# OU-2 PILOT TEST RESULTS AND REMEDIAL ACTION IMPLEMENTATION RECOMMENDATIONS FORMER EXXONMOBIL REFINERY

## OPERABLE UNIT 2
## BUFFALO, NEW YORK
## BCP SITE NO. C915201

***Prepared for:***

**New York State Department of Environmental Conservation**
**Division of Hazardous Waste Remediation, Region 9**
**Buffalo, New York**

***Prepared by:***

**Amec E&E, P.C.**
**Portland, Maine**

**October 6, 2017**

**Project Number: 3617167397**

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# EXECUTIVE SUMMARY

On behalf of ExxonMobil Oil Corporation (ExxonMobil) and Elk Street Redevelopment, LLC (ESR), Amec E&E, P.C. (Amec) conducted field pilot testing of proposed reagent mixtures for stabilization/solidification at the former ExxonMobil Terminal Site in Buffalo, New York. Pilot testing was completed in accordance with Section 3.1 of the Remedial Action Work Plan (RAWP) submitted to the New York State Department of Environmental Conservation (NYSDEC). This report has been prepared to supplement the RAWP by summarizing the results of the pilot testing and communicating our mix design recommendations based on those results.

As described in the RAWP, the objective of the proposed remediation is to stabilize lead-impacted fill and solidify soil meeting 6 NYCRR Part 375 Subpart 375-1 definition of grossly contaminated media (GCM). Pilot testing was conducted in two phases. The first phase was conducted from December 2016 through January 2017. Based on results of the first phase, a second phase was conducted from July through September 2017. Both phases of pilot testing were conducted in accordance with the NYSDEC approved work plans, modified by NYSDEC comments.

The first phase of pilot testing included in-situ stabilization (ISS) of GCM using lime kiln dust (LKD) as a reagent to stabilize impacted soil and provide lasting treatment of GCM. Mixtures of LKD of 5 percent, 7.5 percent, and 10 percent were mixed into the surficial fill and soil to a depth of 4 feet bgs. While the addition of LKD had an immediate effect at reducing the odor and visible nature of GCM, test borings installed one month after stabilization showed evidence of GCM, indicating that the cell was not solidified sufficiently to prevent free-phase hydrocarbons outside of the cell from reentering the treated soil.

The first phase of pilot testing also included stabilization of lead-impacted soil using portland cement as a reagent to chemically bind lead and stabilize the impacted soil. The impacted soil also contained GCM. Approximately ten tons of portland cement (4.5 percent mixture) was mixed into an excavation where lead impacted fill had been exposed between 7.0 and 12.0 feet below ground surface (bgs). Soil samples were collected both prior to, and after mixing the reagent and subjected to analysis of total lead and Toxicity Characteristic Leachate Procedure (TCLP) testing for lead. Additional information was gathered from a boring advanced in the cell approximately one month after treatment. Observations indicated no evidence of GCM and that treated material below the water table was essentially dry.

The results of the first phase of pilot testing indicated the following key points:

- A mixture of 4.5% portland cement solidified the lead-impacted fill material, limiting the potential for future exposure to lead. Results from laboratory analysis of solidified material indicated concentrations below TCLP standards. Because the TCLP lead concentration after stabilization was approximately 0.5 mg/l below the standard, it was recommended that the dosage of portland cement be increased to 5% for full scale implementation.
- While LKD had an immediate effect at reducing the odor and visible nature of GCM, borings installed one month after stabilization produced evidence of GCM, indicating that the addition of only LKD did not achieved sufficient reduction in permeability to prevent migration of separate phase liquid from the surrounding, unstabilized soil back into the area of stabilization.
- To develop an effective mix design for GCM stabilization, portland cement should be added to the mixture to ensure long-term stabilization of GCM and provide a more effective means

of minimizing groundwater flux across the OU-2 property, reducing the total groundwater flow to a negligible amount.
- Additional pilot testing was recommended to select the optimal mix of portland cement for GCM treatment and gather data to demonstrate effectiveness to NYSDEC, ExxonMobil, and ESR.

Based on the issues with the use of LKD and the apparent success of use of 4.5 percent portland cement in stabilization of GCM-containing soil in the lead area, it was decided that use of portland cement as the reagent for the GCM impacted areas of OU-2 was the preferred approach. A second phase pilot test was designed to evaluate the performance of portland cement in mixtures of 4 percent, 5 percent, and 6 percent in GCM areas of the site.

An evaluation of the TCLP testing methodology was conducted following the first phase pilot testing. The analytical methodology presents a step in which an extract fluid is selected based on the pH of the sample. That step is required for analyses being performed for Resource Conservation and Recovery Action (RCRA) projects based on determination of the compatibility of wastes to be placed into hazardous waste landfills containing materials of widely varying pH. In order to evaluate potential mixing of highly acidic and highly basic wastes in a hazardous waste landfill, samples with a pH exceeding 5.0 are subjected to an extract fluid with a pH of 2.88, while other samples are subjected to an extract fluid with a pH of 4.93. Because such mixing conditions are reflective of those associated with ISS at OU-2, the selection process of extract fluids can be limited to selection of Extract Fluid 1, (pH 4.93). NYSDEC agreed with this approach during a conference call regarding the Pilot Testing on May 2, 2017.

The scope of work for the second pilot test included additional ISS field testing to evaluate addition of portland cement and a second option of portland cement augmented with slag (bench scale only). Three groups of three test cells per group were located in areas of the site containing petroleum impacted soils classified as GCM. Each cell was excavated to a depth of five feet. A sample of lead-impacted material was obtained and treated with 5 percent portland cement and submitted with a sample that had been obtained from the first phase lead-impacted material pilot test cell (i.e., 4.5 percent portland cement) for analysis of TCLP lead and total lead using the modified TCLP methodology (limiting use of extract fluid selection to Extract Fluid 1).

Results from the second pilot test indicated that:

- The addition of 4 percent portland cement, by weight, to GCM soil at OU-2 provides lasting treatment of the GCM.
- Permeability tests and observations show that when portland cement is mixed in the presence of water, permeability is on the order of $1 \times 10^{-7}$ cm/s or lower and the consistency of the cured, treated soil is competent.
- UCS testing of treated material mixed thoroughly in the presence of water indicates strengths that are consistent with the intended end use of the subject property.
- Test pits advanced approximately one month after the pilot test in the cured, treated material mixed thoroughly in the presence of water encountered a dry to damp solidified material that does not exhibit the characteristics of GCM.
- Estimations of groundwater flux through the treated soil suggest a total groundwater flux through the current saturated zone of OU-2 on the order of 0.00007 gpm.
- Testing results indicate that use of greater percentages of portland cement (5 percent) does not reduce the permeability appreciably without increasing the unconfined strength of the

material to a point where it may become difficult to excavate during redevelopment of the property.

- Also, permeability produced at higher concentrations of portland cement (6 percent) are generally the same as those produced by 4 percent portland cement and the unconfined strength of the material also increases to a point where future excavation may be more difficult.
- Use of slag produces significantly lower permeability in mixed samples, but also significantly increases strength of the stabilized soil, to a point where it maybe become difficult to excavate.
- Use of either 4.5 percent portland cement and use of 5 percent portland cement produce samples with TCLP lead concentrations well below the 5.0 mg/l criterion when Extract Fluid 1 is used in analysis of the sample.

Based on the pilot testing completed at the site, Amec recommends the following:

1. **GCM Areas -** the addition of 4 percent portland cement based on the assumed soil bulk density used in this and previous pilot testing (100 pounds per cubic foot) along with the addition of water and or use of existing groundwater, to thoroughly mix soil and reagent to the depths and limits specified within the design provided for remediation of OU-2.

2. **Lead Area** - the addition of 5 percent portland cement by weight (and not to exceed 5 percent) based on the assumed soil bulk density used in this and previous pilot testing (100 pounds per cubic foot) along with the addition of water and or use of existing groundwater, to thoroughly mix soil and reagent to the depths and limits specified within the design provided for remediation of OU-2.

# 1.0 INTRODUCTION

On behalf of ExxonMobil Oil Corporation (ExxonMobil) and Elk Street Redevelopment, LLC (ESR), Amec E&E, P.C. (Amec) conducted field pilot testing of proposed reagent mixtures for stabilization/solidification at the former ExxonMobil Terminal Site in Buffalo, New York. Pilot testing was completed in accordance with Section 3.1 of the Remedial Action Work Plan (RAWP) submitted to the New York State Department of Environmental Conservation (NYSDEC). This report has been prepared to supplement the RAWP by summarizing the results of the pilot testing and communicating our mix design recommendations based on those results.

As described in the RAWP, the objective of the proposed remediation is to stabilize lead impacted fill and solidify Grossly Contaminated Media (GCM). Pilot testing was conducted in two phases. The first phase was conducted from December 2016 through January 2017. Based on results of the first phase, a second phase was conducted from July through September 2017. Both phases of pilot testing were conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved work plans, modified by comments made by NYSDEC.

## 1.1 Limitations

This report presents a summary of information known to Amec concerning the project site, which Amec considered pertinent to the scope of work and stated project objective. Amec has performed this pilot study with the care and skill ordinarily used by members of the profession practicing under similar conditions. The conclusions presented herein are those that are deemed pertinent by Amec based upon the assumed accuracy of the available information. No other warranty, expressed or implied, is made as to the professional advice included in this report. The information present in this report is not intended for any use other than the stated objectives of the project.

Amec's professional opinions are based upon its professional judgment, experience and training. These opinions are also based upon data derived from the limited testing and analysis described in this report. It is possible that additional testing and analysis might produce different results and/or different opinions. Amec has not undertaken a systematic investigation of every part of the property and has limited its investigation to the scope agreed upon with its client. Such a systematic investigation might be cost prohibitive and/or beyond the client's budget for testing and analysis (site characterization) and may not necessarily change the interpretations provided herein.

Amec believes that its opinions are reasonably supported by the testing and analysis which has been done, and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area, at this time. That standard of care may change from time to time and new methods and practices of exploration, testing, and analysis may develop in the future which might produce different results.

This document was prepared for the sole use of ExxonMobil, ESR, and the regulatory agencies directly involved with the project, who are the only intended beneficiaries of our work. No other party shall rely on the information contained herein without prior written consent of Amec.

# 2.0 PHASE 1 PILOT TEST

The first phase of pilot testing was conducted in accordance with the NYSDEC approved "OU-2 Stabilization Pilot Scale Work Plan" dated November 21, 2016[1] (Work Plan), modified by comments made on the Work Plan by NYSDEC.

## 2.1 Field Pilot Test Procedures

The scope of work for the initial pilot test included conducting in-situ stabilization (ISS) within a total of four test cells. Three test cells were located in an area of the site containing petroleum impacted soils classified as GCM and one test cell was located in an area where soils are impacted with TCLP lead concentrations that exceed the standard of 5 mg/l. The locations of the test cells, presented on **Figure 1,** were moved slightly from those contemplated in the Work Plan to avoid utilities.

Amec contracted NorthStar Demolition & Remediation, LP (NorthStar) to perform the pilot test activities under the oversight of Amec. In-situ mixing was completed as follows:

- After delineating/surveying the test cells, reagent was delivered to the work area via supersacks containing 1.25 tons of reagent.
- The square footage and anticipated depth of each cell was used to determine the anticipated quantity to be stabilized for that cell, and the amount of reagent to be used was calculated based on intended dosing percentages.
- One pre-reagent application sample was collected from each test cell by blending the soil in place and collecting a sample that represents a composite of the cell.
- The reagent was applied to the test cells by suspending the sacks from an excavator and untying the sacks.
- Once the reagent was dispensed, a track excavator was used to blend and fold the soils for approximately one hour with the reagent until homogeneous.
- The affected soil was blended and folded to achieve uniform mixing; blending continued until no visible reagent was present and no clumps of soil larger than 6-inches in diameter remained.
- Once mixing was completed, a post-reagent sample was collected by grabbing a sample of the mixed material at the surface of the blended cell.
- Amec electronically recorded mixing operations in several of the test cells to provide video documentation.
- Approximately one month after the test cells were treated, a drill rig was used to collect a sample from each test cell for laboratory analysis.

### 2.1.1 Lead Impacted Soil

Field tests were completed in December 2016 and included the mixing of approximately ten tons of portland cement (4.5% mixture) into an excavation (Test Plot "Lead-1") where lead impacted fill had been exposed between 7.0 and 12.0 feet below ground surface (bgs). The materials above 7 feet did not contain GCM.

Background PID readings were made prior to opening the excavation. PID readings were taken prior to adding the amendments, during mixing, and after mixing. In addition, pre-stabilization and post-

[1] Amec, November 21, 2016, "OU-2 Stabilization Pilot Scale Work Plan" Letter to Chad Staniszewski and Eugene Melnyck, New York State Department Environmental Conservation

stabilization samples (collected immediately after stabilization and approximately one month later) were collected. The following testing was conducted:

- Total lead
- TCLP lead
- Unconfined Compressive Strength

### 2.1.2 GCM

Field tests were completed in December 2016 to solidify three test cells where GCM occurred using Lime Kiln Dust (LKD). Mixtures of LKD of 5% (Test Plot "GCM-1"), 7.5% (Test Plot "GCM-2), and 10% (Test Plot "GCM-3") were mixed into the surficial fill and soil to a depth of 4 feet bgs. Visual observations confirmed that GCM was present in each test cell prior to the addition of LKD. Petroleum odors were evident and a separate phase liquid sheen could be observed on groundwater in the excavations.

Background PID readings were made prior to opening the excavation. PID readings were taken prior to adding the amendments, during mixing, and after mixing. In addition, pre-stabilization and post-stabilization samples (collected immediately after stabilization and approximately one month later) were collected. The following testing was conducted:

- Petroleum hydrocarbons – ASTM D7678
- Semi-volatile organic compounds (SVOCs) – US EPA Method 8270
- Volatile organic compounds (VOCs) – US EPA Method 5035/5035A
- Unconfined Compressive Strength

## 2.2 Field Pilot Test Results

### 2.2.1 Lead Impacted Soil

Test Plot Lead-1 encountered brick and paint wastes between 7 and 11 ft. below ground surface. The waste materials were covered by plastic clay fill of relatively low permeability, which did not exhibit GCM characteristic. The clay fill was covered by a geosynthetic liner material with approximately 0.75 feet of soil fill. Clay was encountered below the waste materials at an approximate depth of 12 ft. **Photograph 1** below illustrates Test Cell Lead 1 during excavation.

**Photograph 1** – Test Cell Lead 1

- Materials encountered in Test Plot 1 include apparent paint pigments buried circa 1900 (GES claims to have recovered a Newspaper dated 1901 from the interior of a wooden barrel located in the vicinity of Test Plot 1).
- Paint materials are reported to often be associated with curved wooden barrel staves.
- Materials also include large portions of construction debris, bricks, and dimension lumber with a relatively high permeability.
- Materials are situated atop the lacustrine clay, which is continuous across the site.
- Materials were buried beneath at least 7 feet of low permeability, clay fill.

The results of the field tests and sampling indicated that in-situ stabilization of leachable lead by application of approximately 4.5% Type I/II portland cement produces samples, which when subjected to TCLP extraction, produce leachate with concentrations of lead below the 5 mg/l threshold for determination of a characteristically hazardous material. Furthermore, information from the boring advanced in the cell approximately one month after treatment indicated that the material was relatively dry even though it was below the water table. Therefore, application of portland cement in the prescribed mix rate effectively solidified the fill material. **Table 1** summarizes the analytical results.

### 2.2.2 GCM

Field tests were completed to solidify three test cells where GCM occurred using LKD. Mixtures of LKD of 5%, 7.5%, and 10% were mixed into the surficial fill and soil to a depth of 4 feet below ground surface (**Photograph 2**). Visual observations confirmed that GCM was present in each test cell prior

to addition of LKD; petroleum odors were evident and a separate phase liquid sheen could be observed on groundwater in the excavations.

Following the mixing of LKD in each cell, odors were diminished to imperceptible levels and no visual evidence of petroleum hydrocarbon was noted. Soil samples were collected and analyzed for constituents of interest, including total petroleum hydrocarbons. Analytical results of detected constituents are summarized in **Table 2**. Pre-treatment samples contained Diesel-Range Organics (DRO) at concentrations consistent with those of mobile hydrocarbons. Post-treatment samples contained DRO at concentrations consistent with residual, non-mobile, hydrocarbons. However, approximately one month after installing the field test cells, Amec advanced split-barrel samplers in each cell and visual observations indicated that samples collected from each boring were unconsolidated, wet, and contained evidence of free oil. Samples also exhibited petroleum odors. As a result, jarred samples collected by Amec during the mixing of the cells were also visually inspected. Those samples contain no indication of liquids exceeding field moisture and no petroleum odor, which provides evidence that field conditions, exterior to the test cells, likely impacted the effectiveness of LKD in stabilizing GCM.

**Photograph 2** – Addition of LKD

## 2.3 Discussion of Results

### 2.3.1 Lead Impacted Soil

Results from Test Plot 1 indicate that a mixture of 4.5% portland cement achieved a reduction of TCLP lead concentrations to below the 5 mg/l standard. Furthermore, information from the boring advanced in the cell approximately one month after treatment indicated that the material was relatively dry, even though it was below the water table. Therefore, application of portland cement in the prescribed mix rate effectively solidified the fill material. Because the TCLP lead concentration after stabilization was only 0.5 mg/l below the standard, we recommend increasing the dosage of portland cement to 5% for full scale implementation. The following Table summarizes the lead results reported in the initial Pilot Test Report:

**Table 3**
**Summary of Lead Sample Analyses**
**Initial Pilot Testing**

| Analyte | Units | Pre-Treatment LEAD-1 PRE | Post-Treatment LEAD-1 POST | One Month Post LEAD-1 0117 |
|---|---|---|---|---|
| Lead Total | mg/Kg | 5,850 | 5,500 | 6,350 |
| Lead TCLP | mg/l | 16 | 4.3 | 4.5 |
| TCLP Leach fluid[(a)] | | Number 1 | Number 2 | Number 2 |

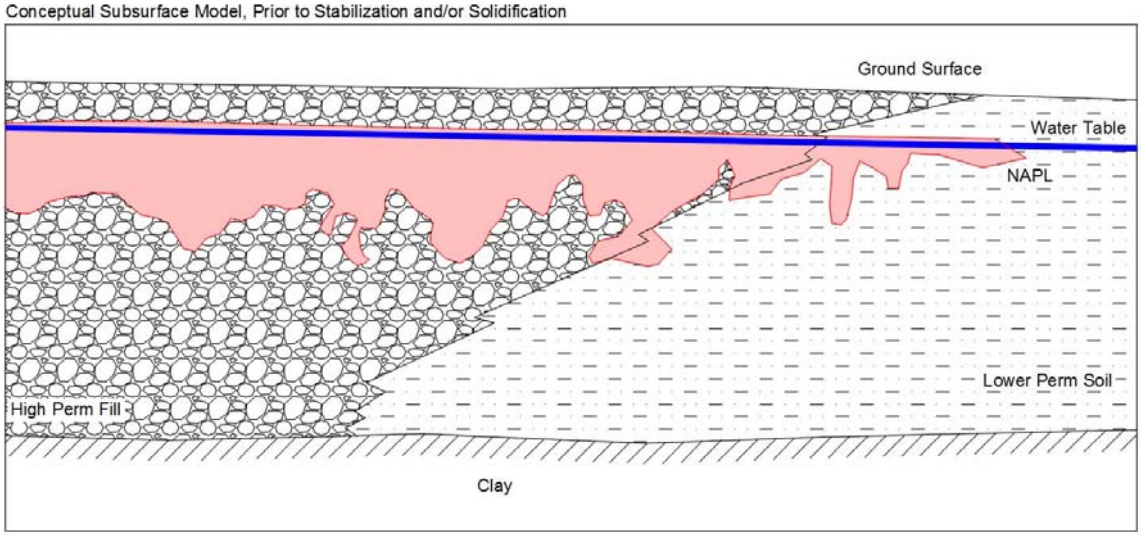
Note: (a) TCLP Method provides for selection of leaching fluid based on pH of sample. When the sample pH exceeds 5.0, extract fluid Number 2 is used. Fluid Number 2 has a pH of 2.88, where Fluid Number 1 has a pH of 4.93 (Section 7.1.4, SW-846 Method 1311).

### 2.3.2 GCM

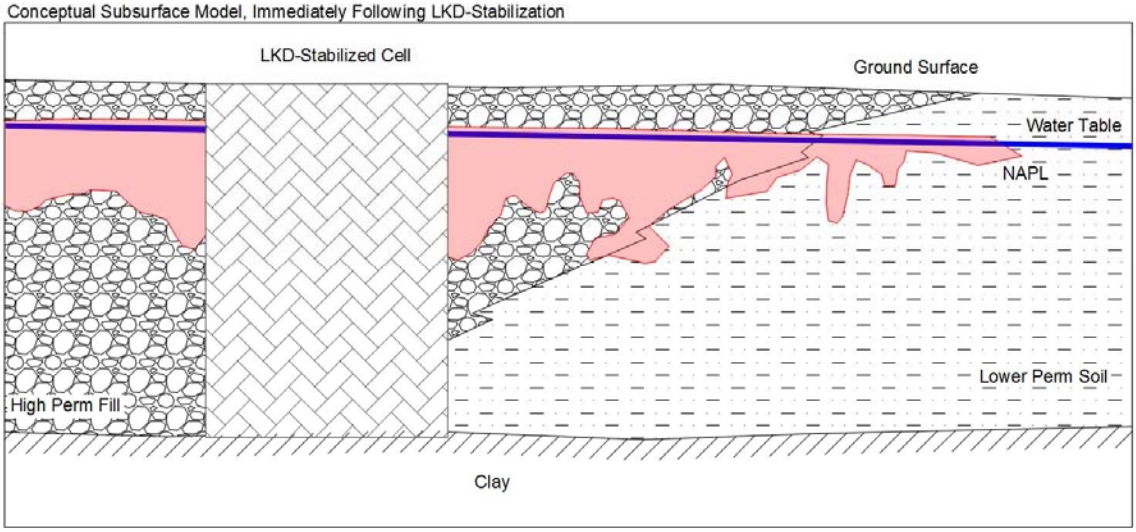
Field tests were completed to solidify three test cells where GCM occurred using LKD. While the addition of LKD had an immediate effect at reducing the odor and visible nature of GCM, the borings installed one month after stabilization produced evidence of GCM, indicating that the cell was not solidified.

The three test cells each measure 20 feet by 20 feet by four feet deep. GCM and petroleum-impacted groundwater was present on all four sides of each cell between 0.5 and 1.5 feet below ground surface. Therefore, an inward gradient between 2.5 to 3.5 feet of head exists at the edge of each cell. Results indicate that the addition of only LKD did not achieved a reduction in permeability adequate to prevent migration of GCM from the surrounding, untreated soil back into the area of stabilization. The following figures provide our interpretation of GCM pilot test results and illustrate the immediate effectiveness of LKD followed by gradual migration of GCM back into the stabilized material.

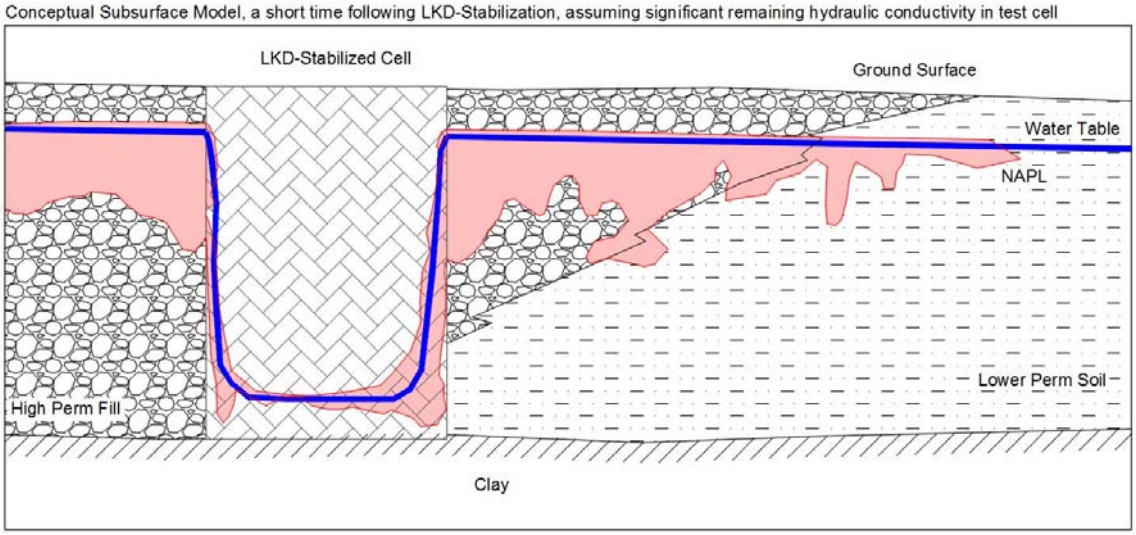
Conceptual Subsurface Model, Prior to Stabilization and/or Solidification



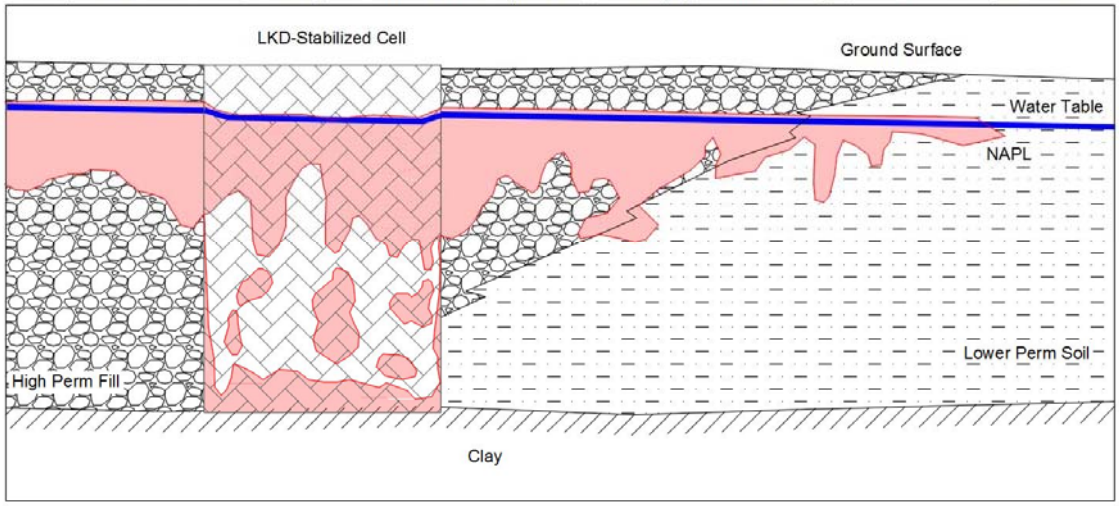

Conceptual Subsurface Model, Immediately Following LKD-Stabilization



Conceptual Subsurface Model, a short time following LKD-Stabilization, assuming significant remaining hydraulic conductivity in test cell




Conceptual Subsurface Model, Following LKD-Stabilization at Equilibration, assuming significant remaining hydraulic conductivity in test cell




Based on the results of the LKD test cell data, initial stabilization of GCM is observed, but an additive to the mixture or replacement is required to ensure long-term solidification. The selected additive or replacement reagent is portland cement due to its availability and inherent solidification properties. A review of the Solidification and Stabilization of Wastes using portland cement[2] indicates additives to portland cement (used in solidification applications) "adsorb water and may also adsorb metals and organics. In addition, many of the additives are pozzolans, which by themselves possess little or no cementitious value but will, in finely divided form and the presence of water, chemically react with the calcium hydroxide released by the hydration of portland cement to form additional cementitious compounds."

[2] Portland Cement Association (PCA), 1998, second edition, publication EB071

As a more effective solidification mixture, the use of portland cement will also provide a more effective means of minimizing groundwater flux across the OU-2 property, reducing the total groundwater flow to a negligible amount. This assertion is based on the project design parameter of stabilizing to the underlying clay (aquitard) over the majority of OU-2, thereby reducing the up-gradient contributory flow regime to OU-2 and beyond. As the remedial measure is constructed moving from north to south (upgradient to downgradient), groundwater in place will be consumed in the ISS mixture and additional groundwater recharge will be negligible due to the reduced permeability of the solidified mass of soil and fill. Areas in which treatments do not touch the underlying clay will remain saturated unless they are drained to a lower level by the existing hydrodynamics of the site.

# 3.0 PHASE 2 PILOT TEST

Phase 2 pilot testing was completed conducted in accordance with the NYSDEC approved work plans[3][4]. Amec mobilized to the site on July 24, 2017 to coordinate and complete field work. Field work was completed during the period of July 24 through July 28, 2017. ESR contracted Geo-Solutions Inc. (Geo-Solutions) of Pittsburgh, Pennsylvania to provide the excavation and mixing services for the pilot testing. Geo-Solutions is a construction firm, highly experienced in completing ISS applications. Geo-Solutions mobilized a Caterpillar 313 excavator, 500-gallon water trailer and miscellaneous field equipment. A copy of Geo-Solutions field report is provided as an attachment to this report. Geo-Solutions subcontracted Geotechnics of Pittsburgh, Pennsylvania to conduct analyses of samples by American Society for Testing and Materials (ASTM) Method D-1633 Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders (i.e., unconfined compressive strength [UCS] testing). Amec also subcontracted Geotechnics to complete analyses by ASTM Method D-5084, Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter (i.e., permeability testing). Chemical analyses were completed for total and TCLP by TestAmerica Laboratories of Buffalo, New York under contract to Amec.

## 3.1 Field Pilot Test Procedures

### 3.1.1 Lead Impacted Soil

Field tests completed in December 2016 included the mixing of portland cement (4.5% mixture) into an excavation (Test Plot “Lead-1”) where lead impacted fill had been exposed between 7.0 and 12.0 feet bgs. A sample of the mixed material was subjected to TCLP analyses using the 1311 methodology, in which extract fluid #2 was used to leach the sample due to the high pH resulting from portland cement addition. Discussions with NYSDEC since that time have resulted in the decision to use extract fluid #1 for future TCLP analyses based on the facts associated with the proposed remedial action.

Sampling is proposed to document the completeness of treatment within individual treatment units resulting from the remedial action. NYSDEC has indicated that such sampling should be conducted for TCLP lead. TCLP analyses are conducted using EPA SW846 Method 1311. Section 7.1.4 of Method 1311 specifies how the extract fluid is to be selected for TCLP analyses. The section states that when pH of a sample to be analyzed for non-volatiles is less than 5.0, Extract Fluid #1 (defined in Section 5.7.1 of the Method) is to be used for leaching. Otherwise, 3.5 ml of 1N HCl is to be added to the sample and the sample is to be heated for 10 minutes and the pH measured again. If the pH is greater than 5.0, Extract Fluid #2 is to be used in the leaching. The extract fluids differ significantly in pH; Extract Fluid #1 pH is 4.93 and Extract Fluid #2 pH is 2.88. Because the project is not regulated under RCRA and the objective is not to evaluate the performance of the treated soil within a hazardous waste storage cell containing a variety of hazardous substances, analyses of the samples may be modified by foregoing the extract selection procedure (except for documentation of sample pH prior to analysis) and Extract Fluid #1 will be pre-selected as the only extract fluid to be utilized for analyses of samples. Therefore, the methodology to be utilized to assess lead in treated

[3] Amec, July 7, 2017, “OU-2 Stabilization Pilot Scale Work Plan”, Letter to Chad Staniszewski and Eugene Melnyck, New York State Department Environmental Conservation
[4] Amec, July 15, 2017, “Revised OU-2 Stabilization Pilot Scale Work Plan”, Letter to Thomas Renauto, Krog-Renova Redevelopment LLC

soil will be Method 1311 Modified and NYSDEC has indicated that modification of the Method is appropriate.

An excavation was advanced approximately 30 feet southwest of Test Cell Lead-1 to expose the lead-impacted material at depths of 7 to 12 feet. As had been observed in Test Cell Lead-1, clay overlaid the subject material. The clay was damp and exhibited no evidence of GCM. Upon encountering the lead-impacted materials below the clay, groundwater rose in the excavation from the material below the clay and contained a petroleum odor and sheen. Materials excavated included a wooden barrel containing a white substance, presumed to be paint pigment based on previous observations at the site.

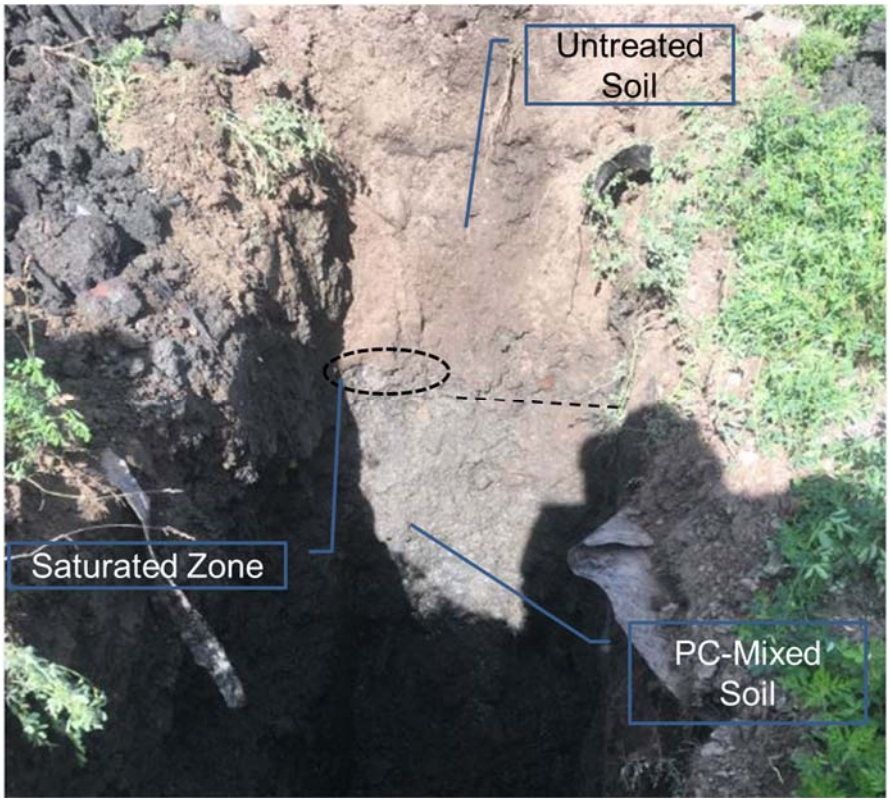
A sample was collected of the materials excavated from below the clay to prepare a sample for analysis of lead by the TCLP method, using extract fluid #1. A small aliquot (approximately ¼ cup) of the white material from the wooden barrel was blended into 10 pounds of soil from the excavation. Eight ounces (5% by weight) of Portland cement was blended into the soil while adding approximately 9 ounces of groundwater to affect a thorough mixture. The sample was mixed manually for approximately 15 minutes, until its consistency was stiff and no visible evidence of paint pigment or reagent remained. A sample was then prepared for analysis of total lead and leachable lead by TCLP Method 1311-Modified (see above). That sample was identified as Lead- 1/2.

