3000 w/ 400 Mhz GPR antenna System  
512 samples/trace; ~10 traces/ft  
Survey dates: May 6 & 7, 2015  
Locations of site diagram and interpreted features are approximate.  
\*Utility pipe as marked by OUPS

**Grumman Exploration, Inc.**  
2309 Dorset Road, Columbus, Ohio 43221  
Near surface Geophysics, Non destructive Subsurface Exploration

Project Harshaw Chemical Site: Geophysical Assessment			
Location 1000 Harvard Avenue, Cleveland, Ohio			
Client ECC/USACE	By [Redacted]	Date 5/13/15	
Project No. 01-35031	Checked [Redacted]	Scale 1"=~60-ft	



Project North



1) GPR Transect #1

Distance (ft)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85

S

0

1

2

3

4

5

6

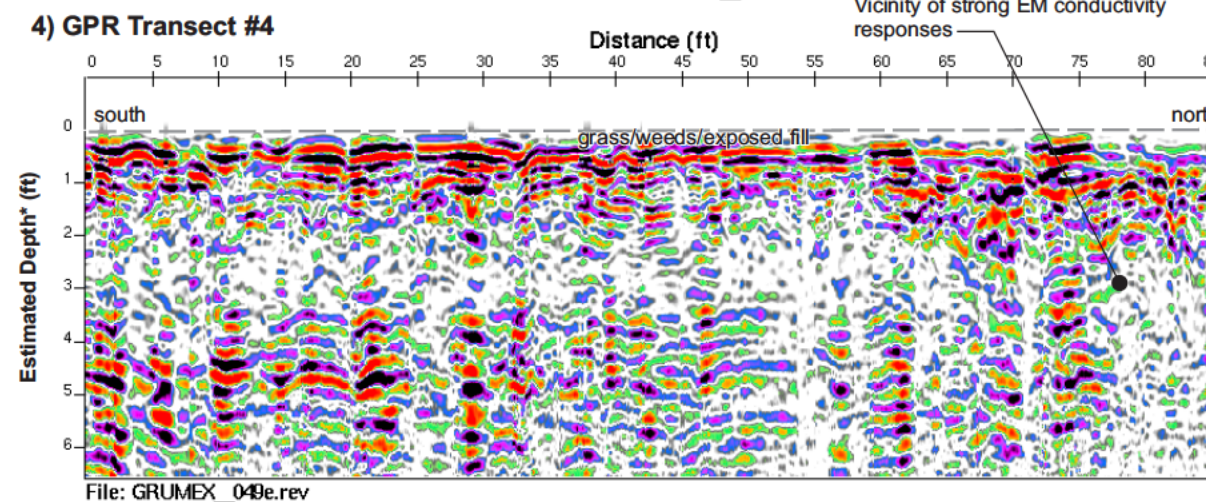
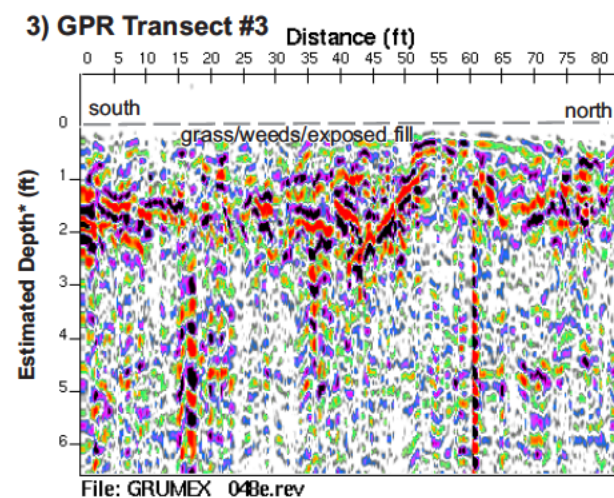
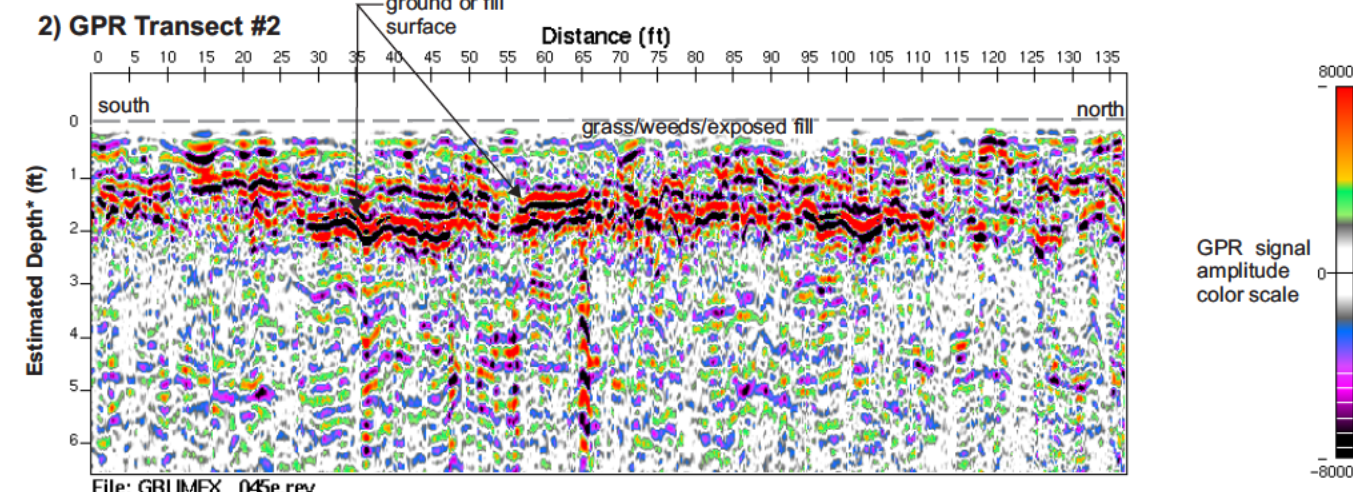
Estimated Depth\* (ft)

south

grass/weeds/exposed fill

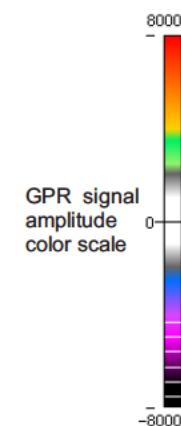
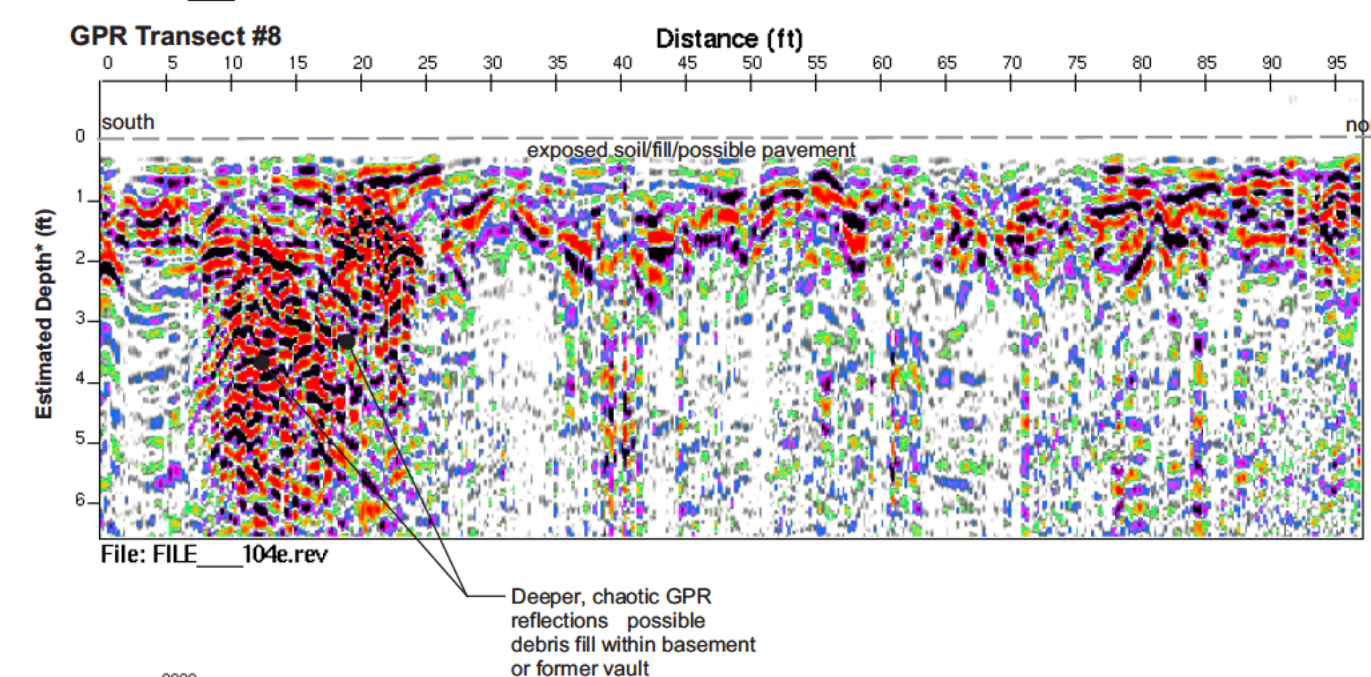