Additionally, a sample that had been in Amec possession since the excavation at Lead-1 was removed from a glass jar and prepared for submittal to the laboratory for TCLP analyses. That sample had been collected as a portion (replicate) of a sample that was analyzed in December and a TCLP test, using extract fluid #2, detected 4.8 mg/l lead in the extract fluid. This sample was submitted to be analyzed for total lead and TCLP Lead using extract fluid #1 as a control sample to quantify the variation in the lead result based on use of the different extract fluid.

An excavation was advanced in the Lead-1 cell to make visual observations of the treated cell approximately seven months after its treatment. Overlying material consisted of the clay that prior to the December pilot test excavation was compacted and provided a very low permeability cover over the lead-impacted soil. Because that soil had not been recompacted following completion of test cell Lead-1, permeability of the clay is significantly greater than that of the clay surrounding it. Precipitation since December has infiltrated and saturated the clay, but upon visual observations, the infiltrated water has perched upon the top of the portland augmented material of Cell Lead-1. The portland augmented material was well cemented, although offered only moderate resistance to the excavator. Samples of the cemented material returned to the surface in the excavator bucket were noted to be dry or damp and without evidence of GCM. The cemented material was observed to act as a groundwater confining layer below the loose, saturated overlying soil and provided no visual evidence of transmitting groundwater. **Photographs 3** and **4** illustrate the material excavated from the test cell and the loose, saturated clay overlying the stabilized material.

**Photograph 3** -Treated soil from LEAD-1 Test Cell after 7 months of curing shows dry to damp characteristic.

**Photograph 4** - LEAD-1 Test Cell after 7 months of curing shows perched water zone in loose clay fill above portland-augmented soil, no evidence of GCM, and no significant water bearing capacity of the treated soil.



### 3.1.2 GCM

The scope of work for the Field Pilot Test included conducting additional in-situ stabilization (ISS) field testing to evaluate addition of portland cement and portland cement augmented with slag in field applications. Three groups of three test cells per group, were located in areas of the site containing petroleum impacted soils classified as GCM. The locations of the test cells, presented on **Figure 1**, were moved slightly from those contemplated in the Work Plan based on pre-excavation activities which were conducted to ensure that the available equipment could excavate 20 feet by 20 feet by 5 feet deep without refusal. During pre-excavation activities, concrete foundations, and what appeared to be a brick sewer or some other kind of water structure were encountered, causing some of the test cells to be relocated. The pilot test used mix ratios of four percent, five percent, and six percent portland cement.

Additionally, pulverized slag was obtained in a 5-gallon bucket to be added to samples of the portland-soil mixtures to prepare bench-scale samples. The slag augmented samples were prepared by mixing a known quantity of slag into a grab sample from a completely mixed pilot cell. Approximately 50 pounds of wet, mixed soil was collected into a 5-gallon bucket and an amount of slag was added as a ratio to the amount of cement contain in the mix. Cement to slag ratios of 2:1, 1:1, and 1:2 were prepared from samples obtained from selected test cells. **Table 4** summarizes the sample identifications, portland cement content, slag content, and cement to slag ratios.

**Table 4**
**Summary of Slag-Portland Content Mixes Tested**
**Second Pilot Testing**

| Sample Identification / Test Cell Identification | Cement to Slag Ratio | Slag Content | Portland Cement Content |
|---|---|---|---|
| GCM-4-5 | 1:1 | 5.0 % | 5.0 % |
| GCM-4-5 | 1:2 | 2.5 % | 5.0 % |
| GCM-5-6 | 1:1 | 6.0 % | 6.0 % |
| GCM-6-4 | 1:2 | 2.0 % | 4.0 % |
| GCM-6-4 | 2:1 | 8.0 % | 4.0 % |

Samples were formed in sample molds for bench-scale testing at a geotechnical laboratory and no slag was used in the mixtures of the test cells at site. The July 7, 2017 Work Plan had contemplated mixing slag into selected cells, but availability of slag for the pilot test made bench testing more practical.

## 3.2 Field Pilot Test Results

### 3.2.1 Lead Analyses – Treated Soil

Sampling of treated soil was conducted during the initial pilot testing and the results are summarized above in **Table 3**. One sample was prepared for analysis of total and TCLP lead from material excavated from a test pit located approximately 30 feet southwest of Test Cell Lead-1. A second

sample was also submitted for analysis, which had been prepared as a replicate of the Post-Treatment sample collected by Amec from Test Cell Lead-1 in December 2017. That sample had remained in custody of Amec since it was collected and was submitted for analysis to evaluate the effect of use of the modified TCLP Method. The initial replicate share of the sample was analyzed as sample "LEAD-1 POST" and TCLP leachate fluid Number 2 was used to extract metals for its analysis. **Table 5** presents the results of analyses of samples collected during both phases of pilot testing to evaluate the efficacy of addition of portland cement to the lead-impacted soil at OU-2.

**Table 5**
**Lead Samples**
**Analyses**
**Portland Cement Treated Soil containing Paint Wastes**

| Sample ID | Total Lead (mg/kg) | TCLP Lead (mg/L) | Flag | TCLP Leaching Fluid | Percent Moisture | Percent Solids | Description |
|---|---|---|---|---|---|---|---|
| LEAD-1 PRE | 5,850 | 16 | | No. 1 | 30 | 70 | Untreated sample |
| LEAD-1 POST | 5,500 | 4.3 | | No. 2 | 30 | 70 | Treated sample |
| LEAD1-0117 | 6,350 | 4.5 | | No. 2 | 23 | 77 | Treated sample, collected by boring January 2017 |
| LEAD-1 | 7,820 | 0.023 | | No. 1 | 10 | 90 | Replicate of LEAD-1 Post, held by Amec December to July |
| LEAD-1/2 | 702 | 0.0078 | J(1) | No. 1 | 24 | 76 | Pilot test 2, treated sample, Test Pit Lead 1/2, Paint residual mixed into sample |

(1) "J" indicates estimated concentration detected above method detection limit and below reporting limit

These data indicate that the total lead concentrations in samples collected from Lead-1 treated and untreated soil range from 5,500 milligrams per kilogram (mg/kg) to 7,820 mg/kg. Untreated soil TCLP analysis detected a concentration of 16 mg/l lead in the leachate. Analysis of treated samples subjected to Leaching Fluid Number 2 (pH of 2.88) detected 4.3 and 4.5 milligrams per liter (mg/l) lead. When the replicate of one of those samples was subjected to Leaching Fluid Number 1 (pH of 4.93), TCLP analysis lead detected a concentration of 0.023 mg/l. Analysis of the sample collected from the additional test pit indicated a total lead concentration of 702 mg/kg, and using Leaching Fluid Number 2, a TCLP lead concentration of 0.0078 mg/l was detected. The TCLP Standard for lead is 5.0 mg/l.

### 3.2.2 GCM

Nine pilot cells were excavated for the mixing of portland cement. The cells in each area were identified as GCM-4, GCM-5, and GCM-6 and each sub-cell was post scripted by the percentage of portland cement added (i.e., Cell GCM 4-5 is located at GCM-4 area and contains 5 percent portland cement). **Figure 1** illustrates the locations and identification of the test cells. Each cell was excavated to a depth of five feet. Only the cells of GCM-4 encountered the clay at 5 feet. The depth to clay at GCM-5 and GCM-6 exceeded five feet.

During excavation at each cell, Amec observed the addition of portland cement to the soil and mixing until the contents were thoroughly mixed. The field scientists used visual and olfactory cues to determine whether the additives had been thoroughly mixed and augmented the sensory observations with photoionization detector readings and use of a photographic gray scale (**Appendix A**) to monitor mixture tonal variation. These tools assisted the field observations to determine when mixing of the additives was complete.

**Table 6** provides a summary of the conditions observed during mixing of soil at the nine soil excavations. In each case, Amec personnel judged the mixing of portland and GCM-containing soil to be complete before sampling was conducted. Furthermore, in each case, the addition of portland cement consumed the available groundwater to the degree that mixing was difficult and groundwater was augmented with city water to complete the mixing. In the case of Cell GCM 4-4, mixing was completed without addition of water, then 500 gallons of water was added to the cell and mixed to improve the mix consistency. Therefore, although water was added to Cell GCM 4-4, the method by which the cell was mixed and water added was different from the methods by which the remaining cells were mixed. The following table also indicates the quantity of water added in each case to complete the mixing of soil and portland cement.

**Table 6**
**Summary of Test Cell Conditions**
**Second Pilot Testing**

| Cell | Depth to Clay (ft.) | Portland (%) | Initial Gray Scale | Final Gray Scale | Initial PID (ppm) | Final PID (ppm) | Cell Dimensions (ft.) | Water added (gal) |
|---|---|---|---|---|---|---|---|---|
| GCM 4-4 | 5 | 4 | 9 | 7 | 9 | 2.4 | 20x20x5 | 500 |
| GCM 4-5 | 5 | 5 | 10 | 6 | 120 | 16.2 | 20x20x5 | 1000 |
| GCM 4-6 | 5 | 6 | 10 | 6 | 140 | 11.4 | 20x20x5 | 1500 |
| GCM 5-4 | >5 | 4 | 8 | 7 | 65 | 0 | 20x20x5 | 1000 |
| GCM 5-5 | >5 | 5 | 9 | 7 | 12.3 | 0 | 20x20x5 | 700 |
| GCM 5-6 | >5 | 6 | 9 | 7 | 12.7 | 0 | 20x20x5 | 900 |
| GCM 6-4 | >5 | 4 | 9 | 7 | 21 | 0 | 20x15x5 | 1500 |
| GCM 6-5 | >5 | 5 | 9 | 7 | 19.7 | 0 | 20x16x5 | 1500 |
| GCM 6-6 | >5 | 6 | 9 | 6 | 28.7 | 0 | 20x16.5x5 | 1500 |

Samples were collected from each cell for analyses by ASTM Method D-1633 for UCS by Geo-Solutions. UCS testing was conducted at 7-days, 14-days, and 28-days. Amec collected samples for analyses by ASTM Method D-5084 for permeability testing. Permeability tests were conducted at 14-days and 28-days.

During sample collection, Amec prepared a sample from Cell GCM 4-4 after the cell was mixed dry, but before 500 gallons was mixed into the cell. The sample collected by Amec is referred to as GCM 4-4DRY and was only analyzed for permeability at 28-days. Comparing that permeability with the 28-day result for sample GCM 4-4 (collected after 500 gallons was mixed into the cell) provides data to compare both mixtures.

Photographs 5 and 6 show the mixing of soil and reagent at test cell GCM 4-4. **Photograph 5** shows the mixing of reagent at the cell without water, which was completed to an endpoint judged complete mixing based on photographic gray scale observations and all other olfactory and visual cues.

**Photograph 6** shows the mixing of water into the test cell following the mixing of reagent to further hydrate the reagent. Subsequent test cells were mixed with water and reagent simultaneously.

**Photograph 5** – Dry mixing of reagent at Test Cell GCM 4-4.

**Photograph 6** – Addition of water at Test Cell GCM 4-4 after reagent had already been mixed

**Table 7** provides a summary of the results of the UCS and permeability tests performed by Geotechnics on samples collected from the nine test cells. The intent of the mixture is to achieve unconfined strength of at least 40 pounds per square inch (psi) based on 28-day tests and permeability not greater than 1 x $10^{-6}$ centimeters per second (cm/s). For convenience, **Table 7** has been arranged with sample results from like cement mix percentages together to illustrate the strength and permeability values associated with each mix (4 percent, 5 percent, and 6 percent).

**Table 7**
**Pilot Study Geotechnical Results**

| | | | Unconfined Compressive Strength | | | Permeability | |
|---|---|---|---|---|---|---|---|
| Cell ID | Cement Content (%vol) | Water Added (gal.) | 7 day (psi) | 14 day (psi) | 28 day (psi) | 14 day (cm/s) | 28 day (cm/s) |
| GCM-4-4DRY | 4% | 0 | | | | | 3.9E-07 |
| GCM-4-4 | 4% | 500 | 17.74 | 22.37 | 22.28 | 2.9E-07 | 3.3E-07 |
| GCM-5-4 | 4% | 1000 | 63.28 | 77.91 | 95.00 | | 3.6E-07 |
| GCM-6-4 | 4% | 1000 | 74.21 | 90.24 | 102.00 | 1.2E-07 | 1.1E-07 |
| GCM-4-5 | 5% | 1000 | 55.48 | 145.84 | 79.15 | | 8.8E-07 |
| GCM-5-5 | 5% | 750 | 115.37 | 149.81 | 235.39 | 4.2E-07 | 3.1E-07 |
| GCM-6-5 | 5% | 1000 | 114.25 | 139.92 | 174.78 | 7.5E-08 | 7.7E-08 |
| GCM-4-6 | 6% | 1500 | 63.22 | 64.95 | 92.00 | | 2.5E-07 |
| GCM-5-6 | 6% | 700 | 462.73 | 128.40 | 155.97 | | 1.9E-07 |
| GCM-6-6 | 6% | 1000 | 81.17 | 116.22 | 133.91 | 1.9E-07 | 1.3E-07 |

Analyses of the samples indicate that 28-day UCS values vary from 22.28 psi to 102.00 psi in the 4 percent mixes. When the mixing variation of GCM 4-4 is considered (water was added after cement and soil were fully mixed), the low value (22.28 psi) is considered as an outlier. The remaining mixes were prepared by adding 1000 gallons of water during the mixing and produced similar strength results, which were both acceptable (95.00 psi and 102.00 psi) for the intended reuse of the property. Analyses of the mixes containing 5 percent portland cement produced 28-day UCS values between 79.15 and 235.39 psi. The two lower strength values (in GCM 4-5 and GCM 6-5) were produced in mixes using 1,000 gallons of water while the mix with the highest strength value was produced in a mix that used 750 gallons of water. While no direct correlation is apparent between water added and strength developed, it is evident that 28-day strength produced with addition of 750 gallons of water are high for the intended reuse of the property and addition of 1,000 gallons produced one UCS strength that is high (174.78 psi) and another value that is generally acceptable (79.15 psi) for the intended reuse. The 28-day strength values for the 6 percent mixes varied from 92.00 psi to 155.97 psi. As with the previous samples, the quantity of water added did show an apparent correlation with developed strength.

Analyses of the samples from the test cells for permeability produced very low hydraulic permeability values. The overall range of values was between 1.1 x $10^{-7}$ cm/s and 7.7 x $10^{-8}$ cm/s. In general, the lowest permeability values were within one half of an order of magnitude of the highest values and the highest values are more than an order of magnitude lower than the design intended minimum permeability. The permeability value produced by the 4 percent mix at GCM 4-4 DRY was 3.9 x $10^{-7}$ cm/s. After water had been added to the mixture, the resulting permeability of the mix was 3.3 x $10^{7}$ cm/s. Although the difference is relatively small, it demonstrates a slight decrease in permeability in the mix, likely due to more effective hydration of the cement. Mixtures using 4 percent cement produced permeability values similar to those produced in the 6 percent mix samples. Mixtures using 5 percent portland cement produced permeability values that were lower than either the 4 percent or 6 percent mixes, but had the greatest variance.

Amec has conducted a simple calculation to estimate the flux of groundwater through a hypothetical treated soil mass at OU-2, measuring 2,025 feet wide (W; perpendicular to groundwater flow), 733 feet long (L; parallel to groundwater flow) and 5 feet thick (T). The assumed gradient (i) across the block would be 0.005 ft./ft. based on the length of the block (733 feet) and groundwater elevations of 584 ft. at the upgradient side and 580 feet at the downgradient side, like conditions observed between Elk and Prenatt Streets. When a hydraulic conductivity (K) of 1 x $10^{-7}$cm/s (3.28 x $10^{-9}$ feet per second) is used for the block, the discharge (Q) can be calculated using the equation:

$$Q = K * i * W * T = 1.7 \times 10^{-7} \text{ ft}^3\text{/second} = \mathbf{7.45 \times 10^{-5} \text{ gallons per minute}}$$

In addition to the portland-soil mixed samples, slag augmented samples were submitted for strength and permeability testing. These tests were each conducted at 28 days assess the decrease in permeability associated with the use of slag. The results of those tests are provided in **Table 8** below.

**Table 8**
**Pilot Study Geotechnical Results**
**Slag Augmented Samples**

| | | | | UCS | Perm |
|---|---|---|---|---|---|
| Slag-Augmented Samples | Slag to Portland Ration | Slag Content | Cement Content | 28 day (psi) | 28 day (cm/s) |
| GCM-4-5 (1:1) | 1:1 | 5% | 5% | | 1.9E-08 |
| GCM-4-5 (1:2) | 1:2 | 2.5% | 5% | 213.95 | 5.6E-08 |
| GCM-5-6 (1:1) | 1:1 | 6% | 6% | | 1.0E-08 |
| GCM-6-4 (1:2) | 1:2 | 2% | 4% | 203.81 | 4.2E-08 |
| GCM-6-4 (2:1) | 2:1 | 8% | 4% | 450.99 | 1.7E-08 |

Use of slag presented significantly lower permeability values than portland cement alone. The permeability values ranged between 1.0 x $10^{-8}$ cm/s and 5.6 x $10^{-8}$ cm/s. However, the increased strength of the material exceeds 200 psi, which is excessively high for the intended reuse of the property.

## 3.3 Return to Site to Inspect Cured Test Cells

During the week of September 18, 2017, Amec and Geo-Solutions returned to the site to excavate test pits into some of the cured test cells to make visual observations of the treated soil. Because permeability testing was completed on samples provided without difficulty or failures in the samples (breakage prohibiting testing, etc.) field permeability testing at the test cells was not required. Excavations were located at each test cell investigated and advanced to a depth of approximately four feet. At that depth, the bottom of the cell remained intact and exterior groundwater did not enter the test pit as the inspection was underway. Visual observations were made for the presence of groundwater, evidence of GCM, or evidence of incomplete mixing of reagent and soil.

Following excavation of the center of each test pit, an extended pit was excavated from the center of the cell to one edge of the cell, into untreated soil. When the untreated soil was encountered, observations were made regarding the presence of groundwater and GCM exterior to the test cell. Test pits were excavated in each test cell where 4 percent portland cement had been added (i.e., GCM 4-4, GCM 5-4, and GCM 6-4), two of the 5 percent portland cement test cells (GCM 5-5 and GCM 6-5) and one 6 percent portland cement test cell (GCM 6-6).

Test Cell GCM 4-4 was excavated and a very small quantity of water was observed at a depth of approximately 1 foot below ground surface. Water level did not rise in the excavation, likely indicating a small amount of infiltration that had entered the cell. The surface of GCM 4-4 appeared more friable than other test cells. The degree of mixing in the cell appeared to be less complete than that observed in other cells. **Photographs 7, 8, and 9** below show the surface of the cell prior to excavation, water encountered at one foot, and degree of mixing within the cell (photograph showing completed trench to untreated soil).


**Photograph 7**

**Photograph 8**

**Photrograph 9**

Excavations in cells GCM 5-4 and GCM 6-4 indicated dry cells with more competent appearance to the surface finish of the treated soil (**Photographs 10 and 11**).

**Photograph 10** –Cell GCM 5-4

**Photograph 11** –Cell GCM 6-4

Mixtures observed in cells GCM 5-4 and GCM 6-4 indicated well blended reagent and soil as shown in **Photographs 12 and 13** below.

**Photographs 12 and 13** - Excavations completed in test cells mixed with 5 percent portland cement and 6 percent portland cement continued to show that no water was present within the mixed soil, no evidence of GCM was observed, and thorough mixing of reagent and soil had occurred. In each case, groundwater and GCM were encountered when the test pits were extended to the untreated soil at the lateral limits of the test cells. Depth to groundwater exterior of the test cells was observed to be at a maximum depth of 2.5 feet below ground surface.

# 4.0 RECOMMENDATIONS

## 4.1 GCM Area

Extensive Pilot testing data indicates that the addition of 4 percent portland cement by weight to GCM soil at OU-2 provides lasting treatment of the GCM, as is demonstrated by observations made at test cells GCM 4-4, GCM 5-4, and GCM 6-4. Permeability tests and observations show that when portland cement is mixed in the presence of water, permeability is on the order of 1 x $10^{-7}$cm/s or lower and the consistency of the cured, treated soil is competent. Observations of the cured, treated material mixed thoroughly in the presence of water indicated a dry to damp solidified material, for which UCS testing indicates strengths that are consistent with the intended end use of the subject property. Estimations of groundwater flux through the treated soil suggest a total groundwater flux through the current saturated zone of OU-2 on the order of 0.00007 gpm. Testing results indicate that use of greater percentages of portland cement (5 percent) do not reduce the permeability appreciably without increasing the unconfined strength of the material to a point where it may become difficult to excavate during redevelopment of the property. Also, permeability produced at higher concentrations of portland cement (6 percent) are generally the same as those produced by 4 percent portland cement and the unconfined strength of the material also increases to a point where future excavation may be more difficult. Use of slag produces significantly lower permeability in mixed samples, but also significantly increases strength of the stabilized soil, to a point where it maybe become difficult to excavate.

Therefore, Amec recommends the addition of 4 percent portland cement based on the assumed soil bulk density used in this and previous pilot testing (100 pounds per cubic foot) along with the addition of water and or use of existing groundwater to thoroughly mix soil and reagent to the depths and limits specified within the design provided for remediation of OU-2.

## 4.2 Lead Area

Pilot testing data indicate that a mixture of 4.5% portland cement solidified the lead-impacted fill material, limiting the potential for future exposure to lead. Results from laboratory analysis of solidified material indicated concentrations below TCLP standards. When the TCLP methodology uses Extract Fluid Number 1 (based on the absence of extremely low pH wastes at OU-2), TCLP analyses indicate lead concentrations orders of magnitude below the 5.0 mg/l standard. Sampling of impacted material that was treated with 5 percent portland cement produced similar results in TCLP analyses. Therefore, treatment of the lead-impacted soil is recommended by addition of 5 percent portland cement by weight (and not to exceed 5 percent) based on the assumed soil bulk density. The assumed soil bulk density used in this and previous pilot testing (100 pounds per cubic foot). Based on field observations, portland cement addition should be completed by addition of water (between 750 and 1000 gallons were added to 2000 cubic foot pilot test cells) and or use of existing groundwater to thoroughly mix soil and reagent to the depths and limits specified within the design provided for remediation of OU-2.

# TABLES

**Table 1**

**Lead-1 Excavation addition of 4.5% Portland Cement**

| | | LEAD-1 PRE | LEAD-1 POST | LEAD1-0117 | |
|---|---|---|---|---|---|
| Analyte | | Result | Result | Result | |
| Photoionization Detector | ppm | 6 | N/A | | |
| Lead | mg/Kg | 5850 | 5500 | 6350 | |
| Lead - TCLP | mg/L | 16 | 4.3 | 4.5 | a |
| | | | | | |
| Initial pH in ext fluid | SU | | 8.75 | 11.67 | |
| Arsenic | mg/Kg | | | 21 | |
| Barium | mg/Kg | | | 980 | |
| Cadmium | mg/Kg | | | 7.8 | |
| Chromium | mg/Kg | | | 124 | |
| Selenium | mg/Kg | | | 1.9 | J |
| Silver | mg/Kg | | | 1 | |
| Mercury | mg/Kg | | | 0.33 | |
| | | | | | |
| 1,2,4-Trimethylbenzene | mg/Kg | | | 3.6 | |
| 1,3,5-Trimethylbenzene | mg/Kg | | | 1.6 | |
| 4-Isopropyltoluene | mg/Kg | | | 0.8 | |
| Chlorobenzene | mg/Kg | | | 0.11 | J |
| Isopropylbenzene | mg/Kg | | | 0.27 | J |
| Methylcyclohexane | mg/Kg | | | 3.5 | |
| Methylene Chloride | mg/Kg | | | 1.1 | B |
| Naphthalene | mg/Kg | | | 0.92 | |
| n-Butylbenzene | mg/Kg | | | 0.33 | J |
| N-Propylbenzene | mg/Kg | | | 0.45 | J |
| sec-Butylbenzene | mg/Kg | | | 0.36 | J |
| Xylenes, Total | mg/Kg | | | 1.1 | J |
| | | | | | |
| 2-Methylnaphthalene | mg/Kg | | | 0.43 | J |
| Acenaphthene | mg/Kg | | | 0.73 | J |
| Acenaphthylene | mg/Kg | | | 0.21 | J |
| Anthracene | mg/Kg | | | 1.3 | |
| Benzo[a]anthracene | mg/Kg | | | 2.6 | |
| Benzo[a]pyrene | mg/Kg | | | 2.2 | |
| Benzo[b]fluoranthene | mg/Kg | | | 2.7 | |
| Benzo[g,h,i]perylene | mg/Kg | | | 1.5 | |
| Benzo[k]fluoranthene | mg/Kg | | | 1 | J |
| Carbazole | mg/Kg | | | 0.66 | J |
| Chrysene | mg/Kg | | | 2.5 | |
| Dibenzofuran | mg/Kg | | | 0.56 | J |
| Fluoranthene | mg/Kg | | | 5.9 | |
| Fluorene | mg/Kg | | | 0.98 | J |
| Indeno[1,2,3-cd]pyrene | mg/Kg | | | 1.2 | |
| Naphthalene | mg/Kg | | | 0.72 | J |
| Phenanthrene | mg/Kg | | | 5.8 | |
| Pyrene | mg/Kg | | | 4.6 | |

a) Sample collected 0117 was rerun and reanalyzed.

**Table 2**
**GCM-1 Excavation Addition of 5% LKD**

| | GCM-1 PRE | | GCM-1 POST | |
|---|---|---|---|---|
| Analyte | mg/Kg | | mg/Kg | |
| Photoionization Detector | 2.8 | ppm | 1.4 | ppm |
| Diesel Range Organics | 47000 | | 20000 | |
| GRO (C6-C10) | 22 | | 12 | |
| | | | | |
| 1,2,4-Trimethylbenzene | 0.14 | | 0.18 | |
| 1,3,5-Trimethylbenzene | 0.068 | J | 0.079 | |
| 4-Isopropyltoluene | 0.2 | | 0.41 | |
| Benzene | 0.016 | J | 0.017 | J |
| Cyclohexane | 0.018 | MDL | 0.046 | J |
| Ethylbenzene | 0.023 | MDL | 0.039 | J |
| Methyl acetate | 0.23 | J | 1.5 | |
| Methylcyclohexane | 0.11 | | 0.11 | |
| Naphthalene | 0.13 | | 0.13 | |
| N-Propylbenzene | 0.024 | J | 0.03 | J |
| Toluene | 0.046 | J | 0.059 | J |
| Xylenes, Total | 0.14 | J | 0.18 | |
| | | | | |
| Chrysene | 14.0 | J | 11.0 | J |
| Fluoranthene | 2.8 | J | 2.1 | J |
| Phenanthrene | 6.1 | J | 5.8 | J |
| Pyrene | 6.3 | J | 5.7 | J |

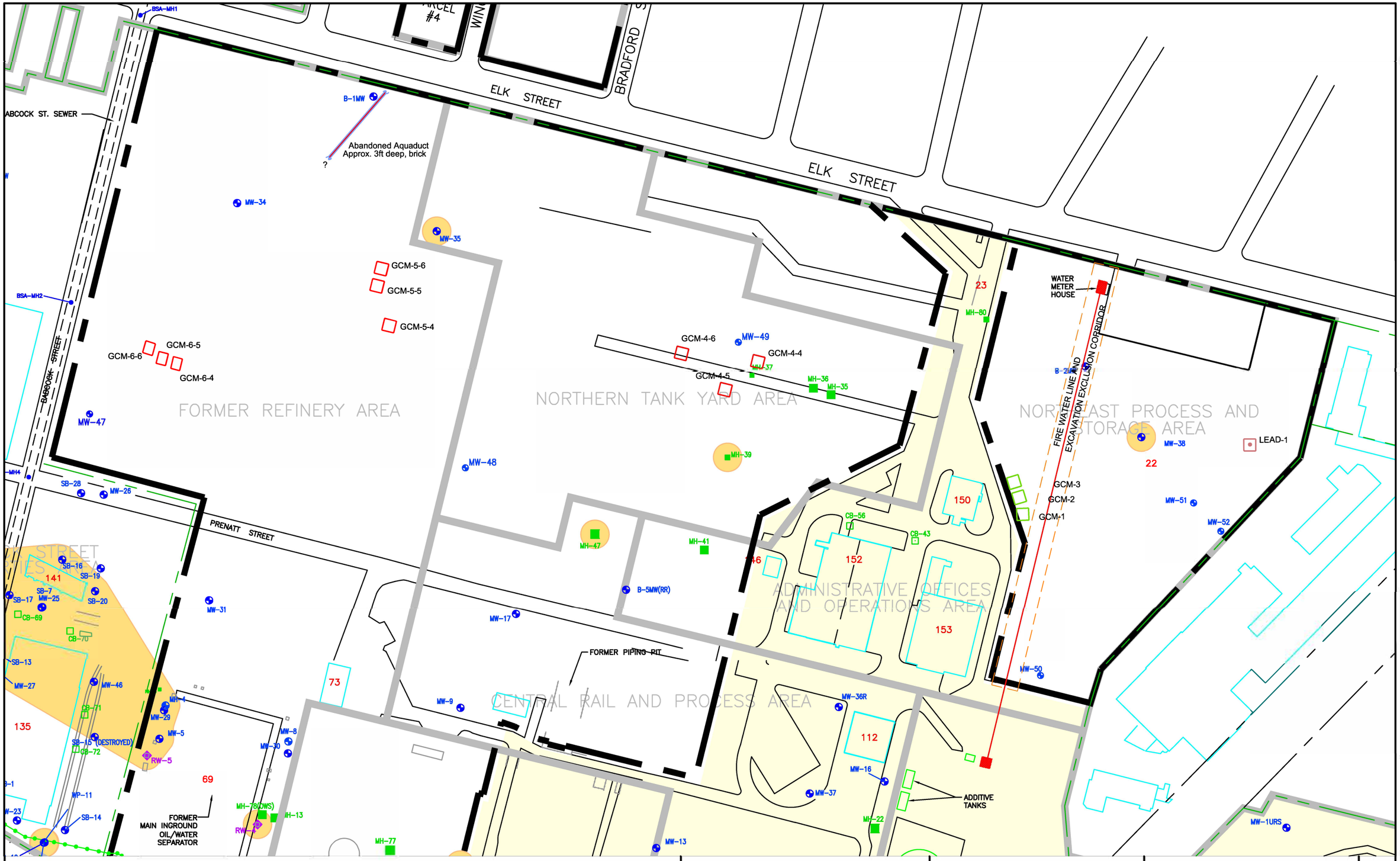
**Table 2 (Continued)**
**GCM-2 Excavation Addition of 7.5% LKD**

| | GCM-2 PRE | | GCM-2 POST | |
|---|---|---|---|---|
| Analyte | mg/Kg | | mg/Kg | |
| Photoionization Detector | 3.9 | ppm | 1 | ppm |
| Diesel Range Organics | 56000 | | 29000 | |
| GRO (C6-C10) | 26 | | 23 | |
| | | | | |
| 1,2,4-Trimethylbenzene | 0.35 | | 0.28 | |
| 1,3,5-Trimethylbenzene | 0.14 | | 0.11 | |
| 4-Isopropyltoluene | 0.22 | | 0.62 | |
| Acetone | 0.42 | | 0.35 | |
| Benzene | 0.047 | J | 0.024 | J |
| Ethylbenzene | 0.12 | | 0.068 | |
| Isopropylbenzene | 0.047 | J | 0.031 | J |
| Methyl acetate | 0.62 | | 2.1 | |
| Methylcyclohexane | 0.31 | | 0.16 | |
| Naphthalene | 0.27 | | 0.25 | |
| n-Butylbenzene | 0.077 | | 0.051 | J |
| N-Propylbenzene | 0.088 | | 0.049 | J |
| sec-Butylbenzene | 0.041 | J | 0.028 | J |
| Toluene | 0.21 | | 0.095 | |
| Xylenes, Total | 0.51 | | 0.35 | |
| | | | | |
| Benzo[a]pyrene | 4.1 | MDL | 2.9 | J |
| Benzo[b]fluoranthene | 4.5 | MDL | 3.7 | J |
| Benzo[g,h,i]perylene | 3.0 | MDL | 2.0 | J |
| Chrysene | 31.0 | | 17.0 | |
| Fluoranthene | 4.1 | J | 4.1 | J |
| Indeno[1,2,3-cd]pyrene | 3.5 | MDL | 2.1 | J |
| Phenanthrene | 13.0 | J | 7.0 | J |
| Pyrene | 14.0 | J | 6.8 | J |

**Table 2 (Continued)**
**GCM-3 Excavation Addition of 10% LKD**

| | GCM-3 PRE | | GCM-3 POST | |
|---|---|---|---|---|
| Analyte | mg/Kg | | mg/Kg | |
| Photoionization Detector | 8.9 | ppm | 2.9 | ppm |
| Diesel Range Organics | 52000 | | 27000 | |
| GRO (C6-C10) | 28 | | 27 | |
| | | | | |
| 1,2,4-Trimethylbenzene | 0.25 | | 0.26 | |
| 1,3,5-Trimethylbenzene | 0.1 | | 0.1 | |
| 4-Isopropyltoluene | 0.15 | | 0.15 | |
| Acetone | 0.3 | J | 0.26 | MDL |
| Benzene | 0.022 | J | 0.024 | J |
| Cyclohexane | 0.12 | | 0.014 | MDL |
| Ethylbenzene | 0.054 | J | 0.059 | J |
| Isopropylbenzene | 0.052 | J | 0.038 | J |
| Methyl acetate | 0.42 | | 1.8 | |
| Methylcyclohexane | 0.32 | | 0.17 | |
| Naphthalene | 0.12 | | 0.14 | |
| n-Butylbenzene | 0.081 | | 0.053 | J |
| N-Propylbenzene | 0.057 | J | 0.052 | J |
| sec-Butylbenzene | 0.024 | MDL | 0.035 | J |
| Toluene | 0.078 | | 0.068 | |
| Xylenes, Total | 0.31 | | 0.28 | |
| | | | | |
| Chrysene | 19.0 | | 7.0 | J |
| Fluoranthene | 2.9 | J | 2.6 | MDL |
| Phenanthrene | 6.3 | J | 7.2 | J |
| Pyrene | 8.9 | J | 2.9 | MDL |

# FIGURES




KROG RENOVA
BUFFALO, NEW YORK

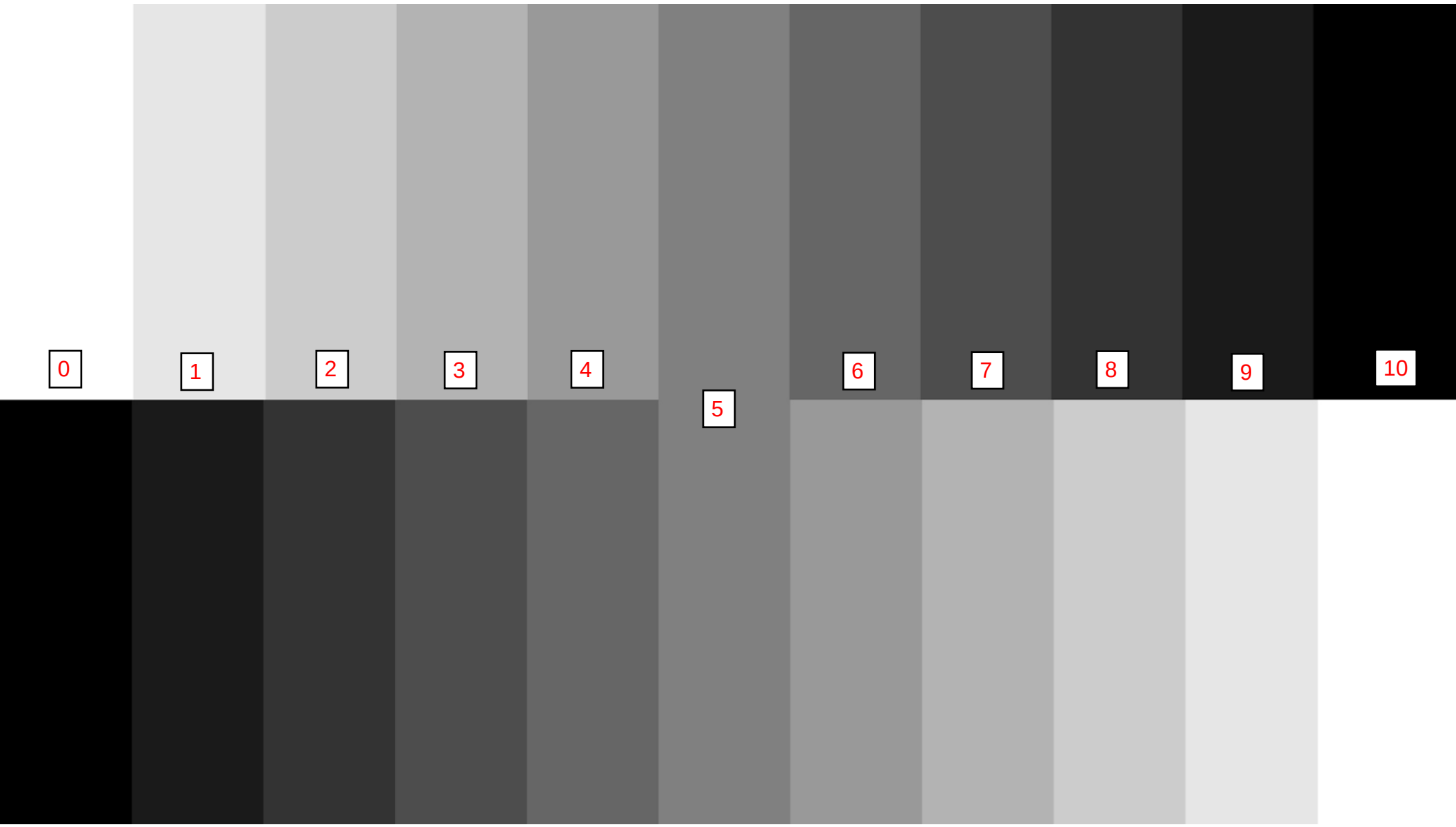
Project No.: 3617167397

PILOT TESTING OU-2 GCM AREAS
TEST CELL LOCATIONS
EXXONMOBIL TERMINAL SITE

Figure: 1

# APPENDIX A

# GRAY SCALE


0
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# APPENDIX B

# LABORATORY REPORTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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

TestAmerica Job ID: 480-111089-1
Client Project/Site: Former Exxon Terminal

For:
Northstar Demolition and Remediation LP
2760 S. Falkenburg Road
Riverview, Florida 33578

Attn: Mr. Mark Talarico

*Authorized for release by:*
*12/29/2016 12:06:35 PM*
Rebecca Jones, Project Management Assistant I
rebecca.jones@testamericainc.com

Designee for

John Schove, Project Manager II
(716)504-9838
john.schove@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

# Table of Contents

## Qualifiers

### GC/MS VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

### GC/MS Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |
| X | Surrogate is outside control limits |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| * | LCS or LCSD is outside acceptance limits. |

### GC VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |

### GC Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| X | Surrogate is outside control limits |
| 4 | MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable. |
| U | Indicates the analyte was analyzed for but not detected. |

### Metals

| Qualifier | Qualifier Description |
|---|---|
| 4 | MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable. |
| U | Indicates the analyte was analyzed for but not detected. |

## Glossary

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

## Job ID: 480-111089-1

### Laboratory: TestAmerica Buffalo

**Narrative**

**Job Narrative**
**480-111089-1**

**Comments**
No additional comments.

**Receipt**
The samples were received on 12/14/2016 1:43 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0º C.

**GC/MS VOA**
Method(s) 8260C: 1. The following samples were analyzed using medium level soil analysis due to the nature of the sample matrix: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4), GCM-3 PRE (480-111089-5) and GCM-3 POST (480-111089-6). Elevated reporting limits (RLs) are provided.

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

**GC/MS Semi VOA**
Method(s) 8270D: The following samples were diluted due to appearance and viscosity: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4) and GCM-3 PRE (480-111089-5). Elevated reporting limits (RL) are provided.

Method(s) 8270D: The following samples required a dilution due to appearance and viscosity: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4) and GCM-3 PRE (480-111089-5). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-337355 recovered outside acceptance criteria, low biased, for bis (2-chloroisopropyl) ether. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for this analyte, the data have been reported.

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-337355 recovered above the upper control limit for 4-Nitrophenol, Hexachlorobenzene and Hexachlorobutadiene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4) and GCM-3 PRE (480-111089-5).

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-337355 recovered above the upper control limit for 2,4,6-Tribromophenol. The samples associated with this CCV were non-detects for analytes affected by this surrogate; therefore, the data have been reported. The following samples are impacted: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4) and GCM-3 PRE (480-111089-5).

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-337856 recovered above the upper control limit for p-Terphenyl-d14(Surr), 4-Nitrophenol, Butyl benzyl phthalate, 2,4,6-Tribromophenol(Surr), 2-Methylnaphthalene, Pyrene and Nitrobenzene-d5(Surr). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: GCM-3 POST (480-111089-6).

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-337856 recovered outside acceptance criteria, low biased, for Anthracene and bis (2-chloroisopropyl) ether. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for this analyte, the data have been reported. The following sample is impacted: GCM-3 POST (480-111089-6).

Method(s) 8270D: The laboratory control sample (LCS) for preparation batch 480-337662 recovered outside control limits for the following analytes: 2-Nitroaniline and Hexachlorocyclopentadiene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported. The following sample is impacted: GCM-3 POST (480-111089-6)

Method(s) 8270D: The following sample was diluted due to the nature of the sample matrix: GCM-3 POST (480-111089-6). As such,

## Job ID: 480-111089-1 (Continued)

### Laboratory: TestAmerica Buffalo (Continued)

surrogate recoveries are below the calibration range or are not reported, and elevated reporting limits (RLs) are provided.

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

**GC VOA**

Method(s) 8015D: The following sample was diluted due to the nature of the sample matrix: GCM-1 PRE (480-111089-1). Elevated reporting limits (RLs) are provided.

Method(s) 8015D: Reported analyte concentrations in the following samples are below 200 ug/kg and may be biased low due to the samples not being collected according to 5035-L/5035A-L low-level specifications: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4), GCM-3 PRE (480-111089-5) and GCM-3 POST (480-111089-6).

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

**GC Semi VOA**

Method(s) 8015D: The following samples were diluted due to an abundance of target analytes: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4), GCM-3 PRE (480-111089-5) and GCM-3 POST (480-111089-6). As such, surrogate recoveries are estimated and not representative, and elevated reporting limits (RLs) are provided.

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

**Metals**

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

**Organic Prep**

Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following sample: LEAD-1 POST (480-111089-8). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method(s) 3550C: Due to the matrix, the following samples could not be concentrated to the final method required volume: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4) and GCM-3 PRE (480-111089-5). The reporting limits (RLs) are elevated proportionately.

Method(s) 3550C: Due to the matrix, the following sample could not be concentrated to the final method required volume: GCM-3 POST (480-111089-6). The reporting limits (RLs) are elevated proportionately.

Method(s) 3550C: Due to the matrix, the following samples could not be concentrated to the final method required volume: GCM-1 PRE (480-111089-1), GCM-1 POST (480-111089-2), GCM-2 PRE (480-111089-3), GCM-2 POST (480-111089-4), GCM-3 PRE (480-111089-5), GCM-3 POST (480-111089-6), (480-111089-A-6 MS) and (480-111089-A-6 MSD). The reporting limits (RLs) are elevated proportionately.

Method(s) 3550C: Due to the matrix, the following sample could not be concentrated to the final method required volume: GCM-3 POST (480-111089-6). The reporting limits (RLs) are elevated proportionately.

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

# Detection Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Client Sample ID: GCM-1 PRE — Lab Sample ID: 480-111089-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 140 | | 79 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 68 | J | 79 | 24 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 200 | | 79 | 27 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzene | 16 | J | 79 | 15 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 230 | J | 400 | 38 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 110 | | 79 | 37 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 130 | | 79 | 27 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 24 | J | 79 | 21 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 46 | J | 79 | 21 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 140 | J | 160 | 44 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Chrysene | 14000 | J | 18000 | 3900 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Fluoranthene | 2800 | J | 18000 | 1900 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 6100 | J | 18000 | 2600 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Pyrene | 6300 | J | 18000 | 2100 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 22 | | 17 | 4.4 | mg/Kg | 10 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 47000 | | 4400 | 1300 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: GCM-1 POST — Lab Sample ID: 480-111089-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 180 | | 73 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 79 | | 73 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 410 | | 73 | 25 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzene | 17 | J | 73 | 14 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Cyclohexane | 46 | J | 73 | 16 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Ethylbenzene | 39 | J | 73 | 21 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 1500 | | 370 | 35 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 110 | | 73 | 34 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 130 | | 73 | 25 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 30 | J | 73 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 59 | J | 73 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 180 | | 150 | 41 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Chrysene | 11000 | J | 17000 | 3900 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Fluoranthene | 2100 | J | 17000 | 1800 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 5800 | J | 17000 | 2600 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Pyrene | 5700 | J | 17000 | 2000 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 12 | | 1.6 | 0.43 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 20000 | | 2200 | 650 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: GCM-2 PRE — Lab Sample ID: 480-111089-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 350 | | 69 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 140 | | 69 | 21 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 220 | | 69 | 23 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Acetone | 420 | | 350 | 290 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzene | 47 | J | 69 | 13 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Ethylbenzene | 120 | | 69 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Isopropylbenzene | 47 | J | 69 | 10 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 620 | | 350 | 33 | ug/Kg | 1 | ☼ | 8260C | Total/NA |

This Detection Summary does not include radiochemical test results.

## Client Sample ID: GCM-2 PRE (Continued)

Lab Sample ID: 480-111089-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Methylcyclohexane | 310 | | 69 | 32 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 270 | | 69 | 23 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| n-Butylbenzene | 77 | | 69 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 88 | | 69 | 18 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| sec-Butylbenzene | 41 | J | 69 | 26 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 210 | | 69 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 510 | | 140 | 38 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Chrysene | 31000 | | 28000 | 6300 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Fluoranthene | 4100 | J | 28000 | 3000 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 13000 | J | 28000 | 4100 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Pyrene | 14000 | J | 28000 | 3300 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 26 | | 1.5 | 0.40 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 56000 | | 6000 | 1800 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: GCM-2 POST

Lab Sample ID: 480-111089-4

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 280 | | 67 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 110 | | 67 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 620 | | 67 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Acetone | 350 | | 330 | 270 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzene | 24 | J | 67 | 13 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Ethylbenzene | 68 | | 67 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Isopropylbenzene | 31 | J | 67 | 10 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 2100 | | 330 | 32 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 160 | | 67 | 31 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 250 | | 67 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| n-Butylbenzene | 51 | J | 67 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 49 | J | 67 | 17 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| sec-Butylbenzene | 28 | J | 67 | 25 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 95 | | 67 | 18 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 350 | | 130 | 37 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzo[a]pyrene | 2900 | J | 17000 | 2500 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Benzo[b]fluoranthene | 3700 | J | 17000 | 2700 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Benzo[g,h,i]perylene | 2000 | J | 17000 | 1800 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Chrysene | 17000 | | 17000 | 3800 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Fluoranthene | 4100 | J | 17000 | 1800 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Indeno[1,2,3-cd]pyrene | 2100 | J | 17000 | 2100 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 7000 | J | 17000 | 2500 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Pyrene | 6800 | J | 17000 | 2000 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 23 | | 1.5 | 0.41 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 29000 | | 3200 | 950 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: GCM-3 PRE

Lab Sample ID: 480-111089-5

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 250 | | 66 | 18 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 100 | | 66 | 20 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 150 | | 66 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Acetone | 300 | J | 330 | 270 | ug/Kg | 1 | ☼ | 8260C | Total/NA |

This Detection Summary does not include radiochemical test results.

# Detection Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Client Sample ID: GCM-3 PRE (Continued)

Lab Sample ID: 480-111089-5

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 22 | J | 66 | 13 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Cyclohexane | 120 | | 66 | 15 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Ethylbenzene | 54 | J | 66 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Isopropylbenzene | 52 | J | 66 | 9.9 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 420 | | 330 | 31 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 320 | | 66 | 31 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 120 | | 66 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| n-Butylbenzene | 81 | | 66 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 57 | J | 66 | 17 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 78 | | 66 | 18 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 310 | | 130 | 37 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Chrysene | 19000 | | 17000 | 3700 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Fluoranthene | 2900 | J | 17000 | 1800 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 6300 | J | 17000 | 2500 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Pyrene | 8900 | J | 17000 | 2000 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 28 | | 1.5 | 0.41 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 52000 | | 4000 | 1200 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: GCM-3 POST

Lab Sample ID: 480-111089-6

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 260 | | 64 | 18 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 100 | | 64 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 150 | | 64 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Benzene | 24 | J | 64 | 12 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Ethylbenzene | 59 | J | 64 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Isopropylbenzene | 38 | J | 64 | 9.6 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methyl acetate | 1800 | | 320 | 30 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 170 | | 64 | 30 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Naphthalene | 140 | | 64 | 22 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| n-Butylbenzene | 53 | J | 64 | 19 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 52 | J | 64 | 17 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| sec-Butylbenzene | 35 | J | 64 | 24 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Toluene | 68 | | 64 | 17 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 280 | | 130 | 35 | ug/Kg | 1 | ☼ | 8260C | Total/NA |
| Chrysene | 7000 | J | 25000 | 5500 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| Phenanthrene | 7200 | J | 25000 | 3600 | ug/Kg | 20 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 27 | | 1.5 | 0.40 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 27000 | | 3000 | 900 | mg/Kg | 50 | ☼ | 8015D | Total/NA |

## Client Sample ID: LEAD-1 PRE

Lab Sample ID: 480-111089-7

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5850 | | 1.4 | 0.34 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Lead | 16.0 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

## Client Sample ID: LEAD-1 POST

Lab Sample ID: 480-111089-8

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5500 | | 1.5 | 0.37 | mg/Kg | 1 | ☼ | 6010C | Total/NA |

This Detection Summary does not include radiochemical test results.

TestAmerica Buffalo

## Client Sample ID: LEAD-1 POST (Continued)

## Lab Sample ID: 480-111089-8

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.3 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

This Detection Summary does not include radiochemical test results.

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-1 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-1**
**Matrix: Solid**
**Percent Solids: 75.9**

**Method: 8260C - Volatile Organic Compounds by GC/MS**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 79 | U | 79 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,1,2,2-Tetrachloroethane | 79 | U | 79 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 79 | U | 79 | 40 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,1,2-Trichloroethane | 79 | U | 79 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,1-Dichloroethane | 79 | U | 79 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,1-Dichloroethene | 79 | U | 79 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2,4-Trichlorobenzene | 79 | U | 79 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **1,2,4-Trimethylbenzene** | **140** | | 79 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2-Dibromo-3-Chloropropane | 79 | U | 79 | 40 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2-Dichlorobenzene | 79 | U | 79 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2-Dichloroethane | 79 | U | 79 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2-Dichloropropane | 79 | U | 79 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **1,3,5-Trimethylbenzene** | **68** | **J** | 79 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,3-Dichlorobenzene | 79 | U | 79 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,4-Dichlorobenzene | 79 | U | 79 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 2-Butanone (MEK) | 400 | U | 400 | 240 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 2-Hexanone | 400 | U | 400 | 160 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **4-Isopropyltoluene** | **200** | | 79 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 400 | U | 400 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Acetone | 400 | U | 400 | 330 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Benzene** | **16** | **J** | 79 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Bromoform | 79 | U | 79 | 40 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Bromomethane | 79 | U | 79 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Carbon disulfide | 79 | U | 79 | 36 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Carbon tetrachloride | 79 | U | 79 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Chlorobenzene | 79 | U | 79 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Dibromochloromethane | 79 | U | 79 | 38 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Chloroethane | 79 | U | 79 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Chloroform | 79 | U | 79 | 54 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Chloromethane | 79 | U | 79 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| cis-1,2-Dichloroethene | 79 | U | 79 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Cyclohexane | 79 | U | 79 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Bromodichloromethane | 79 | U | 79 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Dichlorodifluoromethane | 79 | U | 79 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Ethylbenzene | 79 | U | 79 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| 1,2-Dibromoethane | 79 | U | 79 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Isopropylbenzene | 79 | U | 79 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Methyl acetate** | **230** | **J** | 400 | 38 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Methyl tert-butyl ether | 79 | U | 79 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Methylcyclohexane** | **110** | | 79 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Methylene Chloride | 79 | U | 79 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Naphthalene** | **130** | | 79 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| n-Butylbenzene | 79 | U | 79 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **N-Propylbenzene** | **24** | **J** | 79 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| sec-Butylbenzene | 79 | U | 79 | 29 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Tetrachloroethene | 79 | U | 79 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Toluene** | **46** | **J** | 79 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| trans-1,2-Dichloroethene | 79 | U | 79 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| trans-1,3-Dichloropropene | 79 | U | 79 | 7.8 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |

**Client Sample ID: GCM-1 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-1**
**Matrix: Solid**
**Percent Solids: 75.9**

### Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Trichloroethene | 79 | U | 79 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Trichlorofluoromethane | 79 | U | 79 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Vinyl chloride | 79 | U | 79 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| **Xylenes, Total** | **140** | **J** | 160 | 44 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| cis-1,3-Dichloropropene | 79 | U | 79 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| Styrene | 79 | U | 79 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |
| tert-Butylbenzene | 79 | U | 79 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 03:33 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 03:33* | *1* |
| *4-Bromofluorobenzene (Surr)* | *100* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 03:33* | *1* |
| *Toluene-d8 (Surr)* | *93* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 03:33* | *1* |
| *Dibromofluoromethane (Surr)* | *92* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 03:33* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 18000 | U | 18000 | 4800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,4,6-Trichlorophenol | 18000 | U | 18000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,4-Dichlorophenol | 18000 | U | 18000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,4-Dimethylphenol | 18000 | U | 18000 | 4300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,4-Dinitrophenol | 170000 | U | 170000 | 81000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,4-Dinitrotoluene | 18000 | U | 18000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2,6-Dinitrotoluene | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Chloronaphthalene | 18000 | U | 18000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Chlorophenol | 18000 | U | 18000 | 3200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Methylnaphthalene | 18000 | U | 18000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Methylphenol | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Nitroaniline | 34000 | U | 34000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 2-Nitrophenol | 18000 | U | 18000 | 5000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 3,3'-Dichlorobenzidine | 34000 | U | 34000 | 21000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 3-Nitroaniline | 34000 | U | 34000 | 4900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4,6-Dinitro-2-methylphenol | 34000 | U | 34000 | 18000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Bromophenyl phenyl ether | 18000 | U | 18000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Chloro-3-methylphenol | 18000 | U | 18000 | 4400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Chloroaniline | 18000 | U | 18000 | 4400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Chlorophenyl phenyl ether | 18000 | U | 18000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Methylphenol | 34000 | U | 34000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Nitroaniline | 34000 | U | 34000 | 9200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| 4-Nitrophenol | 34000 | U | 34000 | 12000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Acenaphthene | 18000 | U | 18000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Acenaphthylene | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Acetophenone | 18000 | U | 18000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Anthracene | 18000 | U | 18000 | 4400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Atrazine | 18000 | U | 18000 | 6100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzaldehyde | 18000 | U | 18000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzo[a]anthracene | 18000 | U | 18000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzo[a]pyrene | 18000 | U | 18000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzo[b]fluoranthene | 18000 | U | 18000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzo[g,h,i]perylene | 18000 | U | 18000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Benzo[k]fluoranthene | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |

**Client Sample ID: GCM-1 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-1**
**Matrix: Solid**
**Percent Solids: 75.9**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Biphenyl | 18000 | U | 18000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| bis (2-chloroisopropyl) ether | 18000 | U | 18000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Bis(2-chloroethoxy)methane | 18000 | U | 18000 | 3700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Bis(2-chloroethyl)ether | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Bis(2-ethylhexyl) phthalate | 18000 | U | 18000 | 6000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Butyl benzyl phthalate | 18000 | U | 18000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Caprolactam | 18000 | U | 18000 | 5300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Carbazole | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| **Chrysene** | **14000** | **J** | 18000 | 3900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Dibenz(a,h)anthracene | 18000 | U | 18000 | 3100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Dibenzofuran | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Diethyl phthalate | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Dimethyl phthalate | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Di-n-butyl phthalate | 18000 | U | 18000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Di-n-octyl phthalate | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| **Fluoranthene** | **2800** | **J** | 18000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Fluorene | 18000 | U | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Hexachlorobenzene | 18000 | U | 18000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Hexachlorobutadiene | 18000 | U | 18000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Hexachlorocyclopentadiene | 18000 | U | 18000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Hexachloroethane | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Indeno[1,2,3-cd]pyrene | 18000 | U | 18000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Isophorone | 18000 | U | 18000 | 3700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Naphthalene | 18000 | U | 18000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Nitrobenzene | 18000 | U | 18000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| N-Nitrosodi-n-propylamine | 18000 | U | 18000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| N-Nitrosodiphenylamine | 18000 | U | 18000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Pentachlorophenol | 34000 | U | 34000 | 18000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| **Phenanthrene** | **6100** | **J** | 18000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| Phenol | 18000 | U | 18000 | 2700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |
| **Pyrene** | **6300** | **J** | 18000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:04 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/19/16 14:05* | *12/21/16 00:04* | *20* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **22** | | 17 | 4.4 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 13:47 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *80* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 13:47* | *10* |

## Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **47000** | | 4400 | 1300 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 20:22 | 50 |

## Client Sample ID: GCM-1 PRE

**Lab Sample ID: 480-111089-1**

**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 75.9**

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| o-Terphenyl | 291 | X | 48 - 125 | 12/20/16 11:56 | 12/20/16 20:22 | 50 |

## Client Sample ID: GCM-1 POST

**Lab Sample ID: 480-111089-2**

**Date Collected: 12/13/16 13:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 76.5**

### Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 73 | U | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,1,2,2-Tetrachloroethane | 73 | U | 73 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 73 | U | 73 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,1,2-Trichloroethane | 73 | U | 73 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,1-Dichloroethane | 73 | U | 73 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,1-Dichloroethene | 73 | U | 73 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2,4-Trichlorobenzene | 73 | U | 73 | 28 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **1,2,4-Trimethylbenzene** | **180** | | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2-Dibromo-3-Chloropropane | 73 | U | 73 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2-Dichlorobenzene | 73 | U | 73 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2-Dichloroethane | 73 | U | 73 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2-Dichloropropane | 73 | U | 73 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **1,3,5-Trimethylbenzene** | **79** | | 73 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,3-Dichlorobenzene | 73 | U | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,4-Dichlorobenzene | 73 | U | 73 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 2-Butanone (MEK) | 370 | U | 370 | 220 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 2-Hexanone | 370 | U | 370 | 150 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **4-Isopropyltoluene** | **410** | | 73 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 370 | U | 370 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Acetone | 370 | U | 370 | 300 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Benzene** | **17** | **J** | 73 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Bromoform | 73 | U | 73 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Bromomethane | 73 | U | 73 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Carbon disulfide | 73 | U | 73 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Carbon tetrachloride | 73 | U | 73 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Chlorobenzene | 73 | U | 73 | 9.7 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Dibromochloromethane | 73 | U | 73 | 36 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Chloroethane | 73 | U | 73 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Chloroform | 73 | U | 73 | 50 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Chloromethane | 73 | U | 73 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| cis-1,2-Dichloroethene | 73 | U | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Cyclohexane** | **46** | **J** | 73 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Bromodichloromethane | 73 | U | 73 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Dichlorodifluoromethane | 73 | U | 73 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Ethylbenzene** | **39** | **J** | 73 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| 1,2-Dibromoethane | 73 | U | 73 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Isopropylbenzene | 73 | U | 73 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Methyl acetate** | **1500** | | 370 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Methyl tert-butyl ether | 73 | U | 73 | 28 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Methylcyclohexane** | **110** | | 73 | 34 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Methylene Chloride | 73 | U | 73 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Naphthalene** | **130** | | 73 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-1 POST**
**Date Collected: 12/13/16 13:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-2**
**Matrix: Solid**
**Percent Solids: 76.5**

### Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| n-Butylbenzene | 73 | U | 73 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **N-Propylbenzene** | **30** | **J** | 73 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| sec-Butylbenzene | 73 | U | 73 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Tetrachloroethene | 73 | U | 73 | 9.9 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Toluene** | **59** | **J** | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| trans-1,2-Dichloroethene | 73 | U | 73 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| trans-1,3-Dichloropropene | 73 | U | 73 | 7.2 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Trichloroethene | 73 | U | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Trichlorofluoromethane | 73 | U | 73 | 34 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Vinyl chloride | 73 | U | 73 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| **Xylenes, Total** | **180** | | 150 | 41 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| cis-1,3-Dichloropropene | 73 | U | 73 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| Styrene | 73 | U | 73 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |
| tert-Butylbenzene | 73 | U | 73 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:01 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *92* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 04:01* | *1* |
| *4-Bromofluorobenzene (Surr)* | *100* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 04:01* | *1* |
| *Toluene-d8 (Surr)* | *95* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 04:01* | *1* |
| *Dibromofluoromethane (Surr)* | *91* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 04:01* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 17000 | U | 17000 | 4700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,4,6-Trichlorophenol | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,4-Dichlorophenol | 17000 | U | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,4-Dimethylphenol | 17000 | U | 17000 | 4200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,4-Dinitrophenol | 170000 | U | 170000 | 80000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,4-Dinitrotoluene | 17000 | U | 17000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2,6-Dinitrotoluene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Chloronaphthalene | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Chlorophenol | 17000 | U | 17000 | 3200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Methylnaphthalene | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Methylphenol | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Nitroaniline | 34000 | U | 34000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 2-Nitrophenol | 17000 | U | 17000 | 4900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 3,3'-Dichlorobenzidine | 34000 | U | 34000 | 20000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 3-Nitroaniline | 34000 | U | 34000 | 4800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4,6-Dinitro-2-methylphenol | 34000 | U | 34000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Bromophenyl phenyl ether | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Chloro-3-methylphenol | 17000 | U | 17000 | 4300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Chloroaniline | 17000 | U | 17000 | 4300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Chlorophenyl phenyl ether | 17000 | U | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Methylphenol | 34000 | U | 34000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Nitroaniline | 34000 | U | 34000 | 9100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| 4-Nitrophenol | 34000 | U | 34000 | 12000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Acenaphthene | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Acenaphthylene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Acetophenone | 17000 | U | 17000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Anthracene | 17000 | U | 17000 | 4300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |

**Client Sample ID: GCM-1 POST**
**Date Collected: 12/13/16 13:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-2**
**Matrix: Solid**
**Percent Solids: 76.5**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Atrazine | 17000 | U | 17000 | 6000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzaldehyde | 17000 | U | 17000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzo[a]anthracene | 17000 | U | 17000 | 1700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzo[a]pyrene | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzo[b]fluoranthene | 17000 | U | 17000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzo[g,h,i]perylene | 17000 | U | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Benzo[k]fluoranthene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Biphenyl | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| bis (2-chloroisopropyl) ether | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Bis(2-chloroethoxy)methane | 17000 | U | 17000 | 3700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Bis(2-chloroethyl)ether | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Bis(2-ethylhexyl) phthalate | 17000 | U | 17000 | 5900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Butyl benzyl phthalate | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Caprolactam | 17000 | U | 17000 | 5200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Carbazole | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| **Chrysene** | **11000** | **J** | 17000 | 3900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Dibenz(a,h)anthracene | 17000 | U | 17000 | 3100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Dibenzofuran | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Diethyl phthalate | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Dimethyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Di-n-butyl phthalate | 17000 | U | 17000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Di-n-octyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| **Fluoranthene** | **2100** | **J** | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Fluorene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Hexachlorobenzene | 17000 | U | 17000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Hexachlorobutadiene | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Hexachlorocyclopentadiene | 17000 | U | 17000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Hexachloroethane | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Indeno[1,2,3-cd]pyrene | 17000 | U | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Isophorone | 17000 | U | 17000 | 3700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Naphthalene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Nitrobenzene | 17000 | U | 17000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| N-Nitrosodi-n-propylamine | 17000 | U | 17000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| N-Nitrosodiphenylamine | 17000 | U | 17000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Pentachlorophenol | 34000 | U | 34000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| **Phenanthrene** | **5800** | **J** | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| Phenol | 17000 | U | 17000 | 2700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |
| **Pyrene** | **5700** | **J** | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:29 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/19/16 14:05* | *12/21/16 00:29* | *20* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **12** | | 1.6 | 0.43 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 14:52 | 1 |

## Client Sample ID: GCM-1 POST

**Lab Sample ID: 480-111089-2**
**Date Collected: 12/13/16 13:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 76.5**

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *79* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 14:52* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **20000** | | 2200 | 650 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 20:56 | 50 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *545* | *X* | *48 - 125* | *12/20/16 11:56* | *12/20/16 20:56* | *50* |

## Client Sample ID: GCM-2 PRE

**Lab Sample ID: 480-111089-3**
**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 82.5**

### Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 69 | U | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,1,2,2-Tetrachloroethane | 69 | U | 69 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 69 | U | 69 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,1,2-Trichloroethane | 69 | U | 69 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,1-Dichloroethane | 69 | U | 69 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,1-Dichloroethene | 69 | U | 69 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2,4-Trichlorobenzene | 69 | U | 69 | 26 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **1,2,4-Trimethylbenzene** | **350** | | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2-Dibromo-3-Chloropropane | 69 | U | 69 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2-Dichlorobenzene | 69 | U | 69 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2-Dichloroethane | 69 | U | 69 | 28 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2-Dichloropropane | 69 | U | 69 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **1,3,5-Trimethylbenzene** | **140** | | 69 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,3-Dichlorobenzene | 69 | U | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,4-Dichlorobenzene | 69 | U | 69 | 9.7 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 2-Butanone (MEK) | 350 | U | 350 | 210 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 2-Hexanone | 350 | U | 350 | 140 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **4-Isopropyltoluene** | **220** | | 69 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 350 | U | 350 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Acetone** | **420** | | 350 | 290 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Benzene** | **47** | **J** | 69 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Bromoform | 69 | U | 69 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Bromomethane | 69 | U | 69 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Carbon disulfide | 69 | U | 69 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Carbon tetrachloride | 69 | U | 69 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Chlorobenzene | 69 | U | 69 | 9.2 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Dibromochloromethane | 69 | U | 69 | 34 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Chloroethane | 69 | U | 69 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Chloroform | 69 | U | 69 | 48 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Chloromethane | 69 | U | 69 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| cis-1,2-Dichloroethene | 69 | U | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Cyclohexane | 69 | U | 69 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Bromodichloromethane | 69 | U | 69 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Dichlorodifluoromethane | 69 | U | 69 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Ethylbenzene** | **120** | | 69 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| 1,2-Dibromoethane | 69 | U | 69 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |

**Client Sample ID: GCM-2 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-3**
**Matrix: Solid**
**Percent Solids: 82.5**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Isopropylbenzene** | **47** | **J** | 69 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Methyl acetate** | **620** | | 350 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Methyl tert-butyl ether | 69 | U | 69 | 26 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Methylcyclohexane** | **310** | | 69 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Methylene Chloride | 69 | U | 69 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Naphthalene** | **270** | | 69 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **n-Butylbenzene** | **77** | | 69 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **N-Propylbenzene** | **88** | | 69 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **sec-Butylbenzene** | **41** | **J** | 69 | 26 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Tetrachloroethene | 69 | U | 69 | 9.3 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Toluene** | **210** | | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| trans-1,2-Dichloroethene | 69 | U | 69 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| trans-1,3-Dichloropropene | 69 | U | 69 | 6.8 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Trichloroethene | 69 | U | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Trichlorofluoromethane | 69 | U | 69 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Vinyl chloride | 69 | U | 69 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| **Xylenes, Total** | **510** | | 140 | 38 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| cis-1,3-Dichloropropene | 69 | U | 69 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| Styrene | 69 | U | 69 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |
| tert-Butylbenzene | 69 | U | 69 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:28 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *91* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 04:28* | *1* |
| *4-Bromofluorobenzene (Surr)* | *99* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 04:28* | *1* |
| *Toluene-d8 (Surr)* | *96* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 04:28* | *1* |
| *Dibromofluoromethane (Surr)* | *90* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 04:28* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 28000 | U | 28000 | 7600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,4,6-Trichlorophenol | 28000 | U | 28000 | 5600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,4-Dichlorophenol | 28000 | U | 28000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,4-Dimethylphenol | 28000 | U | 28000 | 6800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,4-Dinitrophenol | 270000 | U | 270000 | 130000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,4-Dinitrotoluene | 28000 | U | 28000 | 5800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2,6-Dinitrotoluene | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Chloronaphthalene | 28000 | U | 28000 | 4600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Chlorophenol | 28000 | U | 28000 | 5100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Methylnaphthalene | 28000 | U | 28000 | 5600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Methylphenol | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Nitroaniline | 54000 | U | 54000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 2-Nitrophenol | 28000 | U | 28000 | 7900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 3,3'-Dichlorobenzidine | 54000 | U | 54000 | 33000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 3-Nitroaniline | 54000 | U | 54000 | 7700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4,6-Dinitro-2-methylphenol | 54000 | U | 54000 | 28000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Bromophenyl phenyl ether | 28000 | U | 28000 | 4000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Chloro-3-methylphenol | 28000 | U | 28000 | 6900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Chloroaniline | 28000 | U | 28000 | 6900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Chlorophenyl phenyl ether | 28000 | U | 28000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Methylphenol | 54000 | U | 54000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-2 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-3**
**Matrix: Solid**
**Percent Solids: 82.5**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 4-Nitroaniline | 54000 | U | 54000 | 15000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| 4-Nitrophenol | 54000 | U | 54000 | 20000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Acenaphthene | 28000 | U | 28000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Acenaphthylene | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Acetophenone | 28000 | U | 28000 | 3800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Anthracene | 28000 | U | 28000 | 6900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Atrazine | 28000 | U | 28000 | 9700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzaldehyde | 28000 | U | 28000 | 22000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzo[a]anthracene | 28000 | U | 28000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzo[a]pyrene | 28000 | U | 28000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzo[b]fluoranthene | 28000 | U | 28000 | 4500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzo[g,h,i]perylene | 28000 | U | 28000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Benzo[k]fluoranthene | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Biphenyl | 28000 | U | 28000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| bis (2-chloroisopropyl) ether | 28000 | U | 28000 | 5600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Bis(2-chloroethoxy)methane | 28000 | U | 28000 | 5900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Bis(2-chloroethyl)ether | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Bis(2-ethylhexyl) phthalate | 28000 | U | 28000 | 9600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Butyl benzyl phthalate | 28000 | U | 28000 | 4600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Caprolactam | 28000 | U | 28000 | 8400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Carbazole | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| **Chrysene** | **31000** | | 28000 | 6300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Dibenz(a,h)anthracene | 28000 | U | 28000 | 4900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Dibenzofuran | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Diethyl phthalate | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Dimethyl phthalate | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Di-n-butyl phthalate | 28000 | U | 28000 | 4800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Di-n-octyl phthalate | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| **Fluoranthene** | **4100** | **J** | 28000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Fluorene | 28000 | U | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Hexachlorobenzene | 28000 | U | 28000 | 3800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Hexachlorobutadiene | 28000 | U | 28000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Hexachlorocyclopentadiene | 28000 | U | 28000 | 3800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Hexachloroethane | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Indeno[1,2,3-cd]pyrene | 28000 | U | 28000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Isophorone | 28000 | U | 28000 | 5900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Naphthalene | 28000 | U | 28000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Nitrobenzene | 28000 | U | 28000 | 3100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| N-Nitrosodi-n-propylamine | 28000 | U | 28000 | 4800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| N-Nitrosodiphenylamine | 28000 | U | 28000 | 23000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Pentachlorophenol | 54000 | U | 54000 | 28000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| **Phenanthrene** | **13000** | **J** | 28000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| Phenol | 28000 | U | 28000 | 4300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |
| **Pyrene** | **14000** | **J** | 28000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 00:55 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |