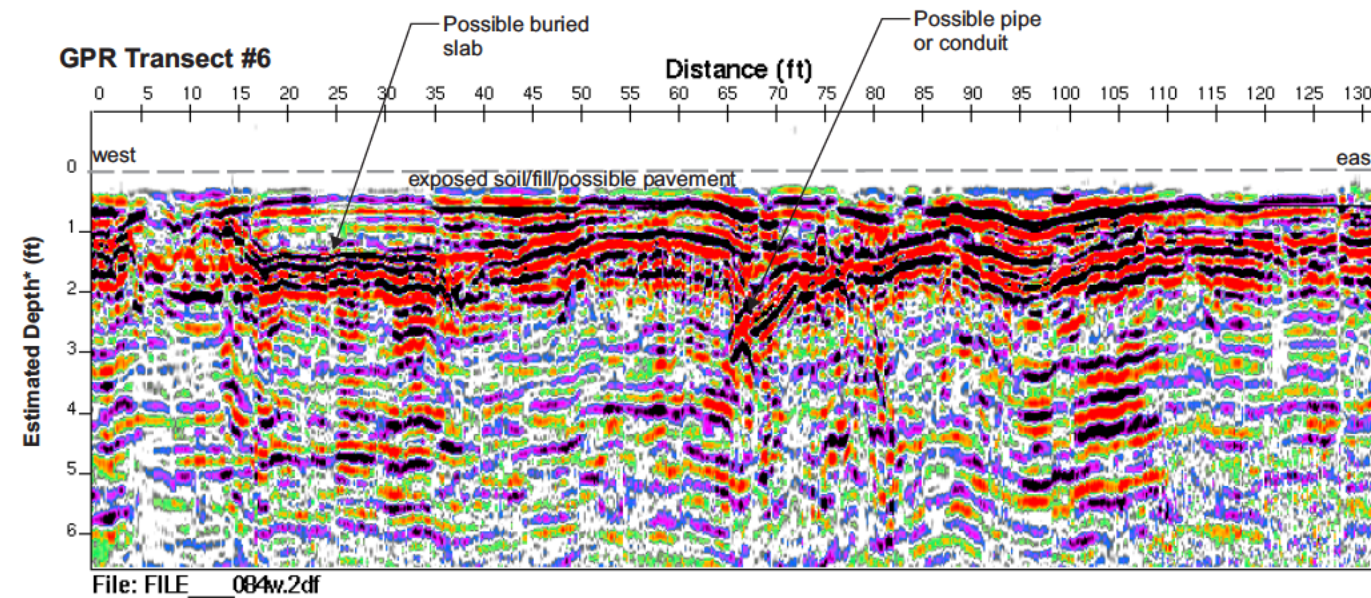
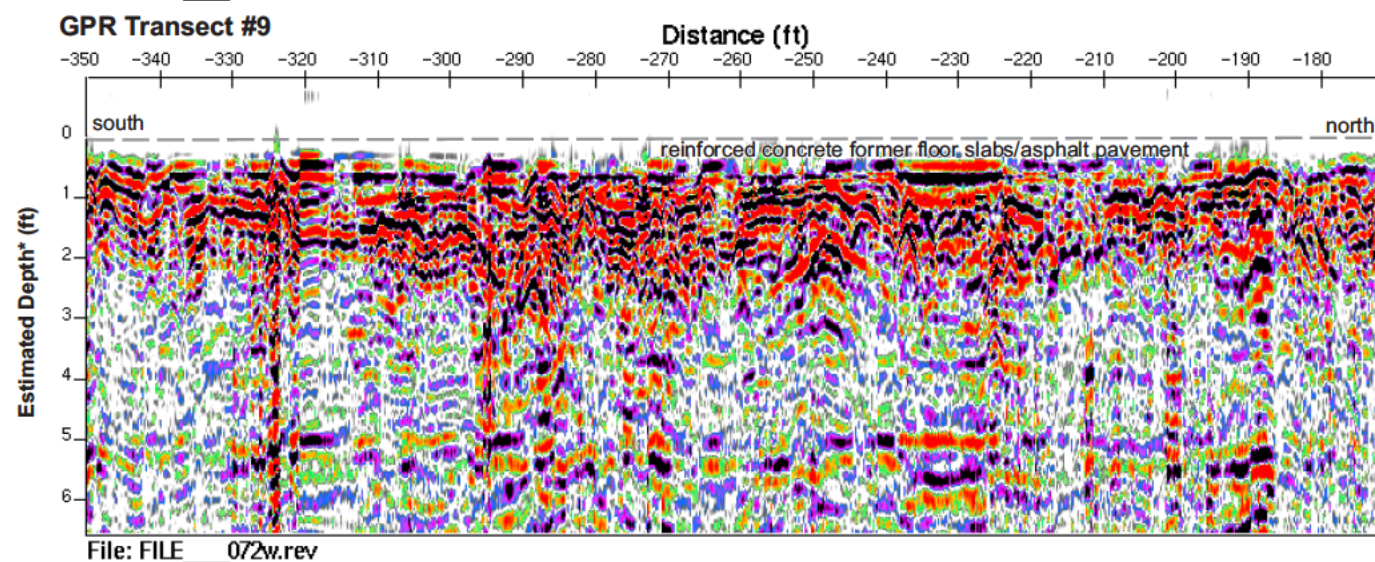