## Client Sample ID: GCM-2 PRE

**Lab Sample ID: 480-111089-3**
**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 82.5**

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

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/19/16 14:05* | *12/21/16 00:55* | *20* |

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **26** | | 1.5 | 0.40 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 15:27 | 1 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *76* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 15:27* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **56000** | | 6000 | 1800 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 21:30 | 50 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *567* | *X* | *48 - 125* | *12/20/16 11:56* | *12/20/16 21:30* | *50* |

## Client Sample ID: GCM-2 POST

**Lab Sample ID: 480-111089-4**
**Date Collected: 12/13/16 15:15**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 79.2**

### Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 67 | U | 67 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,1,2,2-Tetrachloroethane | 67 | U | 67 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 67 | U | 67 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,1,2-Trichloroethane | 67 | U | 67 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,1-Dichloroethane | 67 | U | 67 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,1-Dichloroethene | 67 | U | 67 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2,4-Trichlorobenzene | 67 | U | 67 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **1,2,4-Trimethylbenzene** | **280** | | 67 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2-Dibromo-3-Chloropropane | 67 | U | 67 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2-Dichlorobenzene | 67 | U | 67 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2-Dichloroethane | 67 | U | 67 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2-Dichloropropane | 67 | U | 67 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **1,3,5-Trimethylbenzene** | **110** | | 67 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,3-Dichlorobenzene | 67 | U | 67 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,4-Dichlorobenzene | 67 | U | 67 | 9.3 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 2-Butanone (MEK) | 330 | U | 330 | 200 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 2-Hexanone | 330 | U | 330 | 140 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **4-Isopropyltoluene** | **620** | | 67 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 330 | U | 330 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Acetone** | **350** | | 330 | 270 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Benzene** | **24** | **J** | 67 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Bromoform | 67 | U | 67 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Bromomethane | 67 | U | 67 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Carbon disulfide | 67 | U | 67 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Carbon tetrachloride | 67 | U | 67 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Chlorobenzene | 67 | U | 67 | 8.8 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Dibromochloromethane | 67 | U | 67 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |

**Client Sample ID: GCM-2 POST**
**Date Collected: 12/13/16 15:15**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-4**
**Matrix: Solid**
**Percent Solids: 79.2**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Chloroethane | 67 | U | 67 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Chloroform | 67 | U | 67 | 46 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Chloromethane | 67 | U | 67 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| cis-1,2-Dichloroethene | 67 | U | 67 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Cyclohexane | 67 | U | 67 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Bromodichloromethane | 67 | U | 67 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Dichlorodifluoromethane | 67 | U | 67 | 29 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Ethylbenzene** | **68** | | 67 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| 1,2-Dibromoethane | 67 | U | 67 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Isopropylbenzene** | **31** | **J** | 67 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Methyl acetate** | **2100** | | 330 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Methyl tert-butyl ether | 67 | U | 67 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Methylcyclohexane** | **160** | | 67 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Methylene Chloride | 67 | U | 67 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Naphthalene** | **250** | | 67 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **n-Butylbenzene** | **51** | **J** | 67 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **N-Propylbenzene** | **49** | **J** | 67 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **sec-Butylbenzene** | **28** | **J** | 67 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Tetrachloroethene | 67 | U | 67 | 9.0 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Toluene** | **95** | | 67 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| trans-1,2-Dichloroethene | 67 | U | 67 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| trans-1,3-Dichloropropene | 67 | U | 67 | 6.6 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Trichloroethene | 67 | U | 67 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Trichlorofluoromethane | 67 | U | 67 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Vinyl chloride | 67 | U | 67 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| **Xylenes, Total** | **350** | | 130 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| cis-1,3-Dichloropropene | 67 | U | 67 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| Styrene | 67 | U | 67 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |
| tert-Butylbenzene | 67 | U | 67 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 04:55 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 04:55* | *1* |
| *4-Bromofluorobenzene (Surr)* | *99* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 04:55* | *1* |
| *Toluene-d8 (Surr)* | *97* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 04:55* | *1* |
| *Dibromofluoromethane (Surr)* | *94* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 04:55* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 17000 | U | 17000 | 4600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,4,6-Trichlorophenol | 17000 | U | 17000 | 3400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,4-Dichlorophenol | 17000 | U | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,4-Dimethylphenol | 17000 | U | 17000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,4-Dinitrophenol | 170000 | U | 170000 | 78000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,4-Dinitrotoluene | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2,6-Dinitrotoluene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2-Chloronaphthalene | 17000 | U | 17000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2-Chlorophenol | 17000 | U | 17000 | 3100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2-Methylnaphthalene | 17000 | U | 17000 | 3400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2-Methylphenol | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 2-Nitroaniline | 33000 | U | 33000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-2 POST**
**Date Collected: 12/13/16 15:15**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-4**
**Matrix: Solid**
**Percent Solids: 79.2**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2-Nitrophenol | 17000 | U | 17000 | 4800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 3,3'-Dichlorobenzidine | 33000 | U | 33000 | 20000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 3-Nitroaniline | 33000 | U | 33000 | 4700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4,6-Dinitro-2-methylphenol | 33000 | U | 33000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Bromophenyl phenyl ether | 17000 | U | 17000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Chloro-3-methylphenol | 17000 | U | 17000 | 4200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Chloroaniline | 17000 | U | 17000 | 4200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Chlorophenyl phenyl ether | 17000 | U | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Methylphenol | 33000 | U | 33000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Nitroaniline | 33000 | U | 33000 | 8900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| 4-Nitrophenol | 33000 | U | 33000 | 12000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Acenaphthene | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Acenaphthylene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Acetophenone | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Anthracene | 17000 | U | 17000 | 4200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Atrazine | 17000 | U | 17000 | 5900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Benzaldehyde | 17000 | U | 17000 | 13000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Benzo[a]anthracene | 17000 | U | 17000 | 1700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Benzo[a]pyrene** | **2900** | **J** | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Benzo[b]fluoranthene** | **3700** | **J** | 17000 | 2700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Benzo[g,h,i]perylene** | **2000** | **J** | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Benzo[k]fluoranthene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Biphenyl | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| bis (2-chloroisopropyl) ether | 17000 | U | 17000 | 3400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Bis(2-chloroethoxy)methane | 17000 | U | 17000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Bis(2-chloroethyl)ether | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Bis(2-ethylhexyl) phthalate | 17000 | U | 17000 | 5800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Butyl benzyl phthalate | 17000 | U | 17000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Caprolactam | 17000 | U | 17000 | 5100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Carbazole | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Chrysene** | **17000** | | 17000 | 3800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Dibenz(a,h)anthracene | 17000 | U | 17000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Dibenzofuran | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Diethyl phthalate | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Dimethyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Di-n-butyl phthalate | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Di-n-octyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Fluoranthene** | **4100** | **J** | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Fluorene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Hexachlorobenzene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Hexachlorobutadiene | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Hexachlorocyclopentadiene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Hexachloroethane | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Indeno[1,2,3-cd]pyrene** | **2100** | **J** | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Isophorone | 17000 | U | 17000 | 3600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Naphthalene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Nitrobenzene | 17000 | U | 17000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| N-Nitrosodi-n-propylamine | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| N-Nitrosodiphenylamine | 17000 | U | 17000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |

## Client Sample ID: GCM-2 POST

**Lab Sample ID: 480-111089-4**
**Date Collected: 12/13/16 15:15**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 79.2**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Pentachlorophenol | 33000 | U | 33000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Phenanthrene** | **7000** | **J** | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| Phenol | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |
| **Pyrene** | **6800** | **J** | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:20 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/19/16 14:05* | *12/21/16 01:20* | *20* |

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **23** | | 1.5 | 0.41 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 16:01 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *71* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 16:01* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **29000** | | 3200 | 950 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 22:04 | 50 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *836* | *X* | *48 - 125* | *12/20/16 11:56* | *12/20/16 22:04* | *50* |

## Client Sample ID: GCM-3 PRE

**Lab Sample ID: 480-111089-5**
**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 81.3**

### Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 66 | U | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,1,2,2-Tetrachloroethane | 66 | U | 66 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 66 | U | 66 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,1,2-Trichloroethane | 66 | U | 66 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,1-Dichloroethane | 66 | U | 66 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,1-Dichloroethene | 66 | U | 66 | 23 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2,4-Trichlorobenzene | 66 | U | 66 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **1,2,4-Trimethylbenzene** | **250** | | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2-Dibromo-3-Chloropropane | 66 | U | 66 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2-Dichlorobenzene | 66 | U | 66 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2-Dichloroethane | 66 | U | 66 | 27 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2-Dichloropropane | 66 | U | 66 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **1,3,5-Trimethylbenzene** | **100** | | 66 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,3-Dichlorobenzene | 66 | U | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,4-Dichlorobenzene | 66 | U | 66 | 9.3 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 2-Butanone (MEK) | 330 | U | 330 | 200 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 2-Hexanone | 330 | U | 330 | 140 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **4-Isopropyltoluene** | **150** | | 66 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |

**Client Sample ID: GCM-3 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-5**
**Matrix: Solid**
**Percent Solids: 81.3**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 4-Methyl-2-pentanone (MIBK) | 330 | U | 330 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Acetone** | **300** | **J** | 330 | 270 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Benzene** | **22** | **J** | 66 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Bromoform | 66 | U | 66 | 33 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Bromomethane | 66 | U | 66 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Carbon disulfide | 66 | U | 66 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Carbon tetrachloride | 66 | U | 66 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Chlorobenzene | 66 | U | 66 | 8.7 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Dibromochloromethane | 66 | U | 66 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Chloroethane | 66 | U | 66 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Chloroform | 66 | U | 66 | 45 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Chloromethane | 66 | U | 66 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| cis-1,2-Dichloroethene | 66 | U | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Cyclohexane** | **120** | | 66 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Bromodichloromethane | 66 | U | 66 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Dichlorodifluoromethane | 66 | U | 66 | 29 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Ethylbenzene** | **54** | **J** | 66 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| 1,2-Dibromoethane | 66 | U | 66 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Isopropylbenzene** | **52** | **J** | 66 | 9.9 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Methyl acetate** | **420** | | 330 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Methyl tert-butyl ether | 66 | U | 66 | 25 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Methylcyclohexane** | **320** | | 66 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Methylene Chloride | 66 | U | 66 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Naphthalene** | **120** | | 66 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **n-Butylbenzene** | **81** | | 66 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **N-Propylbenzene** | **57** | **J** | 66 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| sec-Butylbenzene | 66 | U | 66 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Tetrachloroethene | 66 | U | 66 | 8.9 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Toluene** | **78** | | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| trans-1,2-Dichloroethene | 66 | U | 66 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| trans-1,3-Dichloropropene | 66 | U | 66 | 6.5 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Trichloroethene | 66 | U | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Trichlorofluoromethane | 66 | U | 66 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Vinyl chloride | 66 | U | 66 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| **Xylenes, Total** | **310** | | 130 | 37 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| cis-1,3-Dichloropropene | 66 | U | 66 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| Styrene | 66 | U | 66 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |
| tert-Butylbenzene | 66 | U | 66 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:22 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *94* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 05:22* | *1* |
| *4-Bromofluorobenzene (Surr)* | *98* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 05:22* | *1* |
| *Toluene-d8 (Surr)* | *91* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 05:22* | *1* |
| *Dibromofluoromethane (Surr)* | *92* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 05:22* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 17000 | U | 17000 | 4500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2,4,6-Trichlorophenol | 17000 | U | 17000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2,4-Dichlorophenol | 17000 | U | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |

**Client Sample ID: GCM-3 PRE**
**Date Collected: 12/13/16 09:45**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-5**
**Matrix: Solid**
**Percent Solids: 81.3**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4-Dimethylphenol | 17000 | U | 17000 | 4000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2,4-Dinitrophenol | 160000 | U | 160000 | 77000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2,4-Dinitrotoluene | 17000 | U | 17000 | 3400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2,6-Dinitrotoluene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Chloronaphthalene | 17000 | U | 17000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Chlorophenol | 17000 | U | 17000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Methylnaphthalene | 17000 | U | 17000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Methylphenol | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Nitroaniline | 32000 | U | 32000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 2-Nitrophenol | 17000 | U | 17000 | 4700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 3,3'-Dichlorobenzidine | 32000 | U | 32000 | 20000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 3-Nitroaniline | 32000 | U | 32000 | 4600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4,6-Dinitro-2-methylphenol | 32000 | U | 32000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Bromophenyl phenyl ether | 17000 | U | 17000 | 2400 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Chloro-3-methylphenol | 17000 | U | 17000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Chloroaniline | 17000 | U | 17000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Chlorophenyl phenyl ether | 17000 | U | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Methylphenol | 32000 | U | 32000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Nitroaniline | 32000 | U | 32000 | 8800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| 4-Nitrophenol | 32000 | U | 32000 | 12000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Acenaphthene | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Acenaphthylene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Acetophenone | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Anthracene | 17000 | U | 17000 | 4100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Atrazine | 17000 | U | 17000 | 5800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzaldehyde | 17000 | U | 17000 | 13000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzo[a]anthracene | 17000 | U | 17000 | 1700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzo[a]pyrene | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzo[b]fluoranthene | 17000 | U | 17000 | 2700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzo[g,h,i]perylene | 17000 | U | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Benzo[k]fluoranthene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Biphenyl | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| bis (2-chloroisopropyl) ether | 17000 | U | 17000 | 3300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Bis(2-chloroethoxy)methane | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Bis(2-chloroethyl)ether | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Bis(2-ethylhexyl) phthalate | 17000 | U | 17000 | 5700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Butyl benzyl phthalate | 17000 | U | 17000 | 2800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Caprolactam | 17000 | U | 17000 | 5000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Carbazole | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| **Chrysene** | **19000** | | 17000 | 3700 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Dibenz(a,h)anthracene | 17000 | U | 17000 | 3000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Dibenzofuran | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Diethyl phthalate | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Dimethyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Di-n-butyl phthalate | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Di-n-octyl phthalate | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| **Fluoranthene** | **2900** | **J** | 17000 | 1800 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Fluorene | 17000 | U | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Hexachlorobenzene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |

## Client Sample ID: GCM-3 PRE

**Lab Sample ID: 480-111089-5**
**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 81.3**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 17000 | U | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Hexachlorocyclopentadiene | 17000 | U | 17000 | 2300 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Hexachloroethane | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Indeno[1,2,3-cd]pyrene | 17000 | U | 17000 | 2100 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Isophorone | 17000 | U | 17000 | 3500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Naphthalene | 17000 | U | 17000 | 2200 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Nitrobenzene | 17000 | U | 17000 | 1900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| N-Nitrosodi-n-propylamine | 17000 | U | 17000 | 2900 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| N-Nitrosodiphenylamine | 17000 | U | 17000 | 14000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Pentachlorophenol | 32000 | U | 32000 | 17000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| **Phenanthrene** | **6300** | **J** | 17000 | 2500 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| Phenol | 17000 | U | 17000 | 2600 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |
| **Pyrene** | **8900** | **J** | 17000 | 2000 | ug/Kg | ☼ | 12/19/16 14:05 | 12/21/16 01:45 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/19/16 14:05* | *12/21/16 01:45* | *20* |

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **28** | | 1.5 | 0.41 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 16:36 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *77* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 16:36* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **52000** | | 4000 | 1200 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 22:38 | 50 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *1661* | *X* | *48 - 125* | *12/20/16 11:56* | *12/20/16 22:38* | *50* |

## Client Sample ID: GCM-3 POST

**Lab Sample ID: 480-111089-6**
**Date Collected: 12/13/16 16:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 82.2**

### Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 64 | U | 64 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,1,2,2-Tetrachloroethane | 64 | U | 64 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 64 | U | 64 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,1,2-Trichloroethane | 64 | U | 64 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,1-Dichloroethane | 64 | U | 64 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,1-Dichloroethene | 64 | U | 64 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,2,4-Trichlorobenzene | 64 | U | 64 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **1,2,4-Trimethylbenzene** | **260** | | 64 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,2-Dibromo-3-Chloropropane | 64 | U | 64 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-3 POST**
**Date Collected: 12/13/16 16:30**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-6**
**Matrix: Solid**
**Percent Solids: 82.2**

### Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichlorobenzene | 64 | U | 64 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,2-Dichloroethane | 64 | U | 64 | 26 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,2-Dichloropropane | 64 | U | 64 | 10 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **1,3,5-Trimethylbenzene** | **100** | | 64 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,3-Dichlorobenzene | 64 | U | 64 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,4-Dichlorobenzene | 64 | U | 64 | 9.0 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 2-Butanone (MEK) | 320 | U | 320 | 190 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 2-Hexanone | 320 | U | 320 | 130 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **4-Isopropyltoluene** | **150** | | 64 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 320 | U | 320 | 20 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Acetone | 320 | U | 320 | 260 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Benzene** | **24** | **J** | 64 | 12 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Bromoform | 64 | U | 64 | 32 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Bromomethane | 64 | U | 64 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Carbon disulfide | 64 | U | 64 | 29 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Carbon tetrachloride | 64 | U | 64 | 16 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Chlorobenzene | 64 | U | 64 | 8.4 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Dibromochloromethane | 64 | U | 64 | 31 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Chloroethane | 64 | U | 64 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Chloroform | 64 | U | 64 | 44 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Chloromethane | 64 | U | 64 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| cis-1,2-Dichloroethene | 64 | U | 64 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Cyclohexane | 64 | U | 64 | 14 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Bromodichloromethane | 64 | U | 64 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Dichlorodifluoromethane | 64 | U | 64 | 28 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Ethylbenzene** | **59** | **J** | 64 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| 1,2-Dibromoethane | 64 | U | 64 | 11 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Isopropylbenzene** | **38** | **J** | 64 | 9.6 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Methyl acetate** | **1800** | | 320 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Methyl tert-butyl ether | 64 | U | 64 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Methylcyclohexane** | **170** | | 64 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Methylene Chloride | 64 | U | 64 | 13 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Naphthalene** | **140** | | 64 | 22 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **n-Butylbenzene** | **53** | **J** | 64 | 19 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **N-Propylbenzene** | **52** | **J** | 64 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **sec-Butylbenzene** | **35** | **J** | 64 | 24 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Tetrachloroethene | 64 | U | 64 | 8.6 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Toluene** | **68** | | 64 | 17 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| trans-1,2-Dichloroethene | 64 | U | 64 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| trans-1,3-Dichloropropene | 64 | U | 64 | 6.3 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Trichloroethene | 64 | U | 64 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Trichlorofluoromethane | 64 | U | 64 | 30 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Vinyl chloride | 64 | U | 64 | 21 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| **Xylenes, Total** | **280** | | 130 | 35 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| cis-1,3-Dichloropropene | 64 | U | 64 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| Styrene | 64 | U | 64 | 15 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |
| tert-Butylbenzene | 64 | U | 64 | 18 | ug/Kg | ☼ | 12/15/16 14:15 | 12/16/16 05:49 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *93* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 05:49* | *1* |

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

**Client Sample ID: GCM-3 POST**
**Date Collected: 12/13/16 16:30**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-6**
**Matrix: Solid**
**Percent Solids: 82.2**

### Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| *4-Bromofluorobenzene (Surr)* | *99* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 05:49* | *1* |
| *Toluene-d8 (Surr)* | *94* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 05:49* | *1* |
| *Dibromofluoromethane (Surr)* | *92* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 05:49* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 25000 | U | 25000 | 6700 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,4,6-Trichlorophenol | 25000 | U | 25000 | 4900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,4-Dichlorophenol | 25000 | U | 25000 | 2600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,4-Dimethylphenol | 25000 | U | 25000 | 6000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,4-Dinitrophenol | 240000 | U | 240000 | 110000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,4-Dinitrotoluene | 25000 | U | 25000 | 5100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2,6-Dinitrotoluene | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Chloronaphthalene | 25000 | U | 25000 | 4100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Chlorophenol | 25000 | U | 25000 | 4500 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Methylnaphthalene | 25000 | U | 25000 | 4900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Methylphenol | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Nitroaniline | 48000 | U * | 48000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 2-Nitrophenol | 25000 | U | 25000 | 7000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 3,3'-Dichlorobenzidine | 48000 | U | 48000 | 29000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 3-Nitroaniline | 48000 | U | 48000 | 6800 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4,6-Dinitro-2-methylphenol | 48000 | U | 48000 | 25000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Bromophenyl phenyl ether | 25000 | U | 25000 | 3500 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Chloro-3-methylphenol | 25000 | U | 25000 | 6100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Chloroaniline | 25000 | U | 25000 | 6100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Chlorophenyl phenyl ether | 25000 | U | 25000 | 3100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Methylphenol | 48000 | U | 48000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Nitroaniline | 48000 | U | 48000 | 13000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| 4-Nitrophenol | 48000 | U | 48000 | 17000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Acenaphthene | 25000 | U | 25000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Acenaphthylene | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Acetophenone | 25000 | U | 25000 | 3300 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Anthracene | 25000 | U | 25000 | 6100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Atrazine | 25000 | U | 25000 | 8600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzaldehyde | 25000 | U | 25000 | 20000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzo[a]anthracene | 25000 | U | 25000 | 2500 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzo[a]pyrene | 25000 | U | 25000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzo[b]fluoranthene | 25000 | U | 25000 | 3900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzo[g,h,i]perylene | 25000 | U | 25000 | 2600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Benzo[k]fluoranthene | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Biphenyl | 25000 | U | 25000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| bis (2-chloroisopropyl) ether | 25000 | U | 25000 | 4900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Bis(2-chloroethoxy)methane | 25000 | U | 25000 | 5200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Bis(2-chloroethyl)ether | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Bis(2-ethylhexyl) phthalate | 25000 | U | 25000 | 8400 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Butyl benzyl phthalate | 25000 | U | 25000 | 4100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Caprolactam | 25000 | U | 25000 | 7400 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Carbazole | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| **Chrysene** | **7000** | **J** | 25000 | 5500 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |

**Client Sample ID: GCM-3 POST**
**Date Collected: 12/13/16 16:30**
**Date Received: 12/14/16 13:43**

**Lab Sample ID: 480-111089-6**
**Matrix: Solid**
**Percent Solids: 82.2**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Dibenz(a,h)anthracene | 25000 | U | 25000 | 4400 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Dibenzofuran | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Diethyl phthalate | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Dimethyl phthalate | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Di-n-butyl phthalate | 25000 | U | 25000 | 4200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Di-n-octyl phthalate | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Fluoranthene | 25000 | U | 25000 | 2600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Fluorene | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Hexachlorobenzene | 25000 | U | 25000 | 3300 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Hexachlorobutadiene | 25000 | U | 25000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Hexachlorocyclopentadiene | 25000 | U * | 25000 | 3300 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Hexachloroethane | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Indeno[1,2,3-cd]pyrene | 25000 | U | 25000 | 3100 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Isophorone | 25000 | U | 25000 | 5200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Naphthalene | 25000 | U | 25000 | 3200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Nitrobenzene | 25000 | U | 25000 | 2800 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| N-Nitrosodi-n-propylamine | 25000 | U | 25000 | 4200 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| N-Nitrosodiphenylamine | 25000 | U | 25000 | 20000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Pentachlorophenol | 48000 | U | 48000 | 25000 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| **Phenanthrene** | **7200** | **J** | 25000 | 3600 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Phenol | 25000 | U | 25000 | 3800 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |
| Pyrene | 25000 | U | 25000 | 2900 | ug/Kg | ☼ | 12/22/16 07:19 | 12/23/16 13:42 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *39 - 146* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |
| *2-Fluorobiphenyl* | *0* | *X* | *37 - 120* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |
| *2-Fluorophenol (Surr)* | *0* | *X* | *18 - 120* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |
| *Nitrobenzene-d5 (Surr)* | *0* | *X* | *34 - 132* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |
| *Phenol-d5 (Surr)* | *0* | *X* | *11 - 120* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |
| *p-Terphenyl-d14 (Surr)* | *0* | *X* | *65 - 153* | *12/22/16 07:19* | *12/23/16 13:42* | *20* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **27** | | 1.5 | 0.40 | mg/Kg | ☼ | 12/22/16 13:36 | 12/23/16 17:10 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *75* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 17:10* | *1* |

## Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **27000** | | 3000 | 900 | mg/Kg | ☼ | 12/20/16 11:56 | 12/20/16 23:12 | 50 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *89* | | *48 - 125* | *12/20/16 11:56* | *12/20/16 23:12* | *50* |

## Client Sample ID: LEAD-1 PRE

**Lab Sample ID: 480-111089-7**
**Date Collected: 12/14/16 09:15**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 69.8**

### Method: 6010C - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5850 | | 1.4 | 0.34 | mg/Kg | ☼ | 12/15/16 16:18 | 12/16/16 19:08 | 1 |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 16.0 | | 0.020 | 0.0030 | mg/L | | 12/16/16 11:47 | 12/19/16 18:27 | 1 |

## Client Sample ID: LEAD-1 POST

**Lab Sample ID: 480-111089-8**
**Date Collected: 12/14/16 10:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 69.6**

### Method: 6010C - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5500 | | 1.5 | 0.37 | mg/Kg | ☼ | 12/15/16 16:18 | 12/16/16 19:12 | 1 |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.3 | | 0.020 | 0.0030 | mg/L | | 12/16/16 11:57 | 12/19/16 17:40 | 1 |

# Surrogate Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Method: 8260C - Volatile Organic Compounds by GC/MS

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | |
|---|---|---|---|---|---|
| | | 12DCE | BFB | TOL | DBFM |
| Lab Sample ID | Client Sample ID | (53-146) | (49-148) | (50-149) | (60-140) |
| 480-111089-1 | GCM-1 PRE | 97 | 100 | 93 | 92 |
| 480-111089-2 | GCM-1 POST | 92 | 100 | 95 | 91 |
| 480-111089-3 | GCM-2 PRE | 91 | 99 | 96 | 90 |
| 480-111089-4 | GCM-2 POST | 97 | 99 | 97 | 94 |
| 480-111089-5 | GCM-3 PRE | 94 | 98 | 91 | 92 |
| 480-111089-6 | GCM-3 POST | 93 | 99 | 94 | 92 |
| LCS 480-336633/1-A | Lab Control Sample | 94 | 102 | 96 | 93 |
| MB 480-336633/2-A | Method Blank | 92 | 97 | 94 | 91 |

**Surrogate Legend**

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

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

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | |
|---|---|---|---|---|---|---|---|
| | | TBP | FBP | 2FP | NBZ | PHL | TPH |
| Lab Sample ID | Client Sample ID | (39-146) | (37-120) | (18-120) | (34-132) | (11-120) | (65-153) |
| 480-111089-1 | GCM-1 PRE | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| 480-111089-2 | GCM-1 POST | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| 480-111089-3 | GCM-2 PRE | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| 480-111089-4 | GCM-2 POST | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| 480-111089-5 | GCM-3 PRE | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| 480-111089-6 | GCM-3 POST | 0 X | 0 X | 0 X | 0 X | 0 X | 0 X |
| LCS 480-337144/2-A | Lab Control Sample | 107 | 79 | 67 | 74 | 66 | 84 |
| LCS 480-337662/2-A | Lab Control Sample | 131 | 98 | 67 | 85 | 74 | 89 |
| MB 480-337144/1-A | Method Blank | 73 | 70 | 60 | 64 | 58 | 83 |
| MB 480-337662/1-A | Method Blank | 112 | 95 | 57 | 92 | 64 | 95 |

**Surrogate Legend**

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

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

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

| | | Percent Surrogate Recovery (Acceptance Limits) |
|---|---|---|
| | | TFT2 |
| Lab Sample ID | Client Sample ID | (46-156) |
| 480-111089-1 | GCM-1 PRE | 80 |
| 480-111089-2 | GCM-1 POST | 79 |
| 480-111089-3 | GCM-2 PRE | 76 |
| 480-111089-4 | GCM-2 POST | 71 |

## Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lab Sample ID | Client Sample ID | TFT2 (46-156) | | | | | | | | |
| 480-111089-5 | GCM-3 PRE | 77 | | | | | | | | |
| 480-111089-6 | GCM-3 POST | 75 | | | | | | | | |
| LCS 480-337788/2-A | Lab Control Sample | 94 | | | | | | | | |
| LCSD 480-337788/3-A | Lab Control Sample Dup | 93 | | | | | | | | |
| MB 480-337788/1-A | Method Blank | 90 | | | | | | | | |

**Surrogate Legend**

TFT = a,a,a-Trifluorotoluene

## Method: 8015D - Diesel Range Organics (DRO) (GC)

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lab Sample ID | Client Sample ID | OTPH (48-125) | | | | | | | | |
| 480-111089-1 | GCM-1 PRE | 291 X | | | | | | | | |
| 480-111089-2 | GCM-1 POST | 545 X | | | | | | | | |
| 480-111089-3 | GCM-2 PRE | 567 X | | | | | | | | |
| 480-111089-4 | GCM-2 POST | 836 X | | | | | | | | |
| 480-111089-5 | GCM-3 PRE | 1661 X | | | | | | | | |
| 480-111089-6 | GCM-3 POST | 89 | | | | | | | | |
| 480-111089-6 MS | GCM-3 POST | 214 X | | | | | | | | |
| 480-111089-6 MSD | GCM-3 POST | 140 X | | | | | | | | |
| LCS 480-337322/2-A | Lab Control Sample | 94 | | | | | | | | |
| MB 480-337322/1-A | Method Blank | 91 | | | | | | | | |

**Surrogate Legend**

OTPH = o-Terphenyl

## Method: 8260C - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 480-336633/2-A**
**Matrix: Solid**
**Analysis Batch: 336702**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 336633**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 100 | U | 100 | 28 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,1,2,2-Tetrachloroethane | 100 | U | 100 | 16 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 100 | U | 100 | 51 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,1,2-Trichloroethane | 100 | U | 100 | 21 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,1-Dichloroethane | 100 | U | 100 | 31 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,1-Dichloroethene | 100 | U | 100 | 35 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2,4-Trichlorobenzene | 100 | U | 100 | 38 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2,4-Trimethylbenzene | 100 | U | 100 | 28 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2-Dibromo-3-Chloropropane | 100 | U | 100 | 51 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2-Dichlorobenzene | 100 | U | 100 | 26 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2-Dichloroethane | 100 | U | 100 | 41 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2-Dichloropropane | 100 | U | 100 | 16 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,3,5-Trimethylbenzene | 100 | U | 100 | 31 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,3-Dichlorobenzene | 100 | U | 100 | 27 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,4-Dichlorobenzene | 100 | U | 100 | 14 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 2-Butanone (MEK) | 510 | U | 510 | 300 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 2-Hexanone | 510 | U | 510 | 210 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 4-Isopropyltoluene | 100 | U | 100 | 34 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 510 | U | 510 | 32 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Acetone | 510 | U | 510 | 420 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Benzene | 100 | U | 100 | 19 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Bromoform | 100 | U | 100 | 51 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Bromomethane | 100 | U | 100 | 22 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Carbon disulfide | 100 | U | 100 | 46 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Carbon tetrachloride | 100 | U | 100 | 26 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Chlorobenzene | 100 | U | 100 | 13 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Dibromochloromethane | 100 | U | 100 | 49 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Chloroethane | 100 | U | 100 | 21 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Chloroform | 100 | U | 100 | 69 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Chloromethane | 100 | U | 100 | 24 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| cis-1,2-Dichloroethene | 100 | U | 100 | 28 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Cyclohexane | 100 | U | 100 | 22 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Bromodichloromethane | 100 | U | 100 | 20 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Dichlorodifluoromethane | 100 | U | 100 | 44 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Ethylbenzene | 100 | U | 100 | 29 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| 1,2-Dibromoethane | 100 | U | 100 | 18 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Isopropylbenzene | 100 | U | 100 | 15 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Methyl acetate | 510 | U | 510 | 48 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Methyl tert-butyl ether | 100 | U | 100 | 38 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Methylcyclohexane | 100 | U | 100 | 47 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Methylene Chloride | 56.7 | J | 100 | 20 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Naphthalene | 100 | U | 100 | 34 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| n-Butylbenzene | 100 | U | 100 | 29 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| N-Propylbenzene | 100 | U | 100 | 26 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| sec-Butylbenzene | 100 | U | 100 | 37 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Tetrachloroethene | 100 | U | 100 | 14 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Toluene | 100 | U | 100 | 27 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| trans-1,2-Dichloroethene | 100 | U | 100 | 24 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 480-336633/2-A** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Total/NA**
**Analysis Batch: 336702** — **Prep Batch: 336633**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| trans-1,3-Dichloropropene | 100 | U | 100 | 9.9 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Trichloroethene | 100 | U | 100 | 28 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Trichlorofluoromethane | 100 | U | 100 | 47 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Vinyl chloride | 100 | U | 100 | 34 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Xylenes, Total | 200 | U | 200 | 56 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| cis-1,3-Dichloropropene | 100 | U | 100 | 24 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| Styrene | 100 | U | 100 | 24 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |
| tert-Butylbenzene | 100 | U | 100 | 28 | ug/Kg | | 12/15/16 14:15 | 12/16/16 00:09 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *92* | | *53 - 146* | *12/15/16 14:15* | *12/16/16 00:09* | *1* |
| *4-Bromofluorobenzene (Surr)* | *97* | | *49 - 148* | *12/15/16 14:15* | *12/16/16 00:09* | *1* |
| *Toluene-d8 (Surr)* | *94* | | *50 - 149* | *12/15/16 14:15* | *12/16/16 00:09* | *1* |
| *Dibromofluoromethane (Surr)* | *91* | | *60 - 140* | *12/15/16 14:15* | *12/16/16 00:09* | *1* |

**Lab Sample ID: LCS 480-336633/1-A** — **Client Sample ID: Lab Control Sample**
**Matrix: Solid** — **Prep Type: Total/NA**
**Analysis Batch: 336702** — **Prep Batch: 336633**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2520 | 2290 | | ug/Kg | | 91 | 68 - 130 |
| 1,1,2,2-Tetrachloroethane | 2520 | 2420 | | ug/Kg | | 96 | 73 - 120 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 2520 | 2500 | | ug/Kg | | 100 | 10 - 179 |
| 1,1,2-Trichloroethane | 2520 | 2270 | | ug/Kg | | 90 | 80 - 120 |
| 1,1-Dichloroethane | 2520 | 2230 | | ug/Kg | | 89 | 78 - 121 |
| 1,1-Dichloroethene | 2520 | 2230 | | ug/Kg | | 89 | 48 - 133 |
| 1,2,4-Trichlorobenzene | 2520 | 2340 | | ug/Kg | | 93 | 70 - 140 |
| 1,2,4-Trimethylbenzene | 2520 | 2390 | | ug/Kg | | 95 | 77 - 127 |
| 1,2-Dibromo-3-Chloropropane | 2520 | 2260 | | ug/Kg | | 90 | 56 - 122 |
| 1,2-Dichlorobenzene | 2520 | 2460 | | ug/Kg | | 98 | 78 - 125 |
| 1,2-Dichloroethane | 2520 | 2320 | | ug/Kg | | 92 | 74 - 127 |
| 1,2-Dichloropropane | 2520 | 2380 | | ug/Kg | | 95 | 80 - 120 |
| 1,3,5-Trimethylbenzene | 2520 | 2360 | | ug/Kg | | 94 | 79 - 120 |
| 1,3-Dichlorobenzene | 2520 | 2440 | | ug/Kg | | 97 | 80 - 120 |
| 1,4-Dichlorobenzene | 2520 | 2510 | | ug/Kg | | 100 | 80 - 120 |
| 2-Butanone (MEK) | 12600 | 11300 | | ug/Kg | | 90 | 54 - 149 |
| 2-Hexanone | 12600 | 10100 | | ug/Kg | | 81 | 59 - 127 |
| 4-Isopropyltoluene | 2520 | 2370 | | ug/Kg | | 94 | 80 - 120 |
| 4-Methyl-2-pentanone (MIBK) | 12600 | 10700 | | ug/Kg | | 85 | 74 - 120 |
| Acetone | 12600 | 11200 | | ug/Kg | | 89 | 47 - 141 |
| Benzene | 2520 | 2410 | | ug/Kg | | 96 | 77 - 125 |
| Bromoform | 2520 | 2190 | | ug/Kg | | 87 | 48 - 125 |
| Bromomethane | 2520 | 2360 | | ug/Kg | | 94 | 39 - 149 |
| Carbon disulfide | 2520 | 1970 | | ug/Kg | | 78 | 40 - 136 |
| Carbon tetrachloride | 2520 | 2310 | | ug/Kg | | 92 | 54 - 135 |
| Chlorobenzene | 2520 | 2390 | | ug/Kg | | 95 | 76 - 126 |
| Dibromochloromethane | 2520 | 2180 | | ug/Kg | | 87 | 64 - 120 |

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 480-336633/1-A**
**Matrix: Solid**
**Analysis Batch: 336702**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 336633**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Chloroethane | 2520 | 1950 | | ug/Kg | | 77 | 23 - 150 |
| Chloroform | 2520 | 2330 | | ug/Kg | | 93 | 78 - 120 |
| Chloromethane | 2520 | 2250 | | ug/Kg | | 90 | 61 - 124 |
| cis-1,2-Dichloroethene | 2520 | 2390 | | ug/Kg | | 95 | 79 - 124 |
| Cyclohexane | 2520 | 2290 | | ug/Kg | | 91 | 49 - 129 |
| Bromodichloromethane | 2520 | 2180 | | ug/Kg | | 87 | 71 - 121 |
| Dichlorodifluoromethane | 2520 | 2460 | | ug/Kg | | 98 | 10 - 150 |
| Ethylbenzene | 2520 | 2390 | | ug/Kg | | 95 | 78 - 124 |
| 1,2-Dibromoethane | 2520 | 2440 | | ug/Kg | | 97 | 80 - 120 |
| Isopropylbenzene | 2520 | 2440 | | ug/Kg | | 97 | 76 - 120 |
| Methyl acetate | 12600 | 10400 | | ug/Kg | | 83 | 71 - 123 |
| Methyl tert-butyl ether | 2520 | 2240 | | ug/Kg | | 89 | 67 - 137 |
| Methylcyclohexane | 2520 | 2490 | | ug/Kg | | 99 | 50 - 130 |
| Methylene Chloride | 2520 | 2220 | | ug/Kg | | 88 | 75 - 118 |
| Naphthalene | 2520 | 2350 | | ug/Kg | | 93 | 65 - 142 |
| n-Butylbenzene | 2520 | 2410 | | ug/Kg | | 96 | 80 - 120 |
| N-Propylbenzene | 2520 | 2410 | | ug/Kg | | 96 | 76 - 120 |
| sec-Butylbenzene | 2520 | 2480 | | ug/Kg | | 99 | 79 - 120 |
| Tetrachloroethene | 2520 | 2440 | | ug/Kg | | 97 | 73 - 133 |
| Toluene | 2520 | 2400 | | ug/Kg | | 95 | 75 - 124 |
| trans-1,2-Dichloroethene | 2520 | 2340 | | ug/Kg | | 93 | 74 - 129 |
| trans-1,3-Dichloropropene | 2520 | 2410 | | ug/Kg | | 96 | 73 - 120 |
| Trichloroethene | 2520 | 2460 | | ug/Kg | | 98 | 75 - 131 |
| Trichlorofluoromethane | 2520 | 2180 | | ug/Kg | | 87 | 29 - 158 |
| Vinyl chloride | 2520 | 2610 | | ug/Kg | | 104 | 59 - 124 |
| cis-1,3-Dichloropropene | 2520 | 2420 | | ug/Kg | | 96 | 75 - 121 |
| Styrene | 2520 | 2410 | | ug/Kg | | 96 | 80 - 120 |
| tert-Butylbenzene | 2520 | 2430 | | ug/Kg | | 97 | 78 - 120 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *94* | | *53 - 146* |
| *4-Bromofluorobenzene (Surr)* | *102* | | *49 - 148* |
| *Toluene-d8 (Surr)* | *96* | | *50 - 149* |
| *Dibromofluoromethane (Surr)* | *93* | | *60 - 140* |

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

**Lab Sample ID: MB 480-337144/1-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 170 | U | 170 | 46 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2,4,6-Trichlorophenol | 170 | U | 170 | 34 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2,4-Dichlorophenol | 170 | U | 170 | 18 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2,4-Dimethylphenol | 170 | U | 170 | 41 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2,4-Dinitrophenol | 1600 | U | 1600 | 780 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2,4-Dinitrotoluene | 170 | U | 170 | 35 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |

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

**Lab Sample ID: MB 480-337144/1-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,6-Dinitrotoluene | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Chloronaphthalene | 170 | U | 170 | 28 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Chlorophenol | 170 | U | 170 | 31 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Methylnaphthalene | 170 | U | 170 | 34 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Methylphenol | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Nitroaniline | 330 | U | 330 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 2-Nitrophenol | 170 | U | 170 | 48 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 3,3'-Dichlorobenzidine | 330 | U | 330 | 200 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 3-Nitroaniline | 330 | U | 330 | 47 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4,6-Dinitro-2-methylphenol | 330 | U | 330 | 170 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Bromophenyl phenyl ether | 170 | U | 170 | 24 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Chloro-3-methylphenol | 170 | U | 170 | 42 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Chloroaniline | 170 | U | 170 | 42 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Chlorophenyl phenyl ether | 170 | U | 170 | 21 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Methylphenol | 330 | U | 330 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Nitroaniline | 330 | U | 330 | 88 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| 4-Nitrophenol | 330 | U | 330 | 120 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Acenaphthene | 170 | U | 170 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Acenaphthylene | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Acetophenone | 170 | U | 170 | 23 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Anthracene | 170 | U | 170 | 42 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Atrazine | 170 | U | 170 | 58 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzaldehyde | 170 | U | 170 | 130 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzo[a]anthracene | 170 | U | 170 | 17 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzo[a]pyrene | 170 | U | 170 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzo[b]fluoranthene | 170 | U | 170 | 27 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzo[g,h,i]perylene | 170 | U | 170 | 18 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Benzo[k]fluoranthene | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Biphenyl | 170 | U | 170 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| bis (2-chloroisopropyl) ether | 170 | U | 170 | 34 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Bis(2-chloroethoxy)methane | 170 | U | 170 | 36 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Bis(2-chloroethyl)ether | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Bis(2-ethylhexyl) phthalate | 170 | U | 170 | 58 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Butyl benzyl phthalate | 170 | U | 170 | 28 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Caprolactam | 170 | U | 170 | 51 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Carbazole | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Chrysene | 170 | U | 170 | 38 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Dibenz(a,h)anthracene | 170 | U | 170 | 30 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Dibenzofuran | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Diethyl phthalate | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Dimethyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Di-n-butyl phthalate | 170 | U | 170 | 29 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Di-n-octyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Fluoranthene | 170 | U | 170 | 18 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Fluorene | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Hexachlorobenzene | 170 | U | 170 | 23 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Hexachlorobutadiene | 170 | U | 170 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Hexachlorocyclopentadiene | 170 | U | 170 | 23 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |

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

**Lab Sample ID: MB 480-337144/1-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Hexachloroethane | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Indeno[1,2,3-cd]pyrene | 170 | U | 170 | 21 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Isophorone | 170 | U | 170 | 36 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Naphthalene | 170 | U | 170 | 22 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Nitrobenzene | 170 | U | 170 | 19 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| N-Nitrosodi-n-propylamine | 170 | U | 170 | 29 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| N-Nitrosodiphenylamine | 170 | U | 170 | 140 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Pentachlorophenol | 330 | U | 330 | 170 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Phenanthrene | 170 | U | 170 | 25 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Phenol | 170 | U | 170 | 26 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |
| Pyrene | 170 | U | 170 | 20 | ug/Kg | | 12/19/16 14:05 | 12/20/16 09:46 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *73* | | *39 - 146* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |
| *2-Fluorobiphenyl* | *70* | | *37 - 120* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |
| *2-Fluorophenol (Surr)* | *60* | | *18 - 120* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |
| *Nitrobenzene-d5 (Surr)* | *64* | | *34 - 132* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |
| *Phenol-d5 (Surr)* | *58* | | *11 - 120* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |
| *p-Terphenyl-d14 (Surr)* | *83* | | *65 - 153* | *12/19/16 14:05* | *12/20/16 09:46* | *1* |

**Lab Sample ID: LCS 480-337144/2-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 1640 | 1520 | | ug/Kg | | 93 | 59 - 126 |
| 2,4,6-Trichlorophenol | 1640 | 1490 | | ug/Kg | | 91 | 59 - 123 |
| 2,4-Dichlorophenol | 1640 | 1410 | | ug/Kg | | 86 | 61 - 120 |
| 2,4-Dimethylphenol | 1640 | 1240 | | ug/Kg | | 76 | 59 - 120 |
| 2,4-Dinitrophenol | 3280 | 2830 | | ug/Kg | | 86 | 41 - 146 |
| 2,4-Dinitrotoluene | 1640 | 1610 | | ug/Kg | | 98 | 63 - 120 |
| 2,6-Dinitrotoluene | 1640 | 1500 | | ug/Kg | | 92 | 66 - 120 |
| 2-Chloronaphthalene | 1640 | 1360 | | ug/Kg | | 83 | 57 - 120 |
| 2-Chlorophenol | 1640 | 1220 | | ug/Kg | | 74 | 53 - 120 |
| 2-Methylnaphthalene | 1640 | 1400 | | ug/Kg | | 85 | 59 - 120 |
| 2-Methylphenol | 1640 | 1170 | | ug/Kg | | 71 | 54 - 120 |
| 2-Nitroaniline | 1640 | 1430 | | ug/Kg | | 87 | 61 - 120 |
| 2-Nitrophenol | 1640 | 1300 | | ug/Kg | | 79 | 56 - 120 |
| 3,3'-Dichlorobenzidine | 3280 | 2490 | | ug/Kg | | 76 | 54 - 120 |
| 3-Nitroaniline | 1640 | 1160 | | ug/Kg | | 71 | 48 - 120 |
| 4,6-Dinitro-2-methylphenol | 3280 | 2950 | | ug/Kg | | 90 | 49 - 122 |
| 4-Bromophenyl phenyl ether | 1640 | 1670 | | ug/Kg | | 102 | 58 - 120 |
| 4-Chloro-3-methylphenol | 1640 | 1540 | | ug/Kg | | 94 | 61 - 120 |
| 4-Chloroaniline | 1640 | 1130 | | ug/Kg | | 69 | 38 - 120 |
| 4-Chlorophenyl phenyl ether | 1640 | 1550 | | ug/Kg | | 94 | 63 - 124 |
| 4-Methylphenol | 1640 | 1180 | | ug/Kg | | 72 | 55 - 120 |
| 4-Nitroaniline | 1640 | 1360 | | ug/Kg | | 83 | 56 - 120 |
| 4-Nitrophenol | 3280 | 3470 | | ug/Kg | | 106 | 43 - 147 |

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

**Lab Sample ID: LCS 480-337144/2-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Acenaphthene | 1640 | 1420 | | ug/Kg | | 87 | 62 - 120 |
| Acenaphthylene | 1640 | 1430 | | ug/Kg | | 87 | 58 - 121 |
| Acetophenone | 1640 | 1250 | | ug/Kg | | 76 | 54 - 120 |
| Anthracene | 1640 | 1460 | | ug/Kg | | 89 | 62 - 120 |
| Atrazine | 3280 | 3400 | | ug/Kg | | 104 | 60 - 127 |
| Benzaldehyde | 3280 | 1840 | | ug/Kg | | 56 | 10 - 150 |
| Benzo[a]anthracene | 1640 | 1460 | | ug/Kg | | 89 | 65 - 120 |
| Benzo[a]pyrene | 1640 | 1440 | | ug/Kg | | 88 | 64 - 120 |
| Benzo[b]fluoranthene | 1640 | 1530 | | ug/Kg | | 93 | 64 - 120 |
| Benzo[g,h,i]perylene | 1640 | 1450 | | ug/Kg | | 89 | 45 - 145 |
| Benzo[k]fluoranthene | 1640 | 1430 | | ug/Kg | | 88 | 65 - 120 |
| Biphenyl | 1640 | 1360 | | ug/Kg | | 83 | 59 - 120 |
| bis (2-chloroisopropyl) ether | 1640 | 862 | | ug/Kg | | 53 | 44 - 120 |
| Bis(2-chloroethoxy)methane | 1640 | 1210 | | ug/Kg | | 74 | 55 - 120 |
| Bis(2-chloroethyl)ether | 1640 | 1050 | | ug/Kg | | 64 | 45 - 120 |
| Bis(2-ethylhexyl) phthalate | 1640 | 1470 | | ug/Kg | | 90 | 61 - 133 |
| Butyl benzyl phthalate | 1640 | 1470 | | ug/Kg | | 90 | 61 - 129 |
| Caprolactam | 3280 | 2820 | | ug/Kg | | 86 | 47 - 120 |
| Carbazole | 1640 | 1370 | | ug/Kg | | 84 | 65 - 120 |
| Chrysene | 1640 | 1450 | | ug/Kg | | 89 | 64 - 120 |
| Dibenz(a,h)anthracene | 1640 | 1440 | | ug/Kg | | 88 | 54 - 132 |
| Dibenzofuran | 1640 | 1440 | | ug/Kg | | 88 | 63 - 120 |
| Diethyl phthalate | 1640 | 1590 | | ug/Kg | | 97 | 66 - 120 |
| Dimethyl phthalate | 1640 | 1540 | | ug/Kg | | 94 | 65 - 124 |
| Di-n-butyl phthalate | 1640 | 1510 | | ug/Kg | | 92 | 58 - 130 |
| Di-n-octyl phthalate | 1640 | 1450 | | ug/Kg | | 89 | 57 - 133 |
| Fluoranthene | 1640 | 1480 | | ug/Kg | | 90 | 62 - 120 |
| Fluorene | 1640 | 1490 | | ug/Kg | | 91 | 63 - 120 |
| Hexachlorobenzene | 1640 | 1700 | | ug/Kg | | 104 | 60 - 120 |
| Hexachlorobutadiene | 1640 | 1500 | | ug/Kg | | 92 | 45 - 120 |
| Hexachlorocyclopentadiene | 1640 | 1530 | | ug/Kg | | 93 | 47 - 120 |
| Hexachloroethane | 1640 | 1100 | | ug/Kg | | 67 | 41 - 120 |
| Indeno[1,2,3-cd]pyrene | 1640 | 1450 | | ug/Kg | | 89 | 56 - 134 |
| Isophorone | 1640 | 1290 | | ug/Kg | | 79 | 56 - 120 |
| Naphthalene | 1640 | 1250 | | ug/Kg | | 77 | 55 - 120 |
| Nitrobenzene | 1640 | 1240 | | ug/Kg | | 76 | 54 - 120 |
| N-Nitrosodi-n-propylamine | 1640 | 1150 | | ug/Kg | | 70 | 52 - 120 |
| N-Nitrosodiphenylamine | 1640 | 1360 | | ug/Kg | | 83 | 51 - 128 |
| Pentachlorophenol | 3280 | 2690 | | ug/Kg | | 82 | 51 - 120 |
| Phenanthrene | 1640 | 1420 | | ug/Kg | | 87 | 60 - 120 |
| Phenol | 1640 | 1080 | | ug/Kg | | 66 | 53 - 120 |
| Pyrene | 1640 | 1430 | | ug/Kg | | 87 | 61 - 133 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *107* | | *39 - 146* |
| *2-Fluorobiphenyl* | *79* | | *37 - 120* |
| *2-Fluorophenol (Surr)* | *67* | | *18 - 120* |
| *Nitrobenzene-d5 (Surr)* | *74* | | *34 - 132* |

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

**Lab Sample ID: LCS 480-337144/2-A**
**Matrix: Solid**
**Analysis Batch: 337252**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337144**

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *Phenol-d5 (Surr)* | *66* | | *11 - 120* |
| *p-Terphenyl-d14 (Surr)* | *84* | | *65 - 153* |

**Lab Sample ID: MB 480-337662/1-A**
**Matrix: Solid**
**Analysis Batch: 337856**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337662**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 170 | U | 170 | 45 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,4,6-Trichlorophenol | 170 | U | 170 | 34 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,4-Dichlorophenol | 170 | U | 170 | 18 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,4-Dimethylphenol | 170 | U | 170 | 40 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,4-Dinitrophenol | 1600 | U | 1600 | 770 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,4-Dinitrotoluene | 170 | U | 170 | 35 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2,6-Dinitrotoluene | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Chloronaphthalene | 170 | U | 170 | 28 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Chlorophenol | 170 | U | 170 | 31 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Methylnaphthalene | 170 | U | 170 | 34 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Methylphenol | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Nitroaniline | 330 | U | 330 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 2-Nitrophenol | 170 | U | 170 | 47 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 3,3'-Dichlorobenzidine | 330 | U | 330 | 200 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 3-Nitroaniline | 330 | U | 330 | 46 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4,6-Dinitro-2-methylphenol | 330 | U | 330 | 170 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Bromophenyl phenyl ether | 170 | U | 170 | 24 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Chloro-3-methylphenol | 170 | U | 170 | 41 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Chloroaniline | 170 | U | 170 | 41 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Chlorophenyl phenyl ether | 170 | U | 170 | 21 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Methylphenol | 330 | U | 330 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Nitroaniline | 330 | U | 330 | 88 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| 4-Nitrophenol | 330 | U | 330 | 120 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Acenaphthene | 170 | U | 170 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Acenaphthylene | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Acetophenone | 170 | U | 170 | 23 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Anthracene | 170 | U | 170 | 41 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Atrazine | 170 | U | 170 | 58 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzaldehyde | 170 | U | 170 | 130 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzo[a]anthracene | 170 | U | 170 | 17 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzo[a]pyrene | 170 | U | 170 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzo[b]fluoranthene | 170 | U | 170 | 27 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzo[g,h,i]perylene | 170 | U | 170 | 18 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Benzo[k]fluoranthene | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Biphenyl | 170 | U | 170 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| bis (2-chloroisopropyl) ether | 170 | U | 170 | 34 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Bis(2-chloroethoxy)methane | 170 | U | 170 | 36 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Bis(2-chloroethyl)ether | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Bis(2-ethylhexyl) phthalate | 145 | J | 170 | 57 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Butyl benzyl phthalate | 170 | U | 170 | 28 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |

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

**Lab Sample ID: MB 480-337662/1-A**
**Matrix: Solid**
**Analysis Batch: 337856**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337662**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Caprolactam | 170 | U | 170 | 50 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Carbazole | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Chrysene | 170 | U | 170 | 38 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Dibenz(a,h)anthracene | 170 | U | 170 | 30 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Dibenzofuran | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Diethyl phthalate | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Dimethyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Di-n-butyl phthalate | 170 | U | 170 | 29 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Di-n-octyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Fluoranthene | 170 | U | 170 | 18 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Fluorene | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Hexachlorobenzene | 170 | U | 170 | 23 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Hexachlorobutadiene | 170 | U | 170 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Hexachlorocyclopentadiene | 170 | U | 170 | 23 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Hexachloroethane | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Indeno[1,2,3-cd]pyrene | 170 | U | 170 | 21 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Isophorone | 170 | U | 170 | 36 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Naphthalene | 170 | U | 170 | 22 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Nitrobenzene | 170 | U | 170 | 19 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| N-Nitrosodi-n-propylamine | 170 | U | 170 | 29 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| N-Nitrosodiphenylamine | 170 | U | 170 | 140 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Pentachlorophenol | 330 | U | 330 | 170 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Phenanthrene | 170 | U | 170 | 25 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Phenol | 170 | U | 170 | 26 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |
| Pyrene | 170 | U | 170 | 20 | ug/Kg | | 12/22/16 07:19 | 12/23/16 07:35 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *112* | | *39 - 146* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |
| *2-Fluorobiphenyl* | *95* | | *37 - 120* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |
| *2-Fluorophenol (Surr)* | *57* | | *18 - 120* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |
| *Nitrobenzene-d5 (Surr)* | *92* | | *34 - 132* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |
| *Phenol-d5 (Surr)* | *64* | | *11 - 120* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |
| *p-Terphenyl-d14 (Surr)* | *95* | | *65 - 153* | *12/22/16 07:19* | *12/23/16 07:35* | *1* |

**Lab Sample ID: LCS 480-337662/2-A**
**Matrix: Solid**
**Analysis Batch: 337856**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337662**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 1630 | 1900 | | ug/Kg | | 117 | 59 - 126 |
| 2,4,6-Trichlorophenol | 1630 | 2010 | | ug/Kg | | 123 | 59 - 123 |
| 2,4-Dichlorophenol | 1630 | 1360 | | ug/Kg | | 83 | 61 - 120 |
| 2,4-Dimethylphenol | 1630 | 1330 | | ug/Kg | | 82 | 59 - 120 |
| 2,4-Dinitrophenol | 3260 | 3220 | | ug/Kg | | 99 | 41 - 146 |
| 2,4-Dinitrotoluene | 1630 | 1690 | | ug/Kg | | 104 | 63 - 120 |
| 2,6-Dinitrotoluene | 1630 | 1810 | | ug/Kg | | 111 | 66 - 120 |
| 2-Chloronaphthalene | 1630 | 1610 | | ug/Kg | | 99 | 57 - 120 |
| 2-Chlorophenol | 1630 | 1220 | | ug/Kg | | 75 | 53 - 120 |

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

**Lab Sample ID: LCS 480-337662/2-A**
**Matrix: Solid**
**Analysis Batch: 337856**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337662**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | 1630 | 1250 | | ug/Kg | | 76 | 59 - 120 |
| 2-Methylphenol | 1630 | 1530 | | ug/Kg | | 94 | 54 - 120 |
| 2-Nitroaniline | 1630 | 2160 | * | ug/Kg | | 133 | 61 - 120 |
| 2-Nitrophenol | 1630 | 1310 | | ug/Kg | | 80 | 56 - 120 |
| 3,3'-Dichlorobenzidine | 3260 | 2630 | | ug/Kg | | 81 | 54 - 120 |
| 3-Nitroaniline | 1630 | 1180 | | ug/Kg | | 73 | 48 - 120 |
| 4,6-Dinitro-2-methylphenol | 3260 | 3470 | | ug/Kg | | 106 | 49 - 122 |
| 4-Bromophenyl phenyl ether | 1630 | 1850 | | ug/Kg | | 114 | 58 - 120 |
| 4-Chloro-3-methylphenol | 1630 | 1450 | | ug/Kg | | 89 | 61 - 120 |
| 4-Chloroaniline | 1630 | 1240 | | ug/Kg | | 76 | 38 - 120 |
| 4-Chlorophenyl phenyl ether | 1630 | 1650 | | ug/Kg | | 101 | 63 - 124 |
| 4-Methylphenol | 1630 | 1590 | | ug/Kg | | 97 | 55 - 120 |
| 4-Nitroaniline | 1630 | 1480 | | ug/Kg | | 91 | 56 - 120 |
| 4-Nitrophenol | 3260 | 4450 | | ug/Kg | | 136 | 43 - 147 |
| Acenaphthene | 1630 | 1580 | | ug/Kg | | 97 | 62 - 120 |
| Acenaphthylene | 1630 | 1710 | | ug/Kg | | 105 | 58 - 121 |
| Acetophenone | 1630 | 1580 | | ug/Kg | | 97 | 54 - 120 |
| Anthracene | 1630 | 1530 | | ug/Kg | | 94 | 62 - 120 |
| Atrazine | 3260 | 3290 | | ug/Kg | | 101 | 60 - 127 |
| Benzaldehyde | 3260 | 2330 | | ug/Kg | | 71 | 10 - 150 |
| Benzo[a]anthracene | 1630 | 1520 | | ug/Kg | | 93 | 65 - 120 |
| Benzo[a]pyrene | 1630 | 1510 | | ug/Kg | | 92 | 64 - 120 |
| Benzo[b]fluoranthene | 1630 | 1650 | | ug/Kg | | 101 | 64 - 120 |
| Benzo[g,h,i]perylene | 1630 | 1640 | | ug/Kg | | 101 | 45 - 145 |
| Benzo[k]fluoranthene | 1630 | 1500 | | ug/Kg | | 92 | 65 - 120 |
| Biphenyl | 1630 | 1620 | | ug/Kg | | 99 | 59 - 120 |
| bis (2-chloroisopropyl) ether | 1630 | 1300 | | ug/Kg | | 79 | 44 - 120 |
| Bis(2-chloroethoxy)methane | 1630 | 1240 | | ug/Kg | | 76 | 55 - 120 |
| Bis(2-chloroethyl)ether | 1630 | 1140 | | ug/Kg | | 70 | 45 - 120 |
| Bis(2-ethylhexyl) phthalate | 1630 | 1780 | | ug/Kg | | 109 | 61 - 133 |
| Butyl benzyl phthalate | 1630 | 1500 | | ug/Kg | | 92 | 61 - 129 |
| Caprolactam | 3260 | 2630 | | ug/Kg | | 81 | 47 - 120 |
| Carbazole | 1630 | 1490 | | ug/Kg | | 92 | 65 - 120 |
| Chrysene | 1630 | 1490 | | ug/Kg | | 91 | 64 - 120 |
| Dibenz(a,h)anthracene | 1630 | 1560 | | ug/Kg | | 96 | 54 - 132 |
| Dibenzofuran | 1630 | 1510 | | ug/Kg | | 92 | 63 - 120 |
| Diethyl phthalate | 1630 | 1710 | | ug/Kg | | 105 | 66 - 120 |
| Dimethyl phthalate | 1630 | 1770 | | ug/Kg | | 108 | 65 - 124 |
| Di-n-butyl phthalate | 1630 | 1720 | | ug/Kg | | 105 | 58 - 130 |
| Di-n-octyl phthalate | 1630 | 1540 | | ug/Kg | | 94 | 57 - 133 |
| Fluoranthene | 1630 | 1620 | | ug/Kg | | 99 | 62 - 120 |
| Fluorene | 1630 | 1540 | | ug/Kg | | 94 | 63 - 120 |
| Hexachlorobenzene | 1630 | 1920 | | ug/Kg | | 118 | 60 - 120 |
| Hexachlorobutadiene | 1630 | 1390 | | ug/Kg | | 85 | 45 - 120 |
| Hexachlorocyclopentadiene | 1630 | 2060 | * | ug/Kg | | 126 | 47 - 120 |
| Hexachloroethane | 1630 | 1480 | | ug/Kg | | 90 | 41 - 120 |
| Indeno[1,2,3-cd]pyrene | 1630 | 1550 | | ug/Kg | | 95 | 56 - 134 |
| Isophorone | 1630 | 1420 | | ug/Kg | | 87 | 56 - 120 |

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

**Lab Sample ID: LCS 480-337662/2-A**
**Matrix: Solid**
**Analysis Batch: 337856**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337662**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Naphthalene | 1630 | 1620 | | ug/Kg | | 99 | 55 - 120 |
| Nitrobenzene | 1630 | 1300 | | ug/Kg | | 80 | 54 - 120 |
| N-Nitrosodi-n-propylamine | 1630 | 1510 | | ug/Kg | | 93 | 52 - 120 |
| N-Nitrosodiphenylamine | 1630 | 1590 | | ug/Kg | | 97 | 51 - 128 |
| Pentachlorophenol | 3260 | 3480 | | ug/Kg | | 107 | 51 - 120 |
| Phenanthrene | 1630 | 1630 | | ug/Kg | | 100 | 60 - 120 |
| Phenol | 1630 | 1250 | | ug/Kg | | 76 | 53 - 120 |
| Pyrene | 1630 | 1450 | | ug/Kg | | 89 | 61 - 133 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *131* | | *39 - 146* |
| *2-Fluorobiphenyl* | *98* | | *37 - 120* |
| *2-Fluorophenol (Surr)* | *67* | | *18 - 120* |
| *Nitrobenzene-d5 (Surr)* | *85* | | *34 - 132* |
| *Phenol-d5 (Surr)* | *74* | | *11 - 120* |
| *p-Terphenyl-d14 (Surr)* | *89* | | *65 - 153* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

**Lab Sample ID: MB 480-337788/1-A**
**Matrix: Solid**
**Analysis Batch: 337915**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337788**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 1.2 | U | 1.2 | 0.32 | mg/Kg | | 12/22/16 13:36 | 12/23/16 11:50 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *90* | | *46 - 156* | *12/22/16 13:36* | *12/23/16 11:50* | *1* |

**Lab Sample ID: LCS 480-337788/2-A**
**Matrix: Solid**
**Analysis Batch: 337915**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337788**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 9.77 | 11.4 | | mg/Kg | | 116 | 64 - 129 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *94* | | *46 - 156* |

**Lab Sample ID: LCSD 480-337788/3-A**
**Matrix: Solid**
**Analysis Batch: 337915**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 337788**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 9.86 | 11.3 | | mg/Kg | | 115 | 64 - 129 | 0 | 35 |

## Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

**Lab Sample ID: LCSD 480-337788/3-A**
**Matrix: Solid**
**Analysis Batch: 337915**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 337788**

| Surrogate | LCSD %Recovery | LCSD Qualifier | Limits |
|---|---|---|---|
| a,a,a-Trifluorotoluene | 93 | | 46 - 156 |

## Method: 8015D - Diesel Range Organics (DRO) (GC)

**Lab Sample ID: MB 480-337322/1-A**
**Matrix: Solid**
**Analysis Batch: 337418**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 337322**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 17 | U | 17 | 5.0 | mg/Kg | | 12/20/16 11:56 | 12/20/16 18:06 | 1 |

| Surrogate | MB %Recovery | MB Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|
| o-Terphenyl | 91 | | 48 - 125 | 12/20/16 11:56 | 12/20/16 18:06 | 1 |

**Lab Sample ID: LCS 480-337322/2-A**
**Matrix: Solid**
**Analysis Batch: 337418**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 337322**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 49.8 | 54.1 | | mg/Kg | | 109 | 63 - 127 |

| Surrogate | LCS %Recovery | LCS Qualifier | Limits |
|---|---|---|---|
| o-Terphenyl | 94 | | 48 - 125 |

**Lab Sample ID: 480-111089-6 MS**
**Matrix: Solid**
**Analysis Batch: 337418**

**Client Sample ID: GCM-3 POST**
**Prep Type: Total/NA**
**Prep Batch: 337322**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 27000 | | 59.8 | 26600 | 4 | mg/Kg | ☼ | -354 | 43 - 153 |

| Surrogate | MS %Recovery | MS Qualifier | Limits |
|---|---|---|---|
| o-Terphenyl | 214 | X | 48 - 125 |

**Lab Sample ID: 480-111089-6 MSD**
**Matrix: Solid**
**Analysis Batch: 337418**

**Client Sample ID: GCM-3 POST**
**Prep Type: Total/NA**
**Prep Batch: 337322**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 27000 | | 60.7 | 22800 | 4 | mg/Kg | ☼ | -6687 | 43 - 153 | 16 | 35 |

| Surrogate | MSD %Recovery | MSD Qualifier | Limits |
|---|---|---|---|
| o-Terphenyl | 140 | X | 48 - 125 |

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 480-336662/1-A**
**Matrix: Solid**
**Analysis Batch: 337052**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 336662**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.96 | U | 0.96 | 0.23 | mg/Kg | | 12/15/16 16:18 | 12/16/16 18:01 | 1 |

**Lab Sample ID: LCSSRM 480-336662/2-A**
**Matrix: Solid**
**Analysis Batch: 337052**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 336662**

| Analyte | Spike Added | LCSSRM Result | LCSSRM Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 146 | 140.9 | | mg/Kg | | 96.5 | 73.3 - 126.7 |

**Lab Sample ID: MB 480-336827/2-A**
**Matrix: Solid**
**Analysis Batch: 337246**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 336827**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 12/16/16 11:47 | 12/19/16 17:48 | 1 |

**Lab Sample ID: LCS 480-336827/3-A**
**Matrix: Solid**
**Analysis Batch: 337246**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 336827**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 1.08 | | mg/L | | 108 | 80 - 120 |

**Lab Sample ID: MB 480-336829/2-A**
**Matrix: Solid**
**Analysis Batch: 337281**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 336829**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 12/16/16 11:57 | 12/19/16 17:33 | 1 |

**Lab Sample ID: LCS 480-336829/3-A**
**Matrix: Solid**
**Analysis Batch: 337281**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 336829**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 0.954 | | mg/L | | 95 | 80 - 120 |

**Lab Sample ID: LB 480-336513/1-C**
**Matrix: Solid**
**Analysis Batch: 337246**

**Client Sample ID: Method Blank**
**Prep Type: TCLP**
**Prep Batch: 336827**

| Analyte | LB Result | LB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 12/16/16 11:47 | 12/19/16 17:44 | 1 |

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: LB2 480-336572/1-B**
**Matrix: Solid**
**Analysis Batch: 337281**

**Client Sample ID: Method Blank**
**Prep Type: TCLP**
**Prep Batch: 336829**

| Analyte | LB2 Result | LB2 Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 12/16/16 11:57 | 12/19/16 17:30 | 1 |

**Lab Sample ID: 480-111089-8 MS**
**Matrix: Solid**
**Analysis Batch: 337281**

**Client Sample ID: LEAD-1 POST**
**Prep Type: TCLP**
**Prep Batch: 336829**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.3 | | 1.00 | 5.43 | 4 | mg/L | | 116 | 75 - 125 |