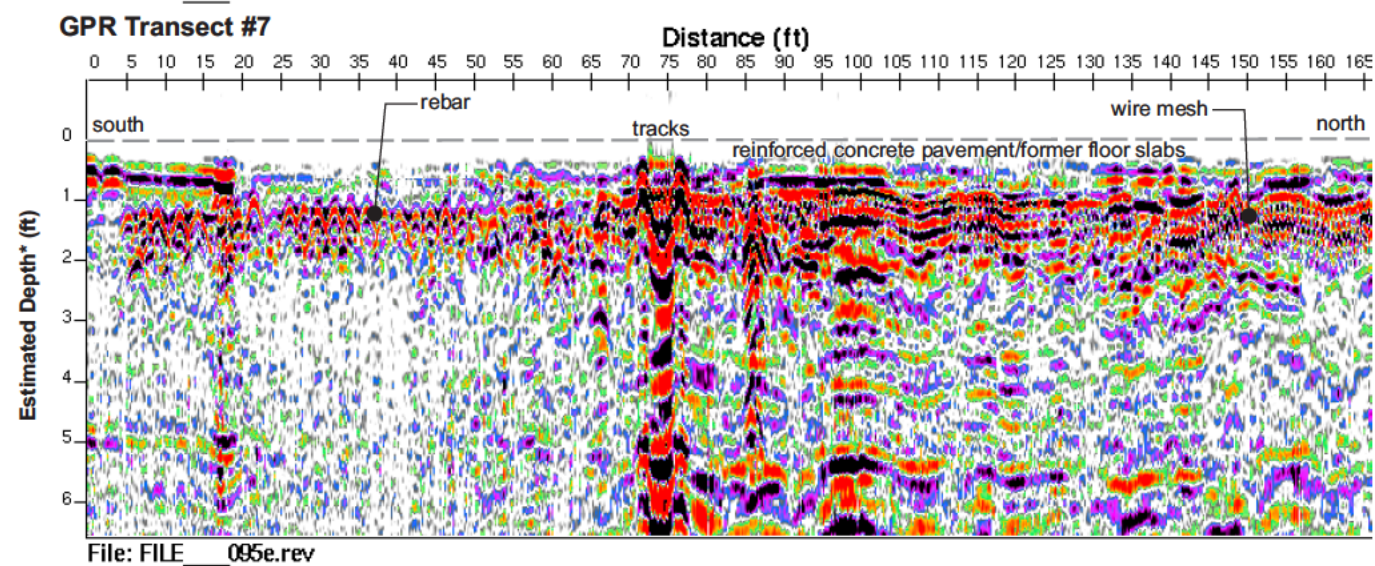
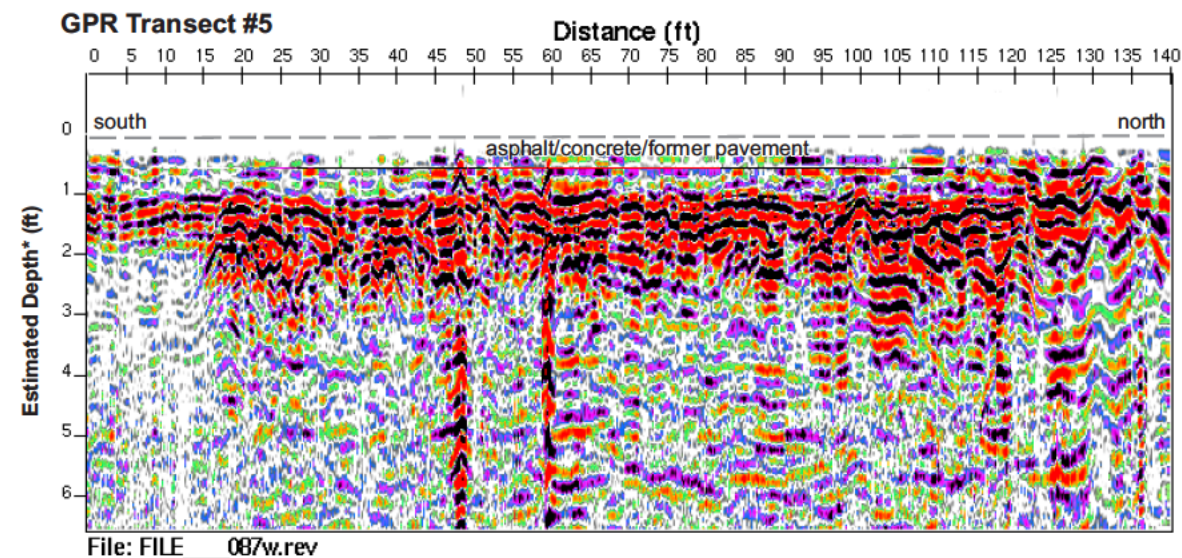
north