**Lab Sample ID: 480-111089-8 MSD**
**Matrix: Solid**
**Analysis Batch: 337281**

**Client Sample ID: LEAD-1 POST**
**Prep Type: TCLP**
**Prep Batch: 336829**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.3 | | 1.00 | 5.16 | 4 | mg/L | | 89 | 75 - 125 | 5 | 20 |

## GC/MS VOA

### Prep Batch: 336633

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 5035A | |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 5035A | |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 5035A | |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 5035A | |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 5035A | |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 5035A | |
| MB 480-336633/2-A | Method Blank | Total/NA | Solid | 5035A | |
| LCS 480-336633/1-A | Lab Control Sample | Total/NA | Solid | 5035A | |

### Analysis Batch: 336702

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 8260C | 336633 |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 8260C | 336633 |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 8260C | 336633 |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 8260C | 336633 |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 8260C | 336633 |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 8260C | 336633 |
| MB 480-336633/2-A | Method Blank | Total/NA | Solid | 8260C | 336633 |
| LCS 480-336633/1-A | Lab Control Sample | Total/NA | Solid | 8260C | 336633 |

## GC/MS Semi VOA

### Prep Batch: 337144

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 3550C | |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 3550C | |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 3550C | |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 3550C | |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 3550C | |
| MB 480-337144/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-337144/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |

### Analysis Batch: 337252

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| MB 480-337144/1-A | Method Blank | Total/NA | Solid | 8270D | 337144 |
| LCS 480-337144/2-A | Lab Control Sample | Total/NA | Solid | 8270D | 337144 |

### Analysis Batch: 337355

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 8270D | 337144 |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 8270D | 337144 |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 8270D | 337144 |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 8270D | 337144 |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 8270D | 337144 |

### Prep Batch: 337662

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 3550C | |
| MB 480-337662/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-337662/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |

## GC/MS Semi VOA (Continued)

### Analysis Batch: 337856

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 8270D | 337662 |
| MB 480-337662/1-A | Method Blank | Total/NA | Solid | 8270D | 337662 |
| LCS 480-337662/2-A | Lab Control Sample | Total/NA | Solid | 8270D | 337662 |

## GC VOA

### Prep Batch: 337788

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 5035 | |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 5035 | |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 5035 | |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 5035 | |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 5035 | |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 5035 | |
| MB 480-337788/1-A | Method Blank | Total/NA | Solid | 5035 | |
| LCS 480-337788/2-A | Lab Control Sample | Total/NA | Solid | 5035 | |
| LCSD 480-337788/3-A | Lab Control Sample Dup | Total/NA | Solid | 5035 | |

### Analysis Batch: 337915

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 8015D | 337788 |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 8015D | 337788 |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 8015D | 337788 |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 8015D | 337788 |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 8015D | 337788 |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 8015D | 337788 |
| MB 480-337788/1-A | Method Blank | Total/NA | Solid | 8015D | 337788 |
| LCS 480-337788/2-A | Lab Control Sample | Total/NA | Solid | 8015D | 337788 |
| LCSD 480-337788/3-A | Lab Control Sample Dup | Total/NA | Solid | 8015D | 337788 |

## GC Semi VOA

### Prep Batch: 337322

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 3550C | |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 3550C | |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 3550C | |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 3550C | |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 3550C | |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 3550C | |
| MB 480-337322/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-337322/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |
| 480-111089-6 MS | GCM-3 POST | Total/NA | Solid | 3550C | |
| 480-111089-6 MSD | GCM-3 POST | Total/NA | Solid | 3550C | |

### Analysis Batch: 337418

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | 8015D | 337322 |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | 8015D | 337322 |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | 8015D | 337322 |

## GC Semi VOA (Continued)

### Analysis Batch: 337418 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | 8015D | 337322 |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | 8015D | 337322 |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | 8015D | 337322 |
| MB 480-337322/1-A | Method Blank | Total/NA | Solid | 8015D | 337322 |
| LCS 480-337322/2-A | Lab Control Sample | Total/NA | Solid | 8015D | 337322 |
| 480-111089-6 MS | GCM-3 POST | Total/NA | Solid | 8015D | 337322 |
| 480-111089-6 MSD | GCM-3 POST | Total/NA | Solid | 8015D | 337322 |

## Metals

### Leach Batch: 336513

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-7 | LEAD-1 PRE | TCLP | Solid | 1311 | |
| LB 480-336513/1-C | Method Blank | TCLP | Solid | 1311 | |

### Leach Batch: 336572

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-8 | LEAD-1 POST | TCLP | Solid | 1311 | |
| LB2 480-336572/1-B | Method Blank | TCLP | Solid | 1311 | |
| 480-111089-8 MS | LEAD-1 POST | TCLP | Solid | 1311 | |
| 480-111089-8 MSD | LEAD-1 POST | TCLP | Solid | 1311 | |

### Prep Batch: 336662

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-7 | LEAD-1 PRE | Total/NA | Solid | 3050B | |
| 480-111089-8 | LEAD-1 POST | Total/NA | Solid | 3050B | |
| MB 480-336662/1-A | Method Blank | Total/NA | Solid | 3050B | |
| LCSSRM 480-336662/2-A | Lab Control Sample | Total/NA | Solid | 3050B | |

### Prep Batch: 336827

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-7 | LEAD-1 PRE | TCLP | Solid | 3010A | 336513 |
| LB 480-336513/1-C | Method Blank | TCLP | Solid | 3010A | 336513 |
| MB 480-336827/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-336827/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |

### Prep Batch: 336829

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-8 | LEAD-1 POST | TCLP | Solid | 3010A | 336572 |
| LB2 480-336572/1-B | Method Blank | TCLP | Solid | 3010A | 336572 |
| MB 480-336829/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-336829/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |
| 480-111089-8 MS | LEAD-1 POST | TCLP | Solid | 3010A | 336572 |
| 480-111089-8 MSD | LEAD-1 POST | TCLP | Solid | 3010A | 336572 |

### Analysis Batch: 337052

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-7 | LEAD-1 PRE | Total/NA | Solid | 6010C | 336662 |
| 480-111089-8 | LEAD-1 POST | Total/NA | Solid | 6010C | 336662 |
| MB 480-336662/1-A | Method Blank | Total/NA | Solid | 6010C | 336662 |

## Metals (Continued)

### Analysis Batch: 337052 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| LCSSRM 480-336662/2-A | Lab Control Sample | Total/NA | Solid | 6010C | 336662 |

### Analysis Batch: 337246

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-7 | LEAD-1 PRE | TCLP | Solid | 6010C | 336827 |
| LB 480-336513/1-C | Method Blank | TCLP | Solid | 6010C | 336827 |
| MB 480-336827/2-A | Method Blank | Total/NA | Solid | 6010C | 336827 |
| LCS 480-336827/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 336827 |

### Analysis Batch: 337281

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-8 | LEAD-1 POST | TCLP | Solid | 6010C | 336829 |
| LB2 480-336572/1-B | Method Blank | TCLP | Solid | 6010C | 336829 |
| MB 480-336829/2-A | Method Blank | Total/NA | Solid | 6010C | 336829 |
| LCS 480-336829/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 336829 |
| 480-111089-8 MS | LEAD-1 POST | TCLP | Solid | 6010C | 336829 |
| 480-111089-8 MSD | LEAD-1 POST | TCLP | Solid | 6010C | 336829 |

## General Chemistry

### Analysis Batch: 336457

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Total/NA | Solid | Moisture | |
| 480-111089-2 | GCM-1 POST | Total/NA | Solid | Moisture | |
| 480-111089-3 | GCM-2 PRE | Total/NA | Solid | Moisture | |
| 480-111089-4 | GCM-2 POST | Total/NA | Solid | Moisture | |
| 480-111089-5 | GCM-3 PRE | Total/NA | Solid | Moisture | |
| 480-111089-6 | GCM-3 POST | Total/NA | Solid | Moisture | |
| 480-111089-7 | LEAD-1 PRE | Total/NA | Solid | Moisture | |
| 480-111089-8 | LEAD-1 POST | Total/NA | Solid | Moisture | |

# Lab Chronicle

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Client Sample ID: GCM-1 PRE

**Lab Sample ID: 480-111089-1**

**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

## Client Sample ID: GCM-1 PRE

**Lab Sample ID: 480-111089-1**

**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 75.9**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 03:33 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337144 | 12/19/16 14:05 | ARS | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337355 | 12/21/16 00:04 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 10 | 337915 | 12/23/16 13:47 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 20:22 | JMO | TAL BUF |

## Client Sample ID: GCM-1 POST

**Lab Sample ID: 480-111089-2**

**Date Collected: 12/13/16 13:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

## Client Sample ID: GCM-1 POST

**Lab Sample ID: 480-111089-2**

**Date Collected: 12/13/16 13:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 76.5**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 04:01 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337144 | 12/19/16 14:05 | ARS | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337355 | 12/21/16 00:29 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 337915 | 12/23/16 14:52 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 20:56 | JMO | TAL BUF |

**Client Sample ID: GCM-2 PRE** — **Lab Sample ID: 480-111089-3**
**Date Collected: 12/13/16 09:45** — **Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

**Client Sample ID: GCM-2 PRE** — **Lab Sample ID: 480-111089-3**
**Date Collected: 12/13/16 09:45** — **Matrix: Solid**
**Date Received: 12/14/16 13:43** — **Percent Solids: 82.5**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 04:28 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337144 | 12/19/16 14:05 | ARS | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337355 | 12/21/16 00:55 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 337915 | 12/23/16 15:27 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 21:30 | JMO | TAL BUF |

**Client Sample ID: GCM-2 POST** — **Lab Sample ID: 480-111089-4**
**Date Collected: 12/13/16 15:15** — **Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

**Client Sample ID: GCM-2 POST** — **Lab Sample ID: 480-111089-4**
**Date Collected: 12/13/16 15:15** — **Matrix: Solid**
**Date Received: 12/14/16 13:43** — **Percent Solids: 79.2**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 04:55 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337144 | 12/19/16 14:05 | ARS | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337355 | 12/21/16 01:20 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 337915 | 12/23/16 16:01 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 22:04 | JMO | TAL BUF |

**Client Sample ID: GCM-3 PRE** — **Lab Sample ID: 480-111089-5**
**Date Collected: 12/13/16 09:45** — **Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

## Client Sample ID: GCM-3 PRE

**Lab Sample ID: 480-111089-5**

**Date Collected: 12/13/16 09:45**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 81.3**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 05:22 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337144 | 12/19/16 14:05 | ARS | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337355 | 12/21/16 01:45 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 337915 | 12/23/16 16:36 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 22:38 | JMO | TAL BUF |

## Client Sample ID: GCM-3 POST

**Lab Sample ID: 480-111089-6**

**Date Collected: 12/13/16 16:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

## Client Sample ID: GCM-3 POST

**Lab Sample ID: 480-111089-6**

**Date Collected: 12/13/16 16:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 82.2**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 336633 | 12/15/16 14:15 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 1 | 336702 | 12/16/16 05:49 | NEA | TAL BUF |
| Total/NA | Prep | 3550C | | | 337662 | 12/22/16 07:19 | SMP | TAL BUF |
| Total/NA | Analysis | 8270D | | 20 | 337856 | 12/23/16 13:42 | MKP | TAL BUF |
| Total/NA | Prep | 5035 | | | 337788 | 12/22/16 13:36 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 337915 | 12/23/16 17:10 | MRB | TAL BUF |
| Total/NA | Prep | 3550C | | | 337322 | 12/20/16 11:56 | RJS | TAL BUF |
| Total/NA | Analysis | 8015D | | 50 | 337418 | 12/20/16 23:12 | JMO | TAL BUF |

## Client Sample ID: LEAD-1 PRE

**Lab Sample ID: 480-111089-7**

**Date Collected: 12/14/16 09:15**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 336513 | 12/15/16 08:05 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 336827 | 12/16/16 11:47 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 337246 | 12/19/16 18:27 | LMH | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

# Lab Chronicle

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Client Sample ID: LEAD-1 PRE

**Lab Sample ID: 480-111089-7**

**Date Collected: 12/14/16 09:15**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 69.8**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 336662 | 12/15/16 16:18 | MVZ | TAL BUF |
| Total/NA | Analysis | 6010C | | 1 | 337052 | 12/16/16 19:08 | AMH | TAL BUF |

## Client Sample ID: LEAD-1 POST

**Lab Sample ID: 480-111089-8**

**Date Collected: 12/14/16 10:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 336572 | 12/15/16 10:17 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 336829 | 12/16/16 11:57 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 337281 | 12/19/16 17:40 | LMH | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 336457 | 12/14/16 21:29 | CMK | TAL BUF |

## Client Sample ID: LEAD-1 POST

**Lab Sample ID: 480-111089-8**

**Date Collected: 12/14/16 10:30**
**Matrix: Solid**
**Date Received: 12/14/16 13:43**
**Percent Solids: 69.6**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 336662 | 12/15/16 16:18 | MVZ | TAL BUF |
| Total/NA | Analysis | 6010C | | 1 | 337052 | 12/16/16 19:12 | AMH | TAL BUF |

**Laboratory References:**

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

# Certification Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

## Laboratory: TestAmerica Buffalo

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

| Authority | Program | EPA Region | Certification ID | Expiration Date |
|---|---|---|---|---|
| New York | NELAP | 2 | 10026 | 03-31-17 |

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

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

# Method Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 8260C | Volatile Organic Compounds by GC/MS | SW846 | TAL BUF |
| 8270D | Semivolatile Organic Compounds (GC/MS) | SW846 | TAL BUF |
| 8015D | Gasoline Range Organics (GRO) (GC) | SW846 | TAL BUF |
| 8015D | Diesel Range Organics (DRO) (GC) | SW846 | TAL BUF |
| 6010C | Metals (ICP) | SW846 | TAL BUF |
| Moisture | Percent Moisture | EPA | TAL BUF |

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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

# Sample Summary

Client: Northstar Demolition and Remediation LP
Project/Site: Former Exxon Terminal

TestAmerica Job ID: 480-111089-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 480-111089-1 | GCM-1 PRE | Solid | 12/13/16 09:45 | 12/14/16 13:43 |
| 480-111089-2 | GCM-1 POST | Solid | 12/13/16 13:45 | 12/14/16 13:43 |
| 480-111089-3 | GCM-2 PRE | Solid | 12/13/16 09:45 | 12/14/16 13:43 |
| 480-111089-4 | GCM-2 POST | Solid | 12/13/16 15:15 | 12/14/16 13:43 |
| 480-111089-5 | GCM-3 PRE | Solid | 12/13/16 09:45 | 12/14/16 13:43 |
| 480-111089-6 | GCM-3 POST | Solid | 12/13/16 16:30 | 12/14/16 13:43 |
| 480-111089-7 | LEAD-1 PRE | Solid | 12/14/16 09:15 | 12/14/16 13:43 |
| 480-111089-8 | LEAD-1 POST | Solid | 12/14/16 10:30 | 12/14/16 13:43 |

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

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information | Sampler: TRENT MILLS | Lab PM: Schove, John R | Carrier Tracking No(s): | COC No: 480-90615-22095.1 |
|---|---|---|---|---|
| Client Contact: Mr. Mark Talarico | Phone: | E-Mail: john.schove@testamericainc.com | | Page: Page 1 of 1 |
| Company: Northstar Demolition and Remediation LP | | | | Job #: |
| Address: 2760 S. Falkenburg Road | Due Date Requested: | | | |
| City: Riverview | TAT Requested (days): NORMAL | | | |
| State, Zip: FL, 33578 | | | | |
| Phone: 813-684-4400(Tel) 813-434-2109(Fax) 813-614-2853 | PO #: 0962002 Purchase Order not required | | | |
| Email: mtalarico@northstar.com | WO #: | | | |
| Project Name: EXXON - Krog Project - Buffalo, NY | Project #: 48015216 | | | |
| Site: FORMER EXXON TERMINAL 625 ELK ST. BUFFALO, NY | SSOW#: | | | |

**Analysis Requested**

**Preservation Codes:**
A - HCL
B - NaOH
C - Zn Ac
D - Nitric
E - NaHSO
F - MeOH
G - Amchl
H - Ascort
I - Ice
J - DI Wat
K - EDTA
L - EDA
M - Hexane
Other:
480-111089 COC

| Sample Identification | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 8015D_GRO - GRO | 8260C - TCL list + STARS | 8270D - TCL SVOA - OLM04.2 | 8015D_DRO - DRO | 6010C - TCLP Lead | 6010C - ICP - Total Lead | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | N | N | N | N | N | N | | |
| GCM-1 PRE | 12/13/16 | 0945 | C | Solid | | | X | X | X | X | | | 8 | |
| GCM-1 POST | | 1345 | | Solid | | | X | X | X | X | | | 8 | |
| GCM-2 PRE | | 0945 | | Solid | | | X | X | X | X | | | 8 | |
| GCM-2 POST | | 1515 | | Solid | | | X | X | X | X | | | 8 | |
| GCM-3 PRE | | 0945 | | Solid | | | X | X | X | X | | | 8 | |
| GCM-3 POST | | 1630 | | Solid | | | X | X | X | X | | | 8 | |
| | | | | Solid | | | | | | | | | | |
| LEAD-1 PRE | 12/14/16 | 0915 | | Solid | | | | | | | X | X | 2 | |
| LEAD-1 POST | 12/14/16 | 1030 | | Solid | | | | | | | X | X | 2 | |
| | | | | Solid | | | | | | | | | | |
| | | | | | | | | | | | | | | |

**Possible Hazard Identification**
[X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown [ ] Radiological

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

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

Special Instructions/QC Requirements:

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

| | Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
|---|---|---|---|---|---|---|
| | | | | Received by: | 12/14/16 1345 | TA |
| | Relinquished by: | Date/Time: 12/14/16 1:45 | Company | Received by: | Date/Time: | Company |
| | Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 3.0 #1 ICE


12/29/2016

# Login Sample Receipt Checklist

Client: Northstar Demolition and Remediation LP

Job Number: 480-111089-1

**Login Number: 111089**

**List Source: TestAmerica Buffalo**

**List Number: 1**

**Creator: Kolb, Chris M**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | True | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time (Excluding tests with immediate HTs).. | True | VIALS PLACED INTO STORAGE ON 12/14/16 @ 1930 |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | N/A | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Sampling Company provided. | False | |
| Samples received within 48 hours of sampling. | True | |
| Samples requiring field filtration have been filtered in the field. | True | |
| Chlorine Residual checked. | N/A | |

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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

TestAmerica Job ID: 480-112103-1
Client Project/Site: OV2 KROG-XOM Test Cells

For:
AMEC Foster Wheeler E & I, Inc
800 North Bell Avenue, Suite 200
Pittsburgh, Pennsylvania 15106

Attn: Dayne Crowley

*Authorized for release by:*
*1/25/2017 1:25:48 PM*
Rebecca Jones, Project Management Assistant I
rebecca.jones@testamericainc.com

Designee for

John Schove, Project Manager II
(716)504-9838
john.schove@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

# Table of Contents

## Qualifiers

### GC/MS VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| B | Compound was found in the blank and sample. |

### GC/MS Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |
| X | Surrogate is outside control limits |
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

### GC VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |

### GC Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |
| X | Surrogate is outside control limits |

### Metals

| Qualifier | Qualifier Description |
|---|---|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| 4 | MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable. |
| U | Indicates the analyte was analyzed for but not detected. |

## Glossary

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

## Job ID: 480-112103-1

### Laboratory: TestAmerica Buffalo

**Narrative**

**Job Narrative**
**480-112103-1**

**Comments**
No additional comments.

**Receipt**
The samples were received on 1/11/2017 3:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0º C.

**GC/MS VOA**
Method(s) 8260C: The following samples were diluted due to the nature of the TCLP matrix: LEAD1-0117 (480-112103-1), GCM1-0117 (480-112103-2), GCM2-0117 (480-112103-3), GCM3-0117 (480-112103-4) and (LB 480-339742/1-A). Elevated reporting limits (RLs) are provided.

Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 480-340630 recovered outside acceptance criteria, low biased, for 2-Hexanone, 4-Methyl-2-pentanone and Cyclohexane. A reporting limit (RL) standard was analyzed, and the target analytes were detected. Since the associated samples were non-detects for these analytes, the data have been reported. The following sample is impacted: LEAD1-0117 (480-112103-1).

Method(s) 8260C: The following sample was analyzed using medium level soil analysis and diluted due to the nature of the sample matrix: LEAD1-0117 (480-112103-1). Elevated reporting limits (RLs) are provided.

Method(s) 8260C: The method blank for preparation batch 480-340158 contained Methylene Chloride above the reporting limit (RL). This compound is considered a common laboratory contaminant. The associated sample was not re-extracted and/or re-analyzed because the concentration of the common lab contaminant in the method blank was less than 5 times the RL.

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

**GC/MS Semi VOA**
Method(s) 8270D: Surrogate recovery for the following sample was outside control limits: LEAD1-0117 (480-112103-1). Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

Method(s) 8270D: The following sample was diluted due to the nature of the sample matrix: LEAD1-0117 (480-112103-1). Elevated reporting limits (RLs) are provided.

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

**GC VOA**
Method(s) 8015B, 8015D: Reported analyte concentrations in the following samples are below 200 ug/kg and may be biased low due to the samples not being collected according to 5035-L/5035A-L low-level specifications: LEAD1-0117 (480-112103-1), GCM1-0117 (480-112103-2), GCM2-0117 (480-112103-3) and GCM3-0117 (480-112103-4).

Method(s) 8015B, 8015D: The following sample was diluted to bring the concentration of target analytes within the calibration range: LEAD1-0117 (480-112103-1). Elevated reporting limits (RLs) are provided.

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

**GC Semi VOA**
Method(s) 8015D: The following sample was diluted due to an abundance of target analytes: GCM1-0117 (480-112103-2) and GCM2-0117 (480-112103-3). As such, surrogate recoveries are estimated and not representative, and elevated reporting limits (RLs) are provided.

Method(s) 8015D: The following sample was diluted due to abundance of target analytes: GCM3-0117 (480-112103-4). As such, surrogate recoveries are estimated and not representative, and elevated reporting limits (RLs) are provided.

## Job ID: 480-112103-1 (Continued)

### Laboratory: TestAmerica Buffalo (Continued)

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

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

**General Chemistry**
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

**Organic Prep**
Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following sample: LEAD1-0117 (480-112103-1) and GCM2-0117 (480-112103-3). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method(s) 1311: Sample 480-112103-4 ruptured and was lost while tumbling overnight: GCM3-0117 (480-112103-4).

Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following sample: GCM3-0117 (480-112103-4). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method(s) 1311: Sample 480-112103-4 ruptured and was lost while tumbling overnight: GCM3-0117 (480-112103-4).

Method(s) 3550C: Due to the matrix, the initial volume used for the following samples deviated from the standard procedure: LEAD1-0117 (480-112103-1), GCM1-0117 (480-112103-2), GCM2-0117 (480-112103-3) and GCM3-0117 (480-112103-4). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3550C: Due to the matrix, the following samples could not be concentrated to the final method required volume: GCM1-0117 (480-112103-2) and GCM2-0117 (480-112103-3). The reporting limits (RLs) are elevated proportionately.

Method(s) 3550C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 480-339694.

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

# Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Client Sample ID: LEAD1-0117 — Lab Sample ID: 480-112103-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| 1,2,4-Trimethylbenzene | 3600 | | 720 | 200 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| 1,3,5-Trimethylbenzene | 1600 | | 720 | 220 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| 4-Isopropyltoluene | 800 | | 720 | 240 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Chlorobenzene | 110 | J | 720 | 95 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Isopropylbenzene | 270 | J | 720 | 110 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Methylcyclohexane | 3500 | | 720 | 340 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Methylene Chloride | 1100 | B | 720 | 140 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Naphthalene | 920 | | 720 | 240 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| n-Butylbenzene | 330 | J | 720 | 210 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| N-Propylbenzene | 450 | J | 720 | 190 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| sec-Butylbenzene | 360 | J | 720 | 260 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| Xylenes, Total | 1100 | J | 1400 | 400 | ug/Kg | 5 | ☼ | 8260C | Total/NA |
| 2-Methylnaphthalene | 430 | J | 1100 | 220 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Acenaphthene | 730 | J | 1100 | 160 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Acenaphthylene | 210 | J | 1100 | 140 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Anthracene | 1300 | | 1100 | 270 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Benzo[a]anthracene | 2600 | | 1100 | 110 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Benzo[a]pyrene | 2200 | | 1100 | 160 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Benzo[b]fluoranthene | 2700 | | 1100 | 170 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Benzo[g,h,i]perylene | 1500 | | 1100 | 110 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Benzo[k]fluoranthene | 1000 | J | 1100 | 140 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Carbazole | 660 | J | 1100 | 130 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Chrysene | 2500 | | 1100 | 240 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Dibenzofuran | 560 | J | 1100 | 130 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Fluoranthene | 5900 | | 1100 | 110 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Fluorene | 980 | J | 1100 | 130 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Indeno[1,2,3-cd]pyrene | 1200 | | 1100 | 130 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Naphthalene | 720 | J | 1100 | 140 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Phenanthrene | 5800 | | 1100 | 160 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| Pyrene | 4600 | | 1100 | 130 | ug/Kg | 5 | ☼ | 8270D | Total/NA |
| GRO (C6-C10) | 150 | | 16 | 4.3 | mg/Kg | 10 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 670 | | 42 | 13 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Arsenic | 21.0 | | 2.7 | 0.55 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Barium | 980 | | 0.69 | 0.15 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Cadmium | 7.8 | | 0.27 | 0.041 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Chromium | 124 | | 0.69 | 0.27 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Lead | 6350 | | 1.4 | 0.33 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Selenium | 1.9 | J | 5.5 | 0.55 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Silver | 1.0 | | 0.82 | 0.27 | mg/Kg | 1 | ☼ | 6010C | Total/NA |
| Lead | 34.3 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |
| Mercury | 0.33 | | 0.025 | 0.010 | mg/Kg | 1 | ☼ | 7471B | Total/NA |

| Analyte | Result | Qualifier | RL | RL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | 1 | | 1010A | Total/NA |

## Client Sample ID: GCM1-0117 — Lab Sample ID: 480-112103-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 8.9 | | 1.5 | 0.39 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 130000 | | 8400 | 2500 | mg/Kg | 20 | ☼ | 8015D | Total/NA |
| Lead | 0.11 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

This Detection Summary does not include radiochemical test results.

TestAmerica Buffalo

# Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Client Sample ID: GCM1-0117 (Continued) — Lab Sample ID: 480-112103-2

| Analyte | Result | Qualifier | RL | RL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | 1 | | 1010A | Total/NA |

## Client Sample ID: GCM2-0117 — Lab Sample ID: 480-112103-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 7.0 | | 1.5 | 0.39 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 57000 | | 4900 | 1500 | mg/Kg | 10 | ☼ | 8015D | Total/NA |
| Lead | 4.0 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

| Analyte | Result | Qualifier | RL | RL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | 1 | | 1010A | Total/NA |

## Client Sample ID: GCM3-0117 — Lab Sample ID: 480-112103-4

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 12 | | 1.6 | 0.41 | mg/Kg | 1 | ☼ | 8015D | Total/NA |
| Diesel Range Organics [C10-C28] | 36000 | | 6100 | 1800 | mg/Kg | 100 | ☼ | 8015D | Total/NA |
| Lead | 5.6 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

| Analyte | Result | Qualifier | RL | RL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | 1 | | 1010A | Total/NA |

This Detection Summary does not include radiochemical test results.

**Client Sample ID: LEAD1-0117**
**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-1**
**Matrix: Solid**
**Percent Solids: 76.9**

## Method: 8260C - Volatile Organic Compounds by GC/MS

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 720 | U | 720 | 200 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,1,2,2-Tetrachloroethane | 720 | U | 720 | 120 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 720 | U | 720 | 360 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,1,2-Trichloroethane | 720 | U | 720 | 150 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,1-Dichloroethane | 720 | U | 720 | 220 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,1-Dichloroethene | 720 | U | 720 | 250 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2,4-Trichlorobenzene | 720 | U | 720 | 270 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **1,2,4-Trimethylbenzene** | **3600** | | 720 | 200 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2-Dibromo-3-Chloropropane | 720 | U | 720 | 360 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2-Dichlorobenzene | 720 | U | 720 | 180 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2-Dichloroethane | 720 | U | 720 | 290 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2-Dichloropropane | 720 | U | 720 | 120 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **1,3,5-Trimethylbenzene** | **1600** | | 720 | 220 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,3-Dichlorobenzene | 720 | U | 720 | 190 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,4-Dichlorobenzene | 720 | U | 720 | 100 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 2-Butanone (MEK) | 3600 | U | 3600 | 2100 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 2-Hexanone | 3600 | U | 3600 | 1500 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **4-Isopropyltoluene** | **800** | | 720 | 240 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 4-Methyl-2-pentanone (MIBK) | 3600 | U | 3600 | 230 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Acetone | 3600 | U | 3600 | 3000 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Benzene | 720 | U | 720 | 140 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Bromoform | 720 | U | 720 | 360 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Bromomethane | 720 | U | 720 | 160 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Carbon disulfide | 720 | U | 720 | 330 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Carbon tetrachloride | 720 | U | 720 | 180 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Chlorobenzene** | **110** | **J** | 720 | 95 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Dibromochloromethane | 720 | U | 720 | 350 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Chloroethane | 720 | U | 720 | 150 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Chloroform | 720 | U | 720 | 490 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Chloromethane | 720 | U | 720 | 170 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| cis-1,2-Dichloroethene | 720 | U | 720 | 200 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Cyclohexane | 720 | U | 720 | 160 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Bromodichloromethane | 720 | U | 720 | 140 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Dichlorodifluoromethane | 720 | U | 720 | 310 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Ethylbenzene | 720 | U | 720 | 210 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| 1,2-Dibromoethane | 720 | U | 720 | 130 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Isopropylbenzene** | **270** | **J** | 720 | 110 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Methyl acetate | 3600 | U | 3600 | 340 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Methyl tert-butyl ether | 720 | U | 720 | 270 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Methylcyclohexane** | **3500** | | 720 | 340 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Methylene Chloride** | **1100** | **B** | 720 | 140 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Naphthalene** | **920** | | 720 | 240 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **n-Butylbenzene** | **330** | **J** | 720 | 210 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **N-Propylbenzene** | **450** | **J** | 720 | 190 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **sec-Butylbenzene** | **360** | **J** | 720 | 260 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Tetrachloroethene | 720 | U | 720 | 97 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Toluene | 720 | U | 720 | 190 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| trans-1,2-Dichloroethene | 720 | U | 720 | 170 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| trans-1,3-Dichloropropene | 720 | U | 720 | 71 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |

**Client Sample ID: LEAD1-0117**
**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-1**
**Matrix: Solid**
**Percent Solids: 76.9**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Trichloroethene | 720 | U | 720 | 200 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Trichlorofluoromethane | 720 | U | 720 | 340 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Vinyl chloride | 720 | U | 720 | 240 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| **Xylenes, Total** | **1100** | **J** | 1400 | 400 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| cis-1,3-Dichloropropene | 720 | U | 720 | 170 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| Styrene | 720 | U | 720 | 170 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |
| tert-Butylbenzene | 720 | U | 720 | 200 | ug/Kg | ☼ | 01/16/17 10:21 | 01/19/17 11:50 | 5 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *105* | | *53 - 146* | *01/16/17 10:21* | *01/19/17 11:50* | *5* |
| *4-Bromofluorobenzene (Surr)* | *97* | | *49 - 148* | *01/16/17 10:21* | *01/19/17 11:50* | *5* |
| *Toluene-d8 (Surr)* | *99* | | *50 - 149* | *01/16/17 10:21* | *01/19/17 11:50* | *5* |
| *Dibromofluoromethane (Surr)* | *103* | | *60 - 140* | *01/16/17 10:21* | *01/19/17 11:50* | *5* |

## Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.010 | U | 0.010 | 0.0041 | mg/L | | | 01/13/17 21:50 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *106* | | *77 - 120* | | *01/13/17 21:50* | *10* |
| *4-Bromofluorobenzene (Surr)* | *94* | | *73 - 120* | | *01/13/17 21:50* | *10* |
| *Toluene-d8 (Surr)* | *95* | | *80 - 120* | | *01/13/17 21:50* | *10* |
| *Dibromofluoromethane (Surr)* | *97* | | *75 - 123* | | *01/13/17 21:50* | *10* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 1100 | U | 1100 | 290 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,4,6-Trichlorophenol | 1100 | U | 1100 | 220 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,4-Dichlorophenol | 1100 | U | 1100 | 110 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,4-Dimethylphenol | 1100 | U | 1100 | 260 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,4-Dinitrophenol | 11000 | U | 11000 | 5000 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,4-Dinitrotoluene | 1100 | U | 1100 | 220 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2,6-Dinitrotoluene | 1100 | U | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2-Chloronaphthalene | 1100 | U | 1100 | 180 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2-Chlorophenol | 1100 | U | 1100 | 200 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **2-Methylnaphthalene** | **430** | **J** | 1100 | 220 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2-Methylphenol | 1100 | U | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2-Nitroaniline | 2100 | U | 2100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 2-Nitrophenol | 1100 | U | 1100 | 300 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 3,3'-Dichlorobenzidine | 2100 | U | 2100 | 1300 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 3-Nitroaniline | 2100 | U | 2100 | 300 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4,6-Dinitro-2-methylphenol | 2100 | U | 2100 | 1100 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Bromophenyl phenyl ether | 1100 | U | 1100 | 150 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Chloro-3-methylphenol | 1100 | U | 1100 | 270 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Chloroaniline | 1100 | U | 1100 | 270 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Chlorophenyl phenyl ether | 1100 | U | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Methylphenol | 2100 | U | 2100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Nitroaniline | 2100 | U | 2100 | 560 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| 4-Nitrophenol | 2100 | U | 2100 | 760 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Acenaphthene** | **730** | **J** | 1100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |

**Client Sample ID: LEAD1-0117**
**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-1**
**Matrix: Solid**
**Percent Solids: 76.9**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Acenaphthylene** | **210** | **J** | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Acetophenone | 1100 | U | 1100 | 150 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Anthracene** | **1300** | | 1100 | 270 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Atrazine | 1100 | U | 1100 | 370 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Benzaldehyde | 1100 | U | 1100 | 860 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Benzo[a]anthracene** | **2600** | | 1100 | 110 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Benzo[a]pyrene** | **2200** | | 1100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Benzo[b]fluoranthene** | **2700** | | 1100 | 170 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Benzo[g,h,i]perylene** | **1500** | | 1100 | 110 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Benzo[k]fluoranthene** | **1000** | **J** | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Biphenyl | 1100 | U | 1100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| bis (2-chloroisopropyl) ether | 1100 | U | 1100 | 220 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Bis(2-chloroethoxy)methane | 1100 | U | 1100 | 230 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Bis(2-chloroethyl)ether | 1100 | U | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Bis(2-ethylhexyl) phthalate | 1100 | U | 1100 | 370 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Butyl benzyl phthalate | 1100 | U | 1100 | 180 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Caprolactam | 1100 | U | 1100 | 320 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Carbazole** | **660** | **J** | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Chrysene** | **2500** | | 1100 | 240 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Dibenz(a,h)anthracene | 1100 | U | 1100 | 190 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Dibenzofuran** | **560** | **J** | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Diethyl phthalate | 1100 | U | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Dimethyl phthalate | 1100 | U | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Di-n-butyl phthalate | 1100 | U | 1100 | 180 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Di-n-octyl phthalate | 1100 | U | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Fluoranthene** | **5900** | | 1100 | 110 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Fluorene** | **980** | **J** | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Hexachlorobenzene | 1100 | U | 1100 | 150 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Hexachlorobutadiene | 1100 | U | 1100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Hexachlorocyclopentadiene | 1100 | U | 1100 | 150 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Hexachloroethane | 1100 | U | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Indeno[1,2,3-cd]pyrene** | **1200** | | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Isophorone | 1100 | U | 1100 | 230 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Naphthalene** | **720** | **J** | 1100 | 140 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Nitrobenzene | 1100 | U | 1100 | 120 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| N-Nitrosodi-n-propylamine | 1100 | U | 1100 | 180 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| N-Nitrosodiphenylamine | 1100 | U | 1100 | 880 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Pentachlorophenol | 2100 | U | 2100 | 1100 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Phenanthrene** | **5800** | | 1100 | 160 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| Phenol | 1100 | U | 1100 | 170 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |
| **Pyrene** | **4600** | | 1100 | 130 | ug/Kg | ☼ | 01/13/17 15:36 | 01/16/17 12:04 | 5 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *0* | *X* | *54 - 120* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |
| *2-Fluorobiphenyl* | *89* | | *60 - 120* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |
| *2-Fluorophenol (Surr)* | *32* | *X* | *52 - 120* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |
| *Nitrobenzene-d5 (Surr)* | *78* | | *53 - 120* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |
| *Phenol-d5 (Surr)* | *75* | | *54 - 120* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |
| *p-Terphenyl-d14 (Surr)* | *93* | | *65 - 121* | *01/13/17 15:36* | *01/16/17 12:04* | *5* |

## Client Sample ID: LEAD1-0117

**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

## Lab Sample ID: 480-112103-1

**Matrix: Solid**
**Percent Solids: 76.9**

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 150 | | 16 | 4.3 | mg/Kg | ☼ | 01/13/17 12:16 | 01/14/17 20:38 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *99* | | *46 - 156* | *01/13/17 12:16* | *01/14/17 20:38* | *10* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 670 | | 42 | 13 | mg/Kg | ☼ | 01/12/17 06:18 | 01/12/17 15:27 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *96* | | *48 - 125* | *01/12/17 06:18* | *01/12/17 15:27* | *1* |

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | 0.28 | U | 0.28 | 0.055 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1221 | 0.28 | U | 0.28 | 0.055 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1232 | 0.28 | U | 0.28 | 0.055 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1242 | 0.28 | U | 0.28 | 0.055 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1248 | 0.28 | U | 0.28 | 0.055 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1254 | 0.28 | U | 0.28 | 0.13 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |
| PCB-1260 | 0.28 | U | 0.28 | 0.13 | mg/Kg | ☼ | 01/12/17 06:26 | 01/12/17 17:10 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Tetrachloro-m-xylene* | *129* | | *60 - 154* | *01/12/17 06:26* | *01/12/17 17:10* | *1* |
| *DCB Decachlorobiphenyl* | *117* | | *65 - 174* | *01/12/17 06:26* | *01/12/17 17:10* | *1* |

### Method: 6010C - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 21.0 | | 2.7 | 0.55 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Barium | 980 | | 0.69 | 0.15 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Cadmium | 7.8 | | 0.27 | 0.041 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Chromium | 124 | | 0.69 | 0.27 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Lead | 6350 | | 1.4 | 0.33 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Selenium | 1.9 | J | 5.5 | 0.55 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |
| Silver | 1.0 | | 0.82 | 0.27 | mg/Kg | ☼ | 01/13/17 15:22 | 01/16/17 14:08 | 1 |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 34.3 | | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 20:33 | 1 |

### Method: 7471B - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.33 | | 0.025 | 0.010 | mg/Kg | ☼ | 01/13/17 09:50 | 01/13/17 11:29 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | | | 01/17/17 16:31 | 1 |

## Client Sample ID: GCM1-0117

**Lab Sample ID: 480-112103-2**
**Date Collected: 01/11/17 13:00**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**

### Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.010 | U | 0.010 | 0.0041 | mg/L | | | 01/13/17 22:13 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *103* | | *77 - 120* | | *01/13/17 22:13* | *10* |
| *4-Bromofluorobenzene (Surr)* | *96* | | *73 - 120* | | *01/13/17 22:13* | *10* |
| *Toluene-d8 (Surr)* | *100* | | *80 - 120* | | *01/13/17 22:13* | *10* |
| *Dibromofluoromethane (Surr)* | *96* | | *75 - 123* | | *01/13/17 22:13* | *10* |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Lead** | **0.11** | | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 18:26 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Flashpoint** | **>176.0** | | 50.0 | 50.0 | Degrees F | | | 01/17/17 16:31 | 1 |

## Client Sample ID: GCM1-0117

**Lab Sample ID: 480-112103-2**
**Date Collected: 01/11/17 13:00**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**
**Percent Solids: 82.5**

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **GRO (C6-C10)** | **8.9** | | 1.5 | 0.39 | mg/Kg | ☼ | 01/13/17 12:16 | 01/13/17 17:58 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *82* | | *46 - 156* | *01/13/17 12:16* | *01/13/17 17:58* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Diesel Range Organics [C10-C28]** | **130000** | | 8400 | 2500 | mg/Kg | ☼ | 01/12/17 06:18 | 01/12/17 18:37 | 20 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *153* | *X* | *48 - 125* | *01/12/17 06:18* | *01/12/17 18:37* | *20* |

## Client Sample ID: GCM2-0117

**Lab Sample ID: 480-112103-3**
**Date Collected: 01/11/17 13:10**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**

### Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.010 | U | 0.010 | 0.0041 | mg/L | | | 01/13/17 22:36 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *102* | | *77 - 120* | | *01/13/17 22:36* | *10* |
| *4-Bromofluorobenzene (Surr)* | *96* | | *73 - 120* | | *01/13/17 22:36* | *10* |
| *Toluene-d8 (Surr)* | *98* | | *80 - 120* | | *01/13/17 22:36* | *10* |
| *Dibromofluoromethane (Surr)* | *94* | | *75 - 123* | | *01/13/17 22:36* | *10* |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Lead** | **4.0** | | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 20:46 | 1 |

## Client Sample ID: GCM2-0117
**Lab Sample ID: 480-112103-3**
**Date Collected: 01/11/17 13:10**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | | | 01/17/17 16:31 | 1 |

## Client Sample ID: GCM2-0117
**Lab Sample ID: 480-112103-3**
**Date Collected: 01/11/17 13:10**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**
**Percent Solids: 82.1**

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 7.0 | | 1.5 | 0.39 | mg/Kg | ☼ | 01/13/17 12:16 | 01/13/17 15:41 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *68* | | *46 - 156* | *01/13/17 12:16* | *01/13/17 15:41* | *1* |

### Method: 8015D - Diesel Range Organics (DRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 57000 | | 4900 | 1500 | mg/Kg | ☼ | 01/12/17 06:18 | 01/12/17 19:16 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *24* | *X* | *48 - 125* | *01/12/17 06:18* | *01/12/17 19:16* | *10* |

## Client Sample ID: GCM3-0117
**Lab Sample ID: 480-112103-4**
**Date Collected: 01/11/17 13:20**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**

### Method: 8260C - Volatile Organic Compounds by GC/MS - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.010 | U | 0.010 | 0.0041 | mg/L | | | 01/13/17 22:59 | 10 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *99* | | *77 - 120* | | *01/13/17 22:59* | *10* |
| *4-Bromofluorobenzene (Surr)* | *95* | | *73 - 120* | | *01/13/17 22:59* | *10* |
| *Toluene-d8 (Surr)* | *98* | | *80 - 120* | | *01/13/17 22:59* | *10* |
| *Dibromofluoromethane (Surr)* | *94* | | *75 - 123* | | *01/13/17 22:59* | *10* |

### Method: 6010C - Metals (ICP) - TCLP

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5.6 | | 0.020 | 0.0030 | mg/L | | 01/20/17 09:34 | 01/23/17 15:48 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | RL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | >176.0 | | 50.0 | 50.0 | Degrees F | | | 01/17/17 16:31 | 1 |

## Client Sample ID: GCM3-0117
**Lab Sample ID: 480-112103-4**
**Date Collected: 01/11/17 13:20**
**Matrix: Solid**
**Date Received: 01/11/17 15:50**
**Percent Solids: 80.3**

### Method: 8015D - Gasoline Range Organics (GRO) (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 12 | | 1.6 | 0.41 | mg/Kg | ☼ | 01/13/17 12:16 | 01/13/17 18:33 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *79* | | *46 - 156* | *01/13/17 12:16* | *01/13/17 18:33* | *1* |

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

**Method: 8015D - Diesel Range Organics (DRO) (GC)**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 36000 | | 6100 | 1800 | mg/Kg | ☼ | 01/12/17 06:18 | 01/13/17 14:35 | 100 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *206* | *X* | *48 - 125* | *01/12/17 06:18* | *01/13/17 14:35* | *100* |

# Surrogate Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Method: 8260C - Volatile Organic Compounds by GC/MS

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | |
|---|---|---|---|---|---|
| | | 12DCE | BFB | TOL | DBFM |
| Lab Sample ID | Client Sample ID | (53-146) | (49-148) | (50-149) | (60-140) |
| 480-112103-1 | LEAD1-0117 | 105 | 97 | 99 | 103 |
| LCS 480-340158/1-A | Lab Control Sample | 97 | 97 | 92 | 96 |
| MB 480-340158/2-A | Method Blank | 93 | 91 | 92 | 96 |

**Surrogate Legend**

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

## Method: 8260C - Volatile Organic Compounds by GC/MS

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | |
|---|---|---|---|---|---|
| | | 12DCE | BFB | TOL | DBFM |
| Lab Sample ID | Client Sample ID | (77-120) | (73-120) | (80-120) | (75-123) |
| LCS 480-340019/5 | Lab Control Sample | 112 | 94 | 101 | 100 |
| MB 480-340019/7 | Method Blank | 100 | 99 | 100 | 95 |

**Surrogate Legend**

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

## Method: 8260C - Volatile Organic Compounds by GC/MS

**Matrix: Solid** **Prep Type: TCLP**

| | | Percent Surrogate Recovery (Acceptance Limits) | | | |
|---|---|---|---|---|---|
| | | 12DCE | BFB | TOL | DBFM |
| Lab Sample ID | Client Sample ID | (77-120) | (73-120) | (80-120) | (75-123) |
| 480-112103-1 | LEAD1-0117 | 106 | 94 | 95 | 97 |
| 480-112103-2 | GCM1-0117 | 103 | 96 | 100 | 96 |
| 480-112103-3 | GCM2-0117 | 102 | 96 | 98 | 94 |
| 480-112103-4 | GCM3-0117 | 99 | 95 | 98 | 94 |
| LB 480-339742/1-A | Method Blank | 101 | 98 | 101 | 98 |

**Surrogate Legend**

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

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

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | |
|---|---|---|---|---|---|---|---|
| | | TBP | FBP | 2FP | NBZ | PHL | TPH |
| Lab Sample ID | Client Sample ID | (54-120) | (60-120) | (52-120) | (53-120) | (54-120) | (65-121) |
| 480-112103-1 | LEAD1-0117 | 0 X | 89 | 32 X | 78 | 75 | 93 |

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

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | |
|---|---|---|---|---|---|---|---|
| Lab Sample ID | Client Sample ID | TBP (54-120) | FBP (60-120) | 2FP (52-120) | NBZ (53-120) | PHL (54-120) | TPH (65-121) |
| LCS 480-340009/2-A | Lab Control Sample | 84 | 82 | 77 | 84 | 80 | 83 |
| MB 480-340009/1-A | Method Blank | 76 | 79 | 75 | 72 | 77 | 87 |

**Surrogate Legend**

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

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

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

| | | Percent Surrogate Recovery (Acceptance Limits) |
|---|---|---|
| Lab Sample ID | Client Sample ID | TFT2 (46-156) |
| 480-112103-1 | LEAD1-0117 | 99 |
| 480-112103-2 | GCM1-0117 | 82 |
| 480-112103-3 | GCM2-0117 | 68 |
| 480-112103-3 MS | GCM2-0117 | 67 |
| 480-112103-3 MSD | GCM2-0117 | 66 |
| 480-112103-4 | GCM3-0117 | 79 |
| LCS 480-339980/2-A | Lab Control Sample | 91 |
| LCS 480-339980/2-A | Lab Control Sample | 94 |
| MB 480-339980/1-A | Method Blank | 89 |
| MB 480-339980/1-A | Method Blank | 95 |

**Surrogate Legend**

TFT = a,a,a-Trifluorotoluene

## Method: 8015D - Diesel Range Organics (DRO) (GC)

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

| | | Percent Surrogate Recovery (Acceptance Limits) |
|---|---|---|
| Lab Sample ID | Client Sample ID | OTPH (48-125) |
| 480-112103-1 | LEAD1-0117 | 96 |
| 480-112103-2 | GCM1-0117 | 153 X |
| 480-112103-3 | GCM2-0117 | 24 X |
| 480-112103-4 | GCM3-0117 | 206 X |
| LCS 480-339694/2-A | Lab Control Sample | 96 |
| LCSD 480-339694/3-A | Lab Control Sample Dup | 100 |
| MB 480-339694/1-A | Method Blank | 81 |

**Surrogate Legend**

OTPH = o-Terphenyl

# Surrogate Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

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

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

| | | Percent Surrogate Recovery (Acceptance Limits) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Sample ID | Client Sample ID | TCX2 (60-154) | DCB2 (65-174) | | | | | | | | |
| 480-112103-1 | LEAD1-0117 | 129 | 117 | | | | | | | | |
| LCS 480-339695/2-A | Lab Control Sample | 146 | 167 | | | | | | | | |
| MB 480-339695/1-A | Method Blank | 116 | 126 | | | | | | | | |

**Surrogate Legend**

TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

## Method: 8260C - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 480-340019/7**
**Matrix: Solid**
**Analysis Batch: 340019**

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

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.0010 | U | 0.0010 | 0.00041 | mg/L | | | 01/13/17 20:25 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *100* | | *77 - 120* | | *01/13/17 20:25* | *1* |
| *4-Bromofluorobenzene (Surr)* | *99* | | *73 - 120* | | *01/13/17 20:25* | *1* |
| *Toluene-d8 (Surr)* | *100* | | *80 - 120* | | *01/13/17 20:25* | *1* |
| *Dibromofluoromethane (Surr)* | *95* | | *75 - 123* | | *01/13/17 20:25* | *1* |

**Lab Sample ID: LCS 480-340019/5**
**Matrix: Solid**
**Analysis Batch: 340019**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | | | 0.0250 | 0.0245 | | mg/L | | 98 | 71 - 124 | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *112* | | *77 - 120* |
| *4-Bromofluorobenzene (Surr)* | *94* | | *73 - 120* |
| *Toluene-d8 (Surr)* | *101* | | *80 - 120* |
| *Dibromofluoromethane (Surr)* | *100* | | *75 - 123* |

**Lab Sample ID: MB 480-340158/2-A**
**Matrix: Solid**
**Analysis Batch: 340260**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340158**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 100 | U | 100 | 28 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,1,2,2-Tetrachloroethane | 100 | U | 100 | 16 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 100 | U | 100 | 50 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,1,2-Trichloroethane | 100 | U | 100 | 21 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,1-Dichloroethane | 100 | U | 100 | 31 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,1-Dichloroethene | 100 | U | 100 | 35 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2,4-Trichlorobenzene | 100 | U | 100 | 38 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2,4-Trimethylbenzene | 100 | U | 100 | 28 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2-Dibromo-3-Chloropropane | 100 | U | 100 | 50 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2-Dichlorobenzene | 100 | U | 100 | 26 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2-Dichloroethane | 100 | U | 100 | 41 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2-Dichloropropane | 100 | U | 100 | 16 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,3,5-Trimethylbenzene | 100 | U | 100 | 30 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,3-Dichlorobenzene | 100 | U | 100 | 27 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,4-Dichlorobenzene | 100 | U | 100 | 14 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 2-Butanone (MEK) | 500 | U | 500 | 300 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 2-Hexanone | 500 | U | 500 | 210 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 4-Isopropyltoluene | 100 | U | 100 | 34 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 4-Methyl-2-pentanone (MIBK) | 500 | U | 500 | 32 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Acetone | 500 | U | 500 | 410 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Benzene | 100 | U | 100 | 19 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 480-340158/2-A**
**Matrix: Solid**
**Analysis Batch: 340260**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340158**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bromoform | 100 | U | 100 | 50 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Bromomethane | 100 | U | 100 | 22 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Carbon disulfide | 100 | U | 100 | 46 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Carbon tetrachloride | 100 | U | 100 | 26 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Chlorobenzene | 100 | U | 100 | 13 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Dibromochloromethane | 100 | U | 100 | 49 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Chloroethane | 100 | U | 100 | 21 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Chloroform | 100 | U | 100 | 69 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Chloromethane | 100 | U | 100 | 24 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| cis-1,2-Dichloroethene | 100 | U | 100 | 28 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Cyclohexane | 100 | U | 100 | 22 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Bromodichloromethane | 100 | U | 100 | 20 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Dichlorodifluoromethane | 100 | U | 100 | 44 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Ethylbenzene | 100 | U | 100 | 29 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| 1,2-Dibromoethane | 100 | U | 100 | 18 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Isopropylbenzene | 100 | U | 100 | 15 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Methyl acetate | 500 | U | 500 | 48 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Methyl tert-butyl ether | 100 | U | 100 | 38 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Methylcyclohexane | 100 | U | 100 | 47 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Methylene Chloride | 113 | | 100 | 20 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Naphthalene | 100 | U | 100 | 34 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| n-Butylbenzene | 100 | U | 100 | 29 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| N-Propylbenzene | 100 | U | 100 | 26 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| sec-Butylbenzene | 100 | U | 100 | 37 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Tetrachloroethene | 100 | U | 100 | 13 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Toluene | 100 | U | 100 | 27 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| trans-1,2-Dichloroethene | 100 | U | 100 | 24 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| trans-1,3-Dichloropropene | 100 | U | 100 | 9.9 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Trichloroethene | 100 | U | 100 | 28 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Trichlorofluoromethane | 100 | U | 100 | 47 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Vinyl chloride | 100 | U | 100 | 34 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Xylenes, Total | 200 | U | 200 | 56 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| cis-1,3-Dichloropropene | 100 | U | 100 | 24 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| Styrene | 100 | U | 100 | 24 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |
| tert-Butylbenzene | 100 | U | 100 | 28 | ug/Kg | | 01/16/17 10:21 | 01/17/17 12:21 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *93* | | *53 - 146* | *01/16/17 10:21* | *01/17/17 12:21* | *1* |
| *4-Bromofluorobenzene (Surr)* | *91* | | *49 - 148* | *01/16/17 10:21* | *01/17/17 12:21* | *1* |
| *Toluene-d8 (Surr)* | *92* | | *50 - 149* | *01/16/17 10:21* | *01/17/17 12:21* | *1* |
| *Dibromofluoromethane (Surr)* | *96* | | *60 - 140* | *01/16/17 10:21* | *01/17/17 12:21* | *1* |

**Lab Sample ID: LCS 480-340158/1-A**
**Matrix: Solid**
**Analysis Batch: 340260**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340158**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2500 | 2800 | | ug/Kg | | 112 | 68 - 130 |

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 480-340158/1-A**
**Matrix: Solid**
**Analysis Batch: 340260**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340158**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 1,1,2,2-Tetrachloroethane | 2500 | 2260 | | ug/Kg | | 90 | 73 - 120 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 2500 | 2980 | | ug/Kg | | 119 | 10 - 179 |
| 1,1,2-Trichloroethane | 2500 | 2380 | | ug/Kg | | 95 | 80 - 120 |
| 1,1-Dichloroethane | 2500 | 2570 | | ug/Kg | | 103 | 78 - 121 |
| 1,1-Dichloroethene | 2500 | 2680 | | ug/Kg | | 107 | 48 - 133 |
| 1,2,4-Trichlorobenzene | 2500 | 2510 | | ug/Kg | | 100 | 70 - 140 |
| 1,2,4-Trimethylbenzene | 2500 | 2670 | | ug/Kg | | 107 | 77 - 127 |
| 1,2-Dibromo-3-Chloropropane | 2500 | 1990 | | ug/Kg | | 80 | 56 - 122 |
| 1,2-Dichlorobenzene | 2500 | 2590 | | ug/Kg | | 104 | 78 - 125 |
| 1,2-Dichloroethane | 2500 | 2680 | | ug/Kg | | 107 | 74 - 127 |
| 1,2-Dichloropropane | 2500 | 2630 | | ug/Kg | | 105 | 80 - 120 |
| 1,3,5-Trimethylbenzene | 2500 | 2680 | | ug/Kg | | 107 | 79 - 120 |
| 1,3-Dichlorobenzene | 2500 | 2720 | | ug/Kg | | 109 | 80 - 120 |
| 1,4-Dichlorobenzene | 2500 | 2620 | | ug/Kg | | 105 | 80 - 120 |
| 2-Butanone (MEK) | 12500 | 10200 | | ug/Kg | | 82 | 54 - 149 |
| 2-Hexanone | 12500 | 9570 | | ug/Kg | | 77 | 59 - 127 |
| 4-Isopropyltoluene | 2500 | 2700 | | ug/Kg | | 108 | 80 - 120 |
| 4-Methyl-2-pentanone (MIBK) | 12500 | 10000 | | ug/Kg | | 80 | 74 - 120 |
| Acetone | 12500 | 10800 | | ug/Kg | | 86 | 47 - 141 |
| Benzene | 2500 | 2690 | | ug/Kg | | 108 | 77 - 125 |
| Bromoform | 2500 | 2270 | | ug/Kg | | 91 | 48 - 125 |
| Bromomethane | 2500 | 2560 | | ug/Kg | | 102 | 39 - 149 |
| Carbon disulfide | 2500 | 2390 | | ug/Kg | | 96 | 40 - 136 |
| Carbon tetrachloride | 2500 | 2710 | | ug/Kg | | 108 | 54 - 135 |
| Chlorobenzene | 2500 | 2610 | | ug/Kg | | 104 | 76 - 126 |
| Dibromochloromethane | 2500 | 2470 | | ug/Kg | | 99 | 64 - 120 |
| Chloroethane | 2500 | 2000 | | ug/Kg | | 80 | 23 - 150 |
| Chloroform | 2500 | 2790 | | ug/Kg | | 112 | 78 - 120 |
| Chloromethane | 2500 | 2430 | | ug/Kg | | 97 | 61 - 124 |
| cis-1,2-Dichloroethene | 2500 | 2710 | | ug/Kg | | 108 | 79 - 124 |
| Cyclohexane | 2500 | 2650 | | ug/Kg | | 106 | 49 - 129 |
| Bromodichloromethane | 2500 | 2510 | | ug/Kg | | 100 | 71 - 121 |
| Dichlorodifluoromethane | 2500 | 2480 | | ug/Kg | | 99 | 10 - 150 |
| Ethylbenzene | 2500 | 2660 | | ug/Kg | | 106 | 78 - 124 |
| 1,2-Dibromoethane | 2500 | 2530 | | ug/Kg | | 101 | 80 - 120 |
| Isopropylbenzene | 2500 | 2730 | | ug/Kg | | 109 | 76 - 120 |
| Methyl acetate | 12500 | 10300 | | ug/Kg | | 82 | 71 - 123 |
| Methyl tert-butyl ether | 2500 | 2350 | | ug/Kg | | 94 | 67 - 137 |
| Methylcyclohexane | 2500 | 2760 | | ug/Kg | | 111 | 50 - 130 |
| Methylene Chloride | 2500 | 2610 | | ug/Kg | | 104 | 75 - 118 |
| Naphthalene | 2500 | 1950 | | ug/Kg | | 78 | 65 - 142 |
| n-Butylbenzene | 2500 | 2730 | | ug/Kg | | 109 | 80 - 120 |
| N-Propylbenzene | 2500 | 2740 | | ug/Kg | | 109 | 76 - 120 |
| sec-Butylbenzene | 2500 | 2810 | | ug/Kg | | 113 | 79 - 120 |
| Tetrachloroethene | 2500 | 2840 | | ug/Kg | | 113 | 73 - 133 |
| Toluene | 2500 | 2690 | | ug/Kg | | 108 | 75 - 124 |
| trans-1,2-Dichloroethene | 2500 | 2660 | | ug/Kg | | 106 | 74 - 129 |

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 480-340158/1-A**
**Matrix: Solid**
**Analysis Batch: 340260**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340158**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| trans-1,3-Dichloropropene | 2500 | 2490 | | ug/Kg | | 100 | 73 - 120 |
| Trichloroethene | 2500 | 2760 | | ug/Kg | | 110 | 75 - 131 |
| Trichlorofluoromethane | 2500 | 2950 | | ug/Kg | | 118 | 29 - 158 |
| Vinyl chloride | 2500 | 2810 | | ug/Kg | | 112 | 59 - 124 |
| cis-1,3-Dichloropropene | 2500 | 2600 | | ug/Kg | | 104 | 75 - 121 |
| Styrene | 2500 | 2660 | | ug/Kg | | 106 | 80 - 120 |
| tert-Butylbenzene | 2500 | 2690 | | ug/Kg | | 108 | 78 - 120 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *97* | | *53 - 146* |
| *4-Bromofluorobenzene (Surr)* | *97* | | *49 - 148* |
| *Toluene-d8 (Surr)* | *92* | | *50 - 149* |
| *Dibromofluoromethane (Surr)* | *96* | | *60 - 140* |

**Lab Sample ID: LB 480-339742/1-A**
**Matrix: Solid**
**Analysis Batch: 340019**

**Client Sample ID: Method Blank**
**Prep Type: TCLP**

| Analyte | LB Result | LB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.010 | U | 0.010 | 0.0041 | mg/L | | | 01/13/17 21:03 | 10 |

| *Surrogate* | *LB %Recovery* | *LB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *1,2-Dichloroethane-d4 (Surr)* | *101* | | *77 - 120* | | *01/13/17 21:03* | *10* |
| *4-Bromofluorobenzene (Surr)* | *98* | | *73 - 120* | | *01/13/17 21:03* | *10* |
| *Toluene-d8 (Surr)* | *101* | | *80 - 120* | | *01/13/17 21:03* | *10* |
| *Dibromofluoromethane (Surr)* | *98* | | *75 - 123* | | *01/13/17 21:03* | *10* |

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

**Lab Sample ID: MB 480-340009/1-A**
**Matrix: Solid**
**Analysis Batch: 340117**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340009**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 170 | U | 170 | 46 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,4,6-Trichlorophenol | 170 | U | 170 | 34 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,4-Dichlorophenol | 170 | U | 170 | 18 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,4-Dimethylphenol | 170 | U | 170 | 41 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,4-Dinitrophenol | 1600 | U | 1600 | 780 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,4-Dinitrotoluene | 170 | U | 170 | 35 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2,6-Dinitrotoluene | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Chloronaphthalene | 170 | U | 170 | 28 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Chlorophenol | 170 | U | 170 | 31 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Methylnaphthalene | 170 | U | 170 | 34 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Methylphenol | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Nitroaniline | 330 | U | 330 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 2-Nitrophenol | 170 | U | 170 | 48 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |

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

**Lab Sample ID: MB 480-340009/1-A**
**Matrix: Solid**
**Analysis Batch: 340117**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340009**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 3,3'-Dichlorobenzidine | 330 | U | 330 | 200 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 3-Nitroaniline | 330 | U | 330 | 47 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4,6-Dinitro-2-methylphenol | 330 | U | 330 | 170 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Bromophenyl phenyl ether | 170 | U | 170 | 24 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Chloro-3-methylphenol | 170 | U | 170 | 42 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Chloroaniline | 170 | U | 170 | 42 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Chlorophenyl phenyl ether | 170 | U | 170 | 21 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Methylphenol | 330 | U | 330 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Nitroaniline | 330 | U | 330 | 88 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| 4-Nitrophenol | 330 | U | 330 | 120 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Acenaphthene | 170 | U | 170 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Acenaphthylene | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Acetophenone | 170 | U | 170 | 23 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Anthracene | 170 | U | 170 | 42 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Atrazine | 170 | U | 170 | 58 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzaldehyde | 170 | U | 170 | 130 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzo[a]anthracene | 170 | U | 170 | 17 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzo[a]pyrene | 170 | U | 170 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzo[b]fluoranthene | 170 | U | 170 | 27 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzo[g,h,i]perylene | 170 | U | 170 | 18 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Benzo[k]fluoranthene | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Biphenyl | 170 | U | 170 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| bis (2-chloroisopropyl) ether | 170 | U | 170 | 34 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Bis(2-chloroethoxy)methane | 170 | U | 170 | 36 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Bis(2-chloroethyl)ether | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Bis(2-ethylhexyl) phthalate | 170 | U | 170 | 57 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Butyl benzyl phthalate | 170 | U | 170 | 28 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Caprolactam | 170 | U | 170 | 51 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Carbazole | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Chrysene | 170 | U | 170 | 38 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Dibenz(a,h)anthracene | 170 | U | 170 | 30 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Dibenzofuran | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Diethyl phthalate | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Dimethyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Di-n-butyl phthalate | 170 | U | 170 | 29 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Di-n-octyl phthalate | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Fluoranthene | 170 | U | 170 | 18 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Fluorene | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Hexachlorobenzene | 170 | U | 170 | 23 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Hexachlorobutadiene | 170 | U | 170 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Hexachlorocyclopentadiene | 170 | U | 170 | 23 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Hexachloroethane | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Indeno[1,2,3-cd]pyrene | 170 | U | 170 | 21 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Isophorone | 170 | U | 170 | 36 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Naphthalene | 170 | U | 170 | 22 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Nitrobenzene | 170 | U | 170 | 19 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| N-Nitrosodi-n-propylamine | 170 | U | 170 | 29 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| N-Nitrosodiphenylamine | 170 | U | 170 | 140 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |

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

**Lab Sample ID: MB 480-340009/1-A**
**Matrix: Solid**
**Analysis Batch: 340117**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340009**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Pentachlorophenol | 330 | U | 330 | 170 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Phenanthrene | 170 | U | 170 | 25 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Phenol | 170 | U | 170 | 26 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |
| Pyrene | 170 | U | 170 | 20 | ug/Kg | | 01/13/17 15:36 | 01/16/17 09:28 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *76* | | *54 - 120* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |
| *2-Fluorobiphenyl* | *79* | | *60 - 120* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |
| *2-Fluorophenol (Surr)* | *75* | | *52 - 120* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |
| *Nitrobenzene-d5 (Surr)* | *72* | | *53 - 120* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |
| *Phenol-d5 (Surr)* | *77* | | *54 - 120* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |
| *p-Terphenyl-d14 (Surr)* | *87* | | *65 - 121* | *01/13/17 15:36* | *01/16/17 09:28* | *1* |

**Lab Sample ID: LCS 480-340009/2-A**
**Matrix: Solid**
**Analysis Batch: 340117**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340009**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | 1620 | 1430 | | ug/Kg | | 88 | 59 - 126 |
| 2,4,6-Trichlorophenol | 1620 | 1430 | | ug/Kg | | 88 | 59 - 123 |
| 2,4-Dichlorophenol | 1620 | 1350 | | ug/Kg | | 83 | 61 - 120 |
| 2,4-Dimethylphenol | 1620 | 1300 | | ug/Kg | | 80 | 59 - 120 |
| 2,4-Dinitrophenol | 3250 | 2910 | | ug/Kg | | 90 | 41 - 146 |
| 2,4-Dinitrotoluene | 1620 | 1440 | | ug/Kg | | 89 | 63 - 120 |
| 2,6-Dinitrotoluene | 1620 | 1430 | | ug/Kg | | 88 | 66 - 120 |
| 2-Chloronaphthalene | 1620 | 1360 | | ug/Kg | | 84 | 57 - 120 |
| 2-Chlorophenol | 1620 | 1260 | | ug/Kg | | 78 | 53 - 120 |
| 2-Methylnaphthalene | 1620 | 1340 | | ug/Kg | | 82 | 59 - 120 |
| 2-Methylphenol | 1620 | 1280 | | ug/Kg | | 79 | 54 - 120 |
| 2-Nitroaniline | 1620 | 1440 | | ug/Kg | | 89 | 61 - 120 |
| 2-Nitrophenol | 1620 | 1340 | | ug/Kg | | 83 | 56 - 120 |
| 3,3'-Dichlorobenzidine | 3250 | 1970 | | ug/Kg | | 61 | 54 - 120 |
| 3-Nitroaniline | 1620 | 1020 | | ug/Kg | | 63 | 48 - 120 |
| 4,6-Dinitro-2-methylphenol | 3250 | 2860 | | ug/Kg | | 88 | 49 - 122 |
| 4-Bromophenyl phenyl ether | 1620 | 1400 | | ug/Kg | | 86 | 58 - 120 |
| 4-Chloro-3-methylphenol | 1620 | 1350 | | ug/Kg | | 83 | 61 - 120 |
| 4-Chloroaniline | 1620 | 732 | | ug/Kg | | 45 | 38 - 120 |
| 4-Chlorophenyl phenyl ether | 1620 | 1340 | | ug/Kg | | 83 | 63 - 124 |
| 4-Methylphenol | 1620 | 1300 | | ug/Kg | | 80 | 55 - 120 |
| 4-Nitroaniline | 1620 | 1310 | | ug/Kg | | 81 | 56 - 120 |
| 4-Nitrophenol | 3250 | 2790 | | ug/Kg | | 86 | 43 - 147 |
| Acenaphthene | 1620 | 1360 | | ug/Kg | | 84 | 62 - 120 |
| Acenaphthylene | 1620 | 1450 | | ug/Kg | | 89 | 58 - 121 |
| Acetophenone | 1620 | 1260 | | ug/Kg | | 78 | 54 - 120 |
| Anthracene | 1620 | 1460 | | ug/Kg | | 90 | 62 - 120 |
| Atrazine | 3250 | 2740 | | ug/Kg | | 84 | 60 - 127 |
| Benzaldehyde | 3250 | 1580 | | ug/Kg | | 49 | 10 - 150 |
| Benzo[a]anthracene | 1620 | 1480 | | ug/Kg | | 91 | 65 - 120 |