File: GRUMEX\_058w.rev




**Notes:**  
GSSI SIR 3000 & 400 MHZ Antenna GPR System  
512 samples/trace; ~10 traces/ft; 5 ft transect spacing  
in gridded survey areas  
Survey dates: May 6 & 7, 2015  
\*Depth estimates per assumed permittivity = 12  
\*\* Coordinates per Ohio North SPC  
Locations of site diagram overlay and interpreted  
features are approximate.





**Notes:**  
 GSSI SIR 3000 & 400 MHZ Antenna GPR System  
 512 samples/trace; ~10 traces/ft  
 Survey dates: May 6 & 7, 2015  
 \*Depth estimates per assumed permittivity = 12  
 Locations of site diagram overlay and interpreted features are approximate.  
 Refer to Figure 4 for GPR transect locations

 <b>Grumman Exploration, Inc.</b> 2309 Dorset Road, Columbus, Ohio 43221 <i>Near surface Geophysics, Non destructive Subsurface Exploration</i>			
Project Harshaw Chemical Site: Geophysical Assessment			
Location 1000 Harvard Avenue, Cleveland, Ohio			
Client ECC/USACE	By [Redacted]	Date 5/11/15	
Project No. 01-35031	Checked [Redacted]	Scale as shown	



## **Attachment 6**

### ***Confined Space Entry Permits***

### 34.7 Permit-Required Confined Spaces, Appendix D - Confined Space Entry Permit

#### 34.7.a Appendix D-1

##### Confined Space Entry Permit

Date and Time Issued: June 1, 2015: 10:30am Date and Time Expires: June 1, 2015: 5:00pm

Job site/Space I.D.: Hatch Chemical 100 ft. Tank Job Supervisor: [REDACTED]

Equipment to be worked on: Catchment Man Work to be performed: Adding 10" Blind Flange

Stand-by personnel: [REDACTED] [REDACTED]

1. Atmospheric Checks: Time 10:30am  
 Oxygen 20.9 % H<sub>2</sub>S 0%  
 Explosive -3 % L.F.L. CO 0%  
 Toxic NA PPM

2. Tester's signature: [REDACTED]

3. Source isolation (No Entry): N/A Yes No

Pumps or lines blinded, ( ) (✓) ( )  
 disconnected, or blocked ( ) (✓) ( )

4. Ventilation Modification: N/A Yes No

Mechanical ( ) ( ) (✓)  
 Natural Ventilation only ( ) (✓) ( )

5. Atmospheric check after

isolation and Ventilation:

Oxygen 20.9 % > 19.5 %  
 Explosive -3 % L.F.L. < 10 %  
 Toxic NA PPM < 10 PPM H(2)S  
 Time 11:00

Tester's signature: [REDACTED]

6. Communication procedures: vocal, 2 way radio

7. Rescue procedures: 3rd Winch retrieval Hoist

8. Entry, standby, and back up persons: Yes No

Successfully completed required training?

Is it current? (✓) ( )

9. Equipment:

Direct reading gas monitor - tested ( ) (✓) ( )

Safety harnesses and lifelines for entry and standby persons ( ) (✓) ( )

Hoisting equipment ( ) (✓) ( )

Powered communications ( ) ( ) (✓)

SCBA's for entry and standby persons (✓) ( ) ( )

Protective Clothing ( ) (✓) ( )

All electric equipment listed Class I, Division I, Group D and Non-sparking tools ( ) ( ) (✓)

10. Periodic atmospheric tests:

August 19, 2011



Duke Cain Contracting, Inc. Health & Safety Plan

Confined Space Operations – Permit Required

Oxygen	<u>20.9</u> %	Time	<u>12:00</u>	Oxygen	_____ %	Time	_____	CO	<u>0.0%</u> <u>12:00</u>
Oxygen	<u>20.7</u> %	Time	<u>1:00</u>	Oxygen	_____ %	Time	_____	H <sub>2</sub> S	<u>0.0%</u> <u>12:00</u>
Explosive	<u>-3</u> %	Time	<u>12:00</u>	Explosive	_____ %	Time	_____	CO	<u>0.0%</u> <u>1:00</u>
Explosive	<u>-3</u> %	Time	<u>1:00</u>	Explosive	_____ %	Time	_____	H <sub>2</sub> S	<u>0.0%</u> <u>1:00</u>
Toxic	<u>NA</u> %	Time	<u>12:00</u>	Toxic	_____ %	Time	_____		
Toxic	<u>NA</u> %	Time	<u>NA</u>	Toxic	_____ %	Time	_____		

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) \_\_\_\_\_  
 Approved By: (Unit Supervisor) \_\_\_\_\_  
 Reviewed By: (Cs Operations Personnel) : \_\_\_\_\_  
 \_\_\_\_\_ (printed name) \_\_\_\_\_ (signature)

This permit to be kept at job site. Return job site copy to Safety Office following job completion.

Copies: White Original (Safety Office)  
 Yellow (Unit Supervisor)  
 Hard (Job site)

34.7.b Appendix D - 2

ENTRY PERMIT

PERMIT VALID FOR 8 HOURS ONLY. ALL COPIES OF PERMIT WILL REMAIN AT JOB SITE UNTIL JOB IS COMPLETED

DATE: - - SITE LOCATION and DESCRIPTION Harshaw Chemical 1000 HARSHAW, Cleveland, OH  
 PURPOSE OF ENTRY Block: Cap H<sub>2</sub>O Main w/ Blind Flange 13"  
 SUPERVISOR(S) in charge of crews \_\_\_\_\_ Type of Crew Phone # \_\_\_\_\_

COMMUNICATION PROCEDURES verbal 2 way if needed  
 RESCUE PROCEDURES (PHONE NUMBERS AT BOTTOM) 911, Fire Hazard Ops

\* BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY\*

REQUIREMENTS COMPLETED	DATE	TIME
Lock Out/De-energize/Try-out	<u>NA</u>	<u>NA</u>
Line(s) Broken-Capped-Blanked	<u>NA</u>	<u>NA</u>
Purge-Flush and Vent	<u>6-1-15 9:00am</u>	<u>9:00am</u>
Ventilation	<u>6-1-15 9:00am</u>	<u>9:00am</u>
Secure Area (Post and Flag)	<u>6-1-15</u>	<u>10:00am</u>
Breathing Apparatus	<u>NA</u>	<u>NA</u>
Resuscitator - Inhalator	<u>NA</u>	<u>NA</u>
Standby Safety Personnel	<u>6-1-15</u>	<u>9:00am</u>
Full Body Harness w/"D" ring	<u>6-1-15</u>	<u>9:00am</u>

August 19, 2011

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Emergency Escape Retrieval Equip	5-31-15	12:00pm
Lifelines	5-31-15	12:00pm
Fire Extinguishers	NA	NA
Lighting (Explosive Proof)	6-1-15	9:00am
Protective Clothing	NA	NA
Respirator(s) (Air Purifying)	NA	NA
Burning and Welding Permit	NA	NA

Note: Items that do not apply enter N/A in the blank.

**\*\*RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS**

CONTINUOUS MONITORING**	Permissible				
TEST(S) TO BE TAKEN	Entry Level				
PERCENT OF OXYGEN	19.5% to 23.5%	22.9	20.9	20.7	20.9
LOWER FLAMMABLE LIMIT	Under 10%	-3	-3	-3	-3
CARBON MONOXIDE	+35 PPM	0%	0%	0%	0%
Aromatic Hydrocarbon	+ 1 PPM * 5PPM	NA	NA	0%	0%
Hydrogen Cyanide	(Skin) * 4PPM	NA	NA	NA	NA
Hydrogen Sulfide	+10 PPM *15PPM	0%	0%	0%	0%
Sulfur Dioxide	+ 2 PPM * 5PPM	NA	NA	NA	NA
Ammonia	*35PPM	NA	NA	NA	NA

\* Short-term exposure limit: Employee can work in the area up to 15 minutes.

+ 8 hr. Time Weighted Avg.: Employee can work in area 8 hrs (longer with appropriate respiratory protection).

REMARKS:

GAS TESTER NAME	INSTRUMENT(S)	MODEL	SERIAL &/OR
& CHECK #	USED	&/OR TYPE	UNIT #
[REDACTED]	MULTI GAS MONITOR	M40	0707044-334

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK

SAFETY STANDBY PERSON(S)	CHECK #	CONFINED SPACE ENTRANT(S)	CHECK #	CONFINED SPACE ENTRANT(S)	CHECK #
[REDACTED]		[REDACTED]		NA	

SUPERVISOR AUTHORIZING - ALL CONDITIONS SATISFIED SATISFIED  
DEPARTMENT/PHONE 517 541 6022

AMBULANCE 2800 FIRE 2900 Safety 4901 Gas Coordinator 4529/5387

### 34.8 Permit-Required Confined Spaces, Appendix E-Sewer System Entry

Sewer entry differs in three vital respects from other permit entries; first, there rarely exists any way to completely isolate the space (a section of a continuous system) to be entered; second, because isolation is not complete, the atmosphere may suddenly and unpredictably become lethally hazardous (toxic, flammable or explosive) from causes



### 34.7 Permit-Required Confined Spaces, Appendix D - Confined Space Entry Permit

#### 34.7.a Appendix D-1

#### Confined Space Entry Permit

Date and Time Issued: June 2nd, 2015 9pm Date and Time Expires: June 2nd, 2015 5pm  
 Job site/Space I.D.: Harshaw Chemical Job Supervisor: [REDACTED]  
 Equipment to be worked on: City Main Work to be performed: Blind Flange Addition

Stand-by personnel: [REDACTED]

1. Atmospheric Checks:
 

Time	_____	
Oxygen	_____	%
Explosive	_____	% L.F.L.
Toxic	_____	PPM
2. Tester's signature: [REDACTED]
3. Source isolation (No Entry):
 

N/A	Yes	No
Pumps or lines blinded, disconnected, or blocked	( )	( )
	( )	( )
4. Ventilation Modification:
 

N/A	Yes	No
Mechanical	( )	( )
Natural Ventilation only	( )	( )
5. Atmospheric check after isolation and Ventilation:
 

Oxygen	<u>20.9</u>	%	>	19.5	%	<u>CO 0%</u>
Explosive	<u>0</u>	% L.F.L.	<	10	%	<u>"</u>
Toxic	<u>0%</u>	PPM	<	10	PPM	H(2)S
Time	_____					
6. Communication procedures: vocal, usual
7. Rescue procedures: Hoist winch
8. Entry, standby, and back up persons:
 

	<u>Yes</u>	No
Successfully completed required training?	( )	( )
Is it current?	( )	( )
9. Equipment:
 

N/A	Yes	No
Direct reading gas monitor - tested	( )	( )
Safety harnesses and lifelines for entry and standby persons	( )	( )
Hoisting equipment	( )	( )
Powered communications	( )	( )
SCBA's for entry and standby persons	( )	( )
Protective Clothing	( )	( )
All electric equipment listed Class I, Division I, Group D and Non-sparking tools	( )	( )
10. Periodic atmospheric tests:

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Duke Cain Contracting, Inc. Health & Safety Plan

Confined Space Operations - Permit Required

Oxygen	<u>20.9</u> %	Time	<u>8:00am</u>	Oxygen	<u>20.9</u> %	Time	<u>10:30</u>	CO	<u>0%</u>	<u>8:00 am</u>
Oxygen	<u>20.9</u> %	Time	<u>9:30am</u>	Oxygen	<u>20.9</u> %	Time	<u>11:30</u>	CO	<u>0%</u>	<u>9:30 am</u>
Explosive	<u>0</u> %	Time	<u>8:00am</u>	Explosive	<u>0</u> %	Time	<u>10:30</u>	H <sub>2</sub> S	<u>0%</u>	<u>8:00 am</u>
Explosive	<u>0</u> %	Time	<u>9:30 am</u>	Explosive	<u>0</u> %	Time	<u>11:30</u>	H <sub>2</sub> S	<u>0%</u>	<u>9:30 am</u>
Toxic	<u>   </u> %	Time	<u>   </u>	Toxic	<u>0</u> %	Time	<u>11:30</u>	CO	<u>0%</u>	<u>10:30</u>
Toxic	<u>   </u> %	Time	<u>   </u>	Toxic	<u>   </u> %	Time	<u>   </u>	CO	<u>0%</u>	<u>11:30</u>
								H <sub>2</sub> S	<u>0%</u>	<u>10:30</u>

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) \_\_\_\_\_  
 Approved By: (Unit Supervisor) \_\_\_\_\_  
 Reviewed By: (Cs Operations Personnel) : \_\_\_\_\_  
 \_\_\_\_\_ (printed name) \_\_\_\_\_ (signature)

This permit to be kept at job site. Return job site copy to Safety Office following job completion.

Copies: White Original (Safety Office)  
 Yellow (Unit Supervisor)  
 Hard (Job site)

34.7.b Appendix D - 2

ENTRY PERMIT

PERMIT VALID FOR 8 HOURS ONLY. ALL COPIES OF PERMIT WILL REMAIN AT JOB SITE UNTIL JOB IS COMPLETED

DATE: - - SITE LOCATION and DESCRIPTION Harshaw Chemical 1000 Harvard Cleveland, OH  
 PURPOSE OF ENTRY \_\_\_\_\_

SUPERVISOR(S) in charge of crews \_\_\_\_\_ Type of Crew Phone # \_\_\_\_\_  
2 men 517 541 622

COMMUNICATION PROCEDURES Visual Signal  
 RESCUE PROCEDURES (PHONE NUMBERS AT BOTTOM) 911 Fire EMS Haz Ops

\* BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY\*

REQUIREMENTS COMPLETED  
 Lock Out/De-energize/Try-out  
 Line(s) Broken-Capped-Blanked  
 Purge-Flush and Vent  
 Ventilation  
 Secure Area (Post and Flag)  
 Breathing Apparatus  
 Resuscitator - Inhalator  
 Standby Safety Personnel  
 Full Body Harness w/"D" ring

DATE	TIME
<u>NA</u>	<u>NA</u>
<u>in progress</u>	<u>in progress</u>
<u>8:00am 6-2-15</u>	<u>8:00am</u>
<u>6-2-15</u>	<u>8:00am</u>
<u>6-2-15</u>	<u>8:00am</u>
<u>NA</u>	<u>NA</u>
<u>NA</u>	<u>NA</u>
<u>6-2-15</u>	<u>8:00am</u>
<u>6-2-15</u>	<u>8:00am</u>

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### Confined Space Operations – Permit Required

62-15

8:00am - Sale Hoist

6.215

8:00 AM

6-2-13

8:00 am

6-2-15

8:00 am

6-2-15

5.00 mm

NA

NA

NA

NA

lank.

CO 0% 0% — — —

TEST(S) TO BE TAKEN	Entry Level
---------------------	-------------

PERCENT OF OXYGEN 19.5% to 23.5%

LOWER FLAMMABLE LIMIT Under 10%

CARBON MONOXIDE +35 PPM

Aromatic Hydrocarbon + 1 PPM

Hydrogen Cyanide (Skin)

Hydrogen Sulfide +10 PPM

Sulfur Dioxide + 2 PPM

Ammonia

\* Short-term exposure limit: Emp

minutes.

+ 8 hr. Time Weighted Avg.:Employee can work in area 8 hrs (longer with appropriate respiratory protection).

REMARKS:

SERIAL &/OR  
UNIT #

Cal. Date = 6-1-15

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK

SAFETY STANDBY PERSON(S)	CHECK #	CONFINED SPACE ENTRANT(S)	CHECK #	CONFINED SPACE ENTRANT(S)	CHECK #
		1		1	
		1		1	

SUPERVISOR AUTHORIZING - ALL CONDITIONS SATISFIED *mt*  
DEPARTMENT/PHONE *Earthlink* *517 541 6022*

AMBULANCE 2800 FIRE 2900 Safety 4901 Gas Coordinator 4529/5387

### 34.8 Permit-Required Confined Spaces, Appendix E-Sewer System Entry

Sewer entry differs in three vital respects from other permit entries; first, there rarely exists any way to completely isolate the space (a section of a continuous system) to be entered; second, because isolation is not complete, the atmosphere may suddenly and unpredictably become lethally hazardous (toxic, flammable or explosive) from causes