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

**Lab Sample ID: LCS 480-340009/2-A**
**Matrix: Solid**
**Analysis Batch: 340117**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340009**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Benzo[a]pyrene | 1620 | 1380 | | ug/Kg | | 85 | 64 - 120 |
| Benzo[b]fluoranthene | 1620 | 1410 | | ug/Kg | | 87 | 64 - 120 |
| Benzo[g,h,i]perylene | 1620 | 1430 | | ug/Kg | | 88 | 45 - 145 |
| Benzo[k]fluoranthene | 1620 | 1440 | | ug/Kg | | 89 | 65 - 120 |
| Biphenyl | 1620 | 1380 | | ug/Kg | | 85 | 59 - 120 |
| bis (2-chloroisopropyl) ether | 1620 | 1250 | | ug/Kg | | 77 | 44 - 120 |
| Bis(2-chloroethoxy)methane | 1620 | 1320 | | ug/Kg | | 81 | 55 - 120 |
| Bis(2-chloroethyl)ether | 1620 | 1210 | | ug/Kg | | 74 | 45 - 120 |
| Bis(2-ethylhexyl) phthalate | 1620 | 1390 | | ug/Kg | | 86 | 61 - 133 |
| Butyl benzyl phthalate | 1620 | 1460 | | ug/Kg | | 90 | 61 - 129 |
| Caprolactam | 3250 | 2790 | | ug/Kg | | 86 | 47 - 120 |
| Carbazole | 1620 | 1450 | | ug/Kg | | 89 | 65 - 120 |
| Chrysene | 1620 | 1470 | | ug/Kg | | 91 | 64 - 120 |
| Dibenz(a,h)anthracene | 1620 | 1400 | | ug/Kg | | 86 | 54 - 132 |
| Dibenzofuran | 1620 | 1380 | | ug/Kg | | 85 | 63 - 120 |
| Diethyl phthalate | 1620 | 1360 | | ug/Kg | | 84 | 66 - 120 |
| Dimethyl phthalate | 1620 | 1410 | | ug/Kg | | 87 | 65 - 124 |
| Di-n-butyl phthalate | 1620 | 1440 | | ug/Kg | | 88 | 58 - 130 |
| Di-n-octyl phthalate | 1620 | 1450 | | ug/Kg | | 89 | 57 - 133 |
| Fluoranthene | 1620 | 1470 | | ug/Kg | | 91 | 62 - 120 |
| Fluorene | 1620 | 1370 | | ug/Kg | | 84 | 63 - 120 |
| Hexachlorobenzene | 1620 | 1380 | | ug/Kg | | 85 | 60 - 120 |
| Hexachlorobutadiene | 1620 | 1200 | | ug/Kg | | 74 | 45 - 120 |
| Hexachlorocyclopentadiene | 1620 | 1430 | | ug/Kg | | 88 | 47 - 120 |
| Hexachloroethane | 1620 | 1140 | | ug/Kg | | 70 | 41 - 120 |
| Indeno[1,2,3-cd]pyrene | 1620 | 1410 | | ug/Kg | | 87 | 56 - 134 |
| Isophorone | 1620 | 1340 | | ug/Kg | | 83 | 56 - 120 |
| Naphthalene | 1620 | 1290 | | ug/Kg | | 79 | 55 - 120 |
| Nitrobenzene | 1620 | 1270 | | ug/Kg | | 78 | 54 - 120 |
| N-Nitrosodi-n-propylamine | 1620 | 1250 | | ug/Kg | | 77 | 52 - 120 |
| N-Nitrosodiphenylamine | 1620 | 1430 | | ug/Kg | | 88 | 51 - 128 |
| Pentachlorophenol | 3250 | 2590 | | ug/Kg | | 80 | 51 - 120 |
| Phenanthrene | 1620 | 1440 | | ug/Kg | | 89 | 60 - 120 |
| Phenol | 1620 | 1320 | | ug/Kg | | 81 | 53 - 120 |
| Pyrene | 1620 | 1520 | | ug/Kg | | 94 | 61 - 133 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *2,4,6-Tribromophenol (Surr)* | *84* | | *54 - 120* |
| *2-Fluorobiphenyl* | *82* | | *60 - 120* |
| *2-Fluorophenol (Surr)* | *77* | | *52 - 120* |
| *Nitrobenzene-d5 (Surr)* | *84* | | *53 - 120* |
| *Phenol-d5 (Surr)* | *80* | | *54 - 120* |
| *p-Terphenyl-d14 (Surr)* | *83* | | *65 - 121* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC)

**Lab Sample ID: MB 480-339980/1-A**
**Matrix: Solid**
**Analysis Batch: 339949**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 1.2 | U | 1.2 | 0.33 | mg/Kg | | 01/13/17 12:16 | 01/13/17 12:57 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *89* | | *46 - 156* | *01/13/17 12:16* | *01/13/17 12:57* | *1* |

**Lab Sample ID: MB 480-339980/1-A**
**Matrix: Solid**
**Analysis Batch: 340074**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 1.2 | U | 1.2 | 0.33 | mg/Kg | | 01/13/17 12:16 | 01/14/17 19:29 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *95* | | *46 - 156* | *01/13/17 12:16* | *01/14/17 19:29* | *1* |

**Lab Sample ID: LCS 480-339980/2-A**
**Matrix: Solid**
**Analysis Batch: 339949**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | | | 9.82 | 9.99 | | mg/Kg | | 102 | 64 - 129 | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *91* | | *46 - 156* |

**Lab Sample ID: LCS 480-339980/2-A**
**Matrix: Solid**
**Analysis Batch: 340074**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | | | 9.82 | 9.77 | | mg/Kg | | 100 | 64 - 129 | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *94* | | *46 - 156* |

**Lab Sample ID: 480-112103-3 MS**
**Matrix: Solid**
**Analysis Batch: 339949**

**Client Sample ID: GCM2-0117**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 7.0 | | 12.2 | 15.0 | | mg/Kg | ☼ | 66 | 41 - 142 | | |

| *Surrogate* | *MS %Recovery* | *MS Qualifier* | *Limits* |
|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *67* | | *46 - 156* |

## Method: 8015D - Gasoline Range Organics (GRO) (GC) (Continued)

**Lab Sample ID: 480-112103-3 MSD**
**Matrix: Solid**
**Analysis Batch: 339949**

**Client Sample ID: GCM2-0117**
**Prep Type: Total/NA**
**Prep Batch: 339980**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GRO (C6-C10) | 7.0 | | 11.8 | 14.1 | | mg/Kg | ☼ | 61 | 41 - 142 | 6 | 32 |

| *Surrogate* | *MSD %Recovery* | *MSD Qualifier* | *Limits* |
|---|---|---|---|
| *a,a,a-Trifluorotoluene* | *66* | | *46 - 156* |

## Method: 8015D - Diesel Range Organics (DRO) (GC)

**Lab Sample ID: MB 480-339694/1-A**
**Matrix: Solid**
**Analysis Batch: 339796**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339694**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 17 | U | 17 | 5.0 | mg/Kg | | 01/12/17 06:18 | 01/12/17 13:45 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *81* | | *48 - 125* | *01/12/17 06:18* | *01/12/17 13:45* | *1* |

**Lab Sample ID: LCS 480-339694/2-A**
**Matrix: Solid**
**Analysis Batch: 339796**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339694**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 49.8 | 47.5 | | mg/Kg | | 96 | 63 - 127 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *o-Terphenyl* | *96* | | *48 - 125* |

**Lab Sample ID: LCSD 480-339694/3-A**
**Matrix: Solid**
**Analysis Batch: 339796**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 339694**

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics [C10-C28] | 49.8 | 49.8 | | mg/Kg | | 100 | 63 - 127 | 5 | 35 |

| *Surrogate* | *LCSD %Recovery* | *LCSD Qualifier* | *Limits* |
|---|---|---|---|
| *o-Terphenyl* | *100* | | *48 - 125* |

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

**Lab Sample ID: MB 480-339695/1-A**
**Matrix: Solid**
**Analysis Batch: 339788**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339695**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1016 | 0.23 | U | 0.23 | 0.045 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |

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

**Lab Sample ID: MB 480-339695/1-A**
**Matrix: Solid**
**Analysis Batch: 339788**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339695**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1221 | 0.23 | U | 0.23 | 0.045 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |
| PCB-1232 | 0.23 | U | 0.23 | 0.045 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |
| PCB-1242 | 0.23 | U | 0.23 | 0.045 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |
| PCB-1248 | 0.23 | U | 0.23 | 0.045 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |
| PCB-1254 | 0.23 | U | 0.23 | 0.11 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |
| PCB-1260 | 0.23 | U | 0.23 | 0.11 | mg/Kg | | 01/12/17 06:26 | 01/12/17 15:50 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Tetrachloro-m-xylene* | *116* | | *60 - 154* | *01/12/17 06:26* | *01/12/17 15:50* | *1* |
| *DCB Decachlorobiphenyl* | *126* | | *65 - 174* | *01/12/17 06:26* | *01/12/17 15:50* | *1* |

**Lab Sample ID: LCS 480-339695/2-A**
**Matrix: Solid**
**Analysis Batch: 339788**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339695**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| PCB-1016 | 2.30 | 3.70 | | mg/Kg | | 160 | 51 - 185 |
| PCB-1260 | 2.30 | 3.78 | | mg/Kg | | 164 | 61 - 184 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *Tetrachloro-m-xylene* | *146* | | *60 - 154* |
| *DCB Decachlorobiphenyl* | *167* | | *65 - 174* |

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 480-339937/2-A**
**Matrix: Solid**
**Analysis Batch: 340411**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339937**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 19:23 | 1 |

**Lab Sample ID: LCS 480-339937/3-A**
**Matrix: Solid**
**Analysis Batch: 340411**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339937**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 0.974 | | mg/L | | 97 | 80 - 120 |

**Lab Sample ID: MB 480-339938/2-A**
**Matrix: Solid**
**Analysis Batch: 340265**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339938**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 17:45 | 1 |

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: LCS 480-339938/3-A**
**Matrix: Solid**
**Analysis Batch: 340265**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339938**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 1.05 | | mg/L | | 105 | 80 - 120 |

**Lab Sample ID: MB 480-339991/1-A**
**Matrix: Solid**
**Analysis Batch: 340290**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 339991**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 2.0 | U | 2.0 | 0.39 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Barium | 0.49 | U | 0.49 | 0.11 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Cadmium | 0.20 | U | 0.20 | 0.029 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Chromium | 0.49 | U | 0.49 | 0.20 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Lead | 0.98 | U | 0.98 | 0.23 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Selenium | 3.9 | U | 3.9 | 0.39 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |
| Silver | 0.59 | U | 0.59 | 0.20 | mg/Kg | | 01/13/17 15:22 | 01/16/17 13:25 | 1 |

**Lab Sample ID: LCSSRM 480-339991/2-A**
**Matrix: Solid**
**Analysis Batch: 340290**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 339991**

| Analyte | Spike Added | LCSSRM Result | LCSSRM Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Arsenic | 145 | 133.6 | | mg/Kg | | 92.1 | 70.3 - 136.6 |
| Barium | 209 | 180.5 | | mg/Kg | | 86.3 | 73.7 - 126.8 |
| Cadmium | 87.6 | 75.08 | | mg/Kg | | 85.7 | 73.3 - 126.7 |
| Chromium | 143 | 126.7 | | mg/Kg | | 88.6 | 69.9 - 129.4 |
| Lead | 146 | 151.0 | | mg/Kg | | 103.4 | 73.3 - 126.7 |
| Selenium | 178 | 159.3 | | mg/Kg | | 89.5 | 68.0 - 131.5 |
| Silver | 31.3 | 27.24 | | mg/Kg | | 87.0 | 65.2 - 134.5 |

**Lab Sample ID: MB 480-340793/2-A**
**Matrix: Solid**
**Analysis Batch: 341158**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 340793**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/20/17 09:34 | 01/23/17 15:31 | 1 |

**Lab Sample ID: LCS 480-340793/3-A**
**Matrix: Solid**
**Analysis Batch: 341158**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 340793**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 0.936 | | mg/L | | 94 | 80 - 120 |

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: LB2 480-339780/1-B** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: TCLP**
**Analysis Batch: 340411** — **Prep Batch: 339937**

| Analyte | LB2 Result | LB2 Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 19:10 | 1 |

**Lab Sample ID: LB 480-339741/1-B** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: TCLP**
**Analysis Batch: 340265** — **Prep Batch: 339938**

| Analyte | LB Result | LB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/13/17 10:30 | 01/16/17 17:41 | 1 |

**Lab Sample ID: LB2 480-340627/1-B** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: TCLP**
**Analysis Batch: 341158** — **Prep Batch: 340793**

| Analyte | LB2 Result | LB2 Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/20/17 09:34 | 01/23/17 15:28 | 1 |

**Lab Sample ID: 480-112103-4 MS** — **Client Sample ID: GCM3-0117**
**Matrix: Solid** — **Prep Type: TCLP**
**Analysis Batch: 341158** — **Prep Batch: 340793**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 5.6 | | 1.00 | 6.61 | 4 | mg/L | | 101 | 75 - 125 |

**Lab Sample ID: 480-112103-4 MSD** — **Client Sample ID: GCM3-0117**
**Matrix: Solid** — **Prep Type: TCLP**
**Analysis Batch: 341158** — **Prep Batch: 340793**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead | 5.6 | | 1.00 | 6.60 | 4 | mg/L | | 100 | 75 - 125 | 0 | 20 |

## Method: 7471B - Mercury (CVAA)

**Lab Sample ID: MB 480-339923/1-A** — **Client Sample ID: Method Blank**
**Matrix: Solid** — **Prep Type: Total/NA**
**Analysis Batch: 339976** — **Prep Batch: 339923**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.019 | U | 0.019 | 0.0079 | mg/Kg | | 01/13/17 09:50 | 01/13/17 11:18 | 1 |

**Lab Sample ID: LCSSRM 480-339923/2-A ^10** — **Client Sample ID: Lab Control Sample**
**Matrix: Solid** — **Prep Type: Total/NA**
**Analysis Batch: 339976** — **Prep Batch: 339923**

| Analyte | Spike Added | LCSSRM Result | LCSSRM Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Mercury | 12.6 | 12.01 | | mg/Kg | | 95.3 | 44.4 - 128.6 |

## Method: 1010A - Ignitability, Pensky-Martens Closed-Cup Method

**Lab Sample ID: LCS 480-340380/1**
**Matrix: Solid**
**Analysis Batch: 340380**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Flashpoint | 81.0 | 82.00 | | Degrees F | | 101 | 97.5 - 102.5 |

## GC/MS VOA

### Leach Batch: 339742

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 1311 | |
| 480-112103-2 | GCM1-0117 | TCLP | Solid | 1311 | |
| 480-112103-3 | GCM2-0117 | TCLP | Solid | 1311 | |
| 480-112103-4 | GCM3-0117 | TCLP | Solid | 1311 | |
| LB 480-339742/1-A | Method Blank | TCLP | Solid | 1311 | |

### Analysis Batch: 340019

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 8260C | 339742 |
| 480-112103-2 | GCM1-0117 | TCLP | Solid | 8260C | 339742 |
| 480-112103-3 | GCM2-0117 | TCLP | Solid | 8260C | 339742 |
| 480-112103-4 | GCM3-0117 | TCLP | Solid | 8260C | 339742 |
| LB 480-339742/1-A | Method Blank | TCLP | Solid | 8260C | 339742 |
| MB 480-340019/7 | Method Blank | Total/NA | Solid | 8260C | |
| LCS 480-340019/5 | Lab Control Sample | Total/NA | Solid | 8260C | |

### Prep Batch: 340158

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 5035A | |
| MB 480-340158/2-A | Method Blank | Total/NA | Solid | 5035A | |
| LCS 480-340158/1-A | Lab Control Sample | Total/NA | Solid | 5035A | |

### Analysis Batch: 340260

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| MB 480-340158/2-A | Method Blank | Total/NA | Solid | 8260C | 340158 |
| LCS 480-340158/1-A | Lab Control Sample | Total/NA | Solid | 8260C | 340158 |

### Analysis Batch: 340630

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 8260C | 340158 |

## GC/MS Semi VOA

### Prep Batch: 340009

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 3550C | |
| MB 480-340009/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-340009/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |

### Analysis Batch: 340117

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 8270D | 340009 |
| MB 480-340009/1-A | Method Blank | Total/NA | Solid | 8270D | 340009 |
| LCS 480-340009/2-A | Lab Control Sample | Total/NA | Solid | 8270D | 340009 |

## GC VOA

### Analysis Batch: 339949

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | 8015D | 339980 |

## GC VOA (Continued)

### Analysis Batch: 339949 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | 8015D | 339980 |
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | 8015D | 339980 |
| MB 480-339980/1-A | Method Blank | Total/NA | Solid | 8015D | 339980 |
| LCS 480-339980/2-A | Lab Control Sample | Total/NA | Solid | 8015D | 339980 |
| 480-112103-3 MS | GCM2-0117 | Total/NA | Solid | 8015D | 339980 |
| 480-112103-3 MSD | GCM2-0117 | Total/NA | Solid | 8015D | 339980 |

### Prep Batch: 339980

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 5035 | |
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | 5035 | |
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | 5035 | |
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | 5035 | |
| MB 480-339980/1-A | Method Blank | Total/NA | Solid | 5035 | |
| LCS 480-339980/2-A | Lab Control Sample | Total/NA | Solid | 5035 | |
| 480-112103-3 MS | GCM2-0117 | Total/NA | Solid | 5035 | |
| 480-112103-3 MSD | GCM2-0117 | Total/NA | Solid | 5035 | |

### Analysis Batch: 340074

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 8015D | 339980 |
| MB 480-339980/1-A | Method Blank | Total/NA | Solid | 8015D | 339980 |
| LCS 480-339980/2-A | Lab Control Sample | Total/NA | Solid | 8015D | 339980 |

## GC Semi VOA

### Prep Batch: 339694

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 3550C | |
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | 3550C | |
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | 3550C | |
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | 3550C | |
| MB 480-339694/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-339694/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |
| LCSD 480-339694/3-A | Lab Control Sample Dup | Total/NA | Solid | 3550C | |

### Prep Batch: 339695

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 3550C | |
| MB 480-339695/1-A | Method Blank | Total/NA | Solid | 3550C | |
| LCS 480-339695/2-A | Lab Control Sample | Total/NA | Solid | 3550C | |

### Analysis Batch: 339788

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 8082A | 339695 |
| MB 480-339695/1-A | Method Blank | Total/NA | Solid | 8082A | 339695 |
| LCS 480-339695/2-A | Lab Control Sample | Total/NA | Solid | 8082A | 339695 |

## GC Semi VOA (Continued)

### Analysis Batch: 339796

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 8015D | 339694 |
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | 8015D | 339694 |
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | 8015D | 339694 |
| MB 480-339694/1-A | Method Blank | Total/NA | Solid | 8015D | 339694 |
| LCS 480-339694/2-A | Lab Control Sample | Total/NA | Solid | 8015D | 339694 |
| LCSD 480-339694/3-A | Lab Control Sample Dup | Total/NA | Solid | 8015D | 339694 |

### Analysis Batch: 339957

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | 8015D | 339694 |

## Metals

### Leach Batch: 339741

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-2 | GCM1-0117 | TCLP | Solid | 1311 | |
| LB 480-339741/1-B | Method Blank | TCLP | Solid | 1311 | |

### Leach Batch: 339780

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 1311 | |
| 480-112103-3 | GCM2-0117 | TCLP | Solid | 1311 | |
| LB2 480-339780/1-B | Method Blank | TCLP | Solid | 1311 | |

### Prep Batch: 339923

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 7471B | |
| MB 480-339923/1-A | Method Blank | Total/NA | Solid | 7471B | |
| LCSSRM 480-339923/2-A ^1 | Lab Control Sample | Total/NA | Solid | 7471B | |

### Prep Batch: 339937

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 3010A | 339780 |
| 480-112103-3 | GCM2-0117 | TCLP | Solid | 3010A | 339780 |
| LB2 480-339780/1-B | Method Blank | TCLP | Solid | 3010A | 339780 |
| MB 480-339937/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-339937/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |

### Prep Batch: 339938

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-2 | GCM1-0117 | TCLP | Solid | 3010A | 339741 |
| LB 480-339741/1-B | Method Blank | TCLP | Solid | 3010A | 339741 |
| MB 480-339938/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-339938/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |

### Analysis Batch: 339976

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 7471B | 339923 |
| MB 480-339923/1-A | Method Blank | Total/NA | Solid | 7471B | 339923 |
| LCSSRM 480-339923/2-A ^1 | Lab Control Sample | Total/NA | Solid | 7471B | 339923 |

## Metals (Continued)

### Prep Batch: 339991

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 3050B | |
| MB 480-339991/1-A | Method Blank | Total/NA | Solid | 3050B | |
| LCSSRM 480-339991/2-A | Lab Control Sample | Total/NA | Solid | 3050B | |

### Analysis Batch: 340265

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-2 | GCM1-0117 | TCLP | Solid | 6010C | 339938 |
| LB 480-339741/1-B | Method Blank | TCLP | Solid | 6010C | 339938 |
| MB 480-339938/2-A | Method Blank | Total/NA | Solid | 6010C | 339938 |
| LCS 480-339938/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 339938 |

### Analysis Batch: 340290

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 6010C | 339991 |
| MB 480-339991/1-A | Method Blank | Total/NA | Solid | 6010C | 339991 |
| LCSSRM 480-339991/2-A | Lab Control Sample | Total/NA | Solid | 6010C | 339991 |

### Analysis Batch: 340411

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 6010C | 339937 |
| 480-112103-3 | GCM2-0117 | TCLP | Solid | 6010C | 339937 |
| LB2 480-339780/1-B | Method Blank | TCLP | Solid | 6010C | 339937 |
| MB 480-339937/2-A | Method Blank | Total/NA | Solid | 6010C | 339937 |
| LCS 480-339937/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 339937 |

### Leach Batch: 340627

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-4 | GCM3-0117 | TCLP | Solid | 1311 | |
| LB2 480-340627/1-B | Method Blank | TCLP | Solid | 1311 | |
| 480-112103-4 MS | GCM3-0117 | TCLP | Solid | 1311 | |
| 480-112103-4 MSD | GCM3-0117 | TCLP | Solid | 1311 | |

### Prep Batch: 340793

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-4 | GCM3-0117 | TCLP | Solid | 3010A | 340627 |
| LB2 480-340627/1-B | Method Blank | TCLP | Solid | 3010A | 340627 |
| MB 480-340793/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-340793/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |
| 480-112103-4 MS | GCM3-0117 | TCLP | Solid | 3010A | 340627 |
| 480-112103-4 MSD | GCM3-0117 | TCLP | Solid | 3010A | 340627 |

### Analysis Batch: 341158

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-4 | GCM3-0117 | TCLP | Solid | 6010C | 340793 |
| LB2 480-340627/1-B | Method Blank | TCLP | Solid | 6010C | 340793 |
| MB 480-340793/2-A | Method Blank | Total/NA | Solid | 6010C | 340793 |
| LCS 480-340793/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 340793 |
| 480-112103-4 MS | GCM3-0117 | TCLP | Solid | 6010C | 340793 |
| 480-112103-4 MSD | GCM3-0117 | TCLP | Solid | 6010C | 340793 |

# QC Association Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## General Chemistry

### Analysis Batch: 339692

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | Moisture | |
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | Moisture | |
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | Moisture | |
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | Moisture | |

### Analysis Batch: 340380

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Total/NA | Solid | 1010A | |
| 480-112103-2 | GCM1-0117 | Total/NA | Solid | 1010A | |
| 480-112103-3 | GCM2-0117 | Total/NA | Solid | 1010A | |
| 480-112103-4 | GCM3-0117 | Total/NA | Solid | 1010A | |
| LCS 480-340380/1 | Lab Control Sample | Total/NA | Solid | 1010A | |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Client Sample ID: LEAD1-0117

**Lab Sample ID: 480-112103-1**

**Date Collected: 01/11/17 12:00**

**Matrix: Solid**

**Date Received: 01/11/17 15:50**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 339742 | 01/12/17 08:38 | CPH | TAL BUF |
| TCLP | Analysis | 8260C | | 10 | 340019 | 01/13/17 21:50 | NEA | TAL BUF |
| TCLP | Leach | 1311 | | | 339780 | 01/12/17 11:17 | CPH | TAL BUF |
| TCLP | Prep | 3010A | | | 339937 | 01/13/17 10:30 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 340411 | 01/16/17 20:33 | AMH | TAL BUF |
| Total/NA | Analysis | 1010A | | 1 | 340380 | 01/17/17 16:31 | JCL | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 339692 | 01/12/17 05:09 | CSW | TAL BUF |

## Client Sample ID: LEAD1-0117

**Lab Sample ID: 480-112103-1**

**Date Collected: 01/11/17 12:00**

**Matrix: Solid**

**Date Received: 01/11/17 15:50**

**Percent Solids: 76.9**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035A | | | 340158 | 01/16/17 10:21 | NEA | TAL BUF |
| Total/NA | Analysis | 8260C | | 5 | 340630 | 01/19/17 11:50 | SMY | TAL BUF |
| Total/NA | Prep | 3550C | | | 340009 | 01/13/17 15:36 | SMP | TAL BUF |
| Total/NA | Analysis | 8270D | | 5 | 340117 | 01/16/17 12:04 | LMW | TAL BUF |
| Total/NA | Prep | 5035 | | | 339980 | 01/13/17 12:16 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 10 | 340074 | 01/14/17 20:38 | JLS | TAL BUF |
| Total/NA | Prep | 3550C | | | 339694 | 01/12/17 06:18 | CAM | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 339796 | 01/12/17 15:27 | JMO | TAL BUF |
| Total/NA | Prep | 3550C | | | 339695 | 01/12/17 06:26 | CAM | TAL BUF |
| Total/NA | Analysis | 8082A | | 1 | 339788 | 01/12/17 17:10 | KS | TAL BUF |
| Total/NA | Prep | 3050B | | | 339991 | 01/13/17 15:22 | MVZ | TAL BUF |
| Total/NA | Analysis | 6010C | | 1 | 340290 | 01/16/17 14:08 | LMH | TAL BUF |
| Total/NA | Prep | 7471B | | | 339923 | 01/13/17 09:50 | RMZ | TAL BUF |
| Total/NA | Analysis | 7471B | | 1 | 339976 | 01/13/17 11:29 | RMZ | TAL BUF |

## Client Sample ID: GCM1-0117

**Lab Sample ID: 480-112103-2**

**Date Collected: 01/11/17 13:00**

**Matrix: Solid**

**Date Received: 01/11/17 15:50**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 339742 | 01/12/17 08:38 | CPH | TAL BUF |
| TCLP | Analysis | 8260C | | 10 | 340019 | 01/13/17 22:13 | NEA | TAL BUF |
| TCLP | Leach | 1311 | | | 339741 | 01/12/17 08:33 | CPH | TAL BUF |
| TCLP | Prep | 3010A | | | 339938 | 01/13/17 10:30 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 340265 | 01/16/17 18:26 | AMH | TAL BUF |
| Total/NA | Analysis | 1010A | | 1 | 340380 | 01/17/17 16:31 | JCL | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 339692 | 01/12/17 05:09 | CSW | TAL BUF |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Client Sample ID: GCM1-0117

**Date Collected: 01/11/17 13:00**
**Date Received: 01/11/17 15:50**

## Lab Sample ID: 480-112103-2

**Matrix: Solid**
**Percent Solids: 82.5**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035 | | | 339980 | 01/13/17 12:16 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 339949 | 01/13/17 17:58 | JLS | TAL BUF |
| Total/NA | Prep | 3550C | | | 339694 | 01/12/17 06:18 | CAM | TAL BUF |
| Total/NA | Analysis | 8015D | | 20 | 339796 | 01/12/17 18:37 | JMO | TAL BUF |

## Client Sample ID: GCM2-0117

**Date Collected: 01/11/17 13:10**
**Date Received: 01/11/17 15:50**

## Lab Sample ID: 480-112103-3

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 339742 | 01/12/17 08:38 | CPH | TAL BUF |
| TCLP | Analysis | 8260C | | 10 | 340019 | 01/13/17 22:36 | NEA | TAL BUF |
| TCLP | Leach | 1311 | | | 339780 | 01/12/17 11:17 | CPH | TAL BUF |
| TCLP | Prep | 3010A | | | 339937 | 01/13/17 10:30 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 340411 | 01/16/17 20:46 | AMH | TAL BUF |
| Total/NA | Analysis | 1010A | | 1 | 340380 | 01/17/17 16:31 | JCL | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 339692 | 01/12/17 05:09 | CSW | TAL BUF |

## Client Sample ID: GCM2-0117

**Date Collected: 01/11/17 13:10**
**Date Received: 01/11/17 15:50**

## Lab Sample ID: 480-112103-3

**Matrix: Solid**
**Percent Solids: 82.1**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035 | | | 339980 | 01/13/17 12:16 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 339949 | 01/13/17 15:41 | JLS | TAL BUF |
| Total/NA | Prep | 3550C | | | 339694 | 01/12/17 06:18 | CAM | TAL BUF |
| Total/NA | Analysis | 8015D | | 10 | 339796 | 01/12/17 19:16 | JMO | TAL BUF |

## Client Sample ID: GCM3-0117

**Date Collected: 01/11/17 13:20**
**Date Received: 01/11/17 15:50**

## Lab Sample ID: 480-112103-4

**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 339742 | 01/12/17 08:38 | CPH | TAL BUF |
| TCLP | Analysis | 8260C | | 10 | 340019 | 01/13/17 22:59 | NEA | TAL BUF |
| TCLP | Leach | 1311 | | | 340627 | 01/19/17 08:43 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 340793 | 01/20/17 09:34 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 341158 | 01/23/17 15:48 | SLB | TAL BUF |
| Total/NA | Analysis | 1010A | | 1 | 340380 | 01/17/17 16:31 | JCL | TAL BUF |
| Total/NA | Analysis | Moisture | | 1 | 339692 | 01/12/17 05:09 | CSW | TAL BUF |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

**Client Sample ID: GCM3-0117**
**Date Collected: 01/11/17 13:20**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-4**
**Matrix: Solid**
**Percent Solids: 80.3**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 5035 | | | 339980 | 01/13/17 12:16 | TRG | TAL BUF |
| Total/NA | Analysis | 8015D | | 1 | 339949 | 01/13/17 18:33 | JLS | TAL BUF |
| Total/NA | Prep | 3550C | | | 339694 | 01/12/17 06:18 | CAM | TAL BUF |
| Total/NA | Analysis | 8015D | | 100 | 339957 | 01/13/17 14:35 | JMO | TAL BUF |

**Laboratory References:**

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

# Certification Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

## Laboratory: TestAmerica Buffalo

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

| Authority | Program | EPA Region | Certification ID | Expiration Date |
|---|---|---|---|---|
| New York | NELAP | 2 | 10026 | 03-31-17 * |

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

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

* Certification renewal pending - certification considered valid.

# Method Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 8260C | Volatile Organic Compounds by GC/MS | SW846 | TAL BUF |
| 8270D | Semivolatile Organic Compounds (GC/MS) | SW846 | TAL BUF |
| 8015D | Gasoline Range Organics (GRO) (GC) | SW846 | TAL BUF |
| 8015D | Diesel Range Organics (DRO) (GC) | SW846 | TAL BUF |
| 8082A | Polychlorinated Biphenyls (PCBs) by Gas Chromatography | SW846 | TAL BUF |
| 6010C | Metals (ICP) | SW846 | TAL BUF |
| 7471B | Mercury (CVAA) | SW846 | TAL BUF |
| 1010A | Ignitability, Pensky-Martens Closed-Cup Method | SW846 | TAL BUF |
| Moisture | Percent Moisture | EPA | TAL BUF |

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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

# Sample Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Solid | 01/11/17 12:00 | 01/11/17 15:50 |
| 480-112103-2 | GCM1-0117 | Solid | 01/11/17 13:00 | 01/11/17 15:50 |
| 480-112103-3 | GCM2-0117 | Solid | 01/11/17 13:10 | 01/11/17 15:50 |
| 480-112103-4 | GCM3-0117 | Solid | 01/11/17 13:20 | 01/11/17 15:50 |

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228
Phone: 716.691.2600 Fax: 716.691.7991

# Chain of Custody Record

184018

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

1/25/2017

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

| Client Contact | Project Manager: D. CROWLEY | Site Contact: | Date: | COC No: |
|---|---|---|---|---|
| Company Name: AMEC FW | Tel/Fax: 412-279-6661 | Lab Contact: | Carrier: | ____ of ____ COCs |
| Address: 300 N. BELLAVE SUITE 200 | Analysis Turnaround Time | | | Sampler: S. HULBURT |
| City/State/Zip: CARNEGIE, PA 15106 | ☐ CALENDAR DAYS ☐ WORKING DAYS | | | For Lab Use Only |
| Phone: 412-279-6661 | TAT if different from Below ____ | | | Walk-in Client: |
| Fax: | ☑ 2 weeks STANDARD | | | Lab Sampling: |
| Project Name: OU2 KROG-XOM TEST CELLS | ☐ 1 week | | | Job / SDG No.: |
| Site: OU2 FORMER XOM BUFFALO | ☐ 2 days | | | 480-112103 COC |
| P O # | ☐ 1 day | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y/N) | Perform MS / MSD (Y/N) | 6010-TCLP LEAD | 8260C-TCLP BENZENE | 1010A-FLASH POINT | 8015D-DRO-DRO | 8015D-GRO-GRO | 6010C 7471B | 8082A 8270D | 8260C-TCL-STARS | 1010A 7470A | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEAD1-0117 | 1/11/17 | 1200 | C | SOLID | 10 | X | X | X | X | X | X | X | X | X | X | X | HOLD RCRA METALS UNTIL NOTICE |
| GCM1-0117 | ↓ | 1300 | ↓ | ↓ | 6 | | | X | X | X | X | X | | | | | |
| GCM2-0117 | ↓ | 1310 | ↓ | ↓ | 6 | | | ↓ | ↓ | ↓ | ↓ | ↓ | | | | | |
| GCM-3-0117 | ↓ | 1320 | ↓ | ↓ | 6 | | | ↓ | ↓ | ↓ | ↓ | ↓ | | | | | |

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

**Special Instructions/QC Requirements & Comments:**

3-0 #1

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
|---|---|---|---|---|---|
| SEAN HULBURT | AMEC FW | 1/11/17 1550 | Karen Kuhl | TAB | 15:50 1/11/17 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| | | | | TA | |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: |

# Login Sample Receipt Checklist

Client: AMEC Foster Wheeler E & I, Inc

Job Number: 480-112103-1

**Login Number: 112103**
**List Number: 1**
**Creator: Conway, Curtis R**

**List Source: TestAmerica Buffalo**

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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

TestAmerica Job ID: 480-112103-2
Client Project/Site: OV2 KROG-XOM Test Cells

For:
AMEC Foster Wheeler E & I, Inc
800 North Bell Avenue, Suite 200
Pittsburgh, Pennsylvania 15106

Attn: Dayne Crowley

*Authorized for release by:*
*2/1/2017 12:40:58 PM*

John Schove, Project Manager II
(716)504-9838
john.schove@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

# Table of Contents

# Definitions/Glossary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |

## Glossary

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

## Job ID: 480-112103-2

### Laboratory: TestAmerica Buffalo

**Narrative**

**Job Narrative**
**480-112103-2**

**Comments**
No additional comments.

**Receipt**
The samples were received on 1/11/2017 3:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0º C.

**Metals**
Method(s) 6010C: The following sample was diluted due to the presence of TCLP Sulfur which interferes with Lead: LEAD1-0117 (480-112103-1). Elevated reporting limits (RLs) are provided.

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

**Organic Prep**
Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following sample: LEAD1-0117 (480-112103-1). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

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

# Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

## Client Sample ID: LEAD1-0117

## Lab Sample ID: 480-112103-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.5 | | 0.10 | 0.015 | mg/L | 5 | | 6010C | TCLP |

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

**Client Sample ID: LEAD1-0117**
**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-1**
**Matrix: Solid**

**Method: 6010C - Metals (ICP) - TCLP**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 4.5 | | 0.10 | 0.015 | mg/L | | 01/27/17 10:20 | 01/31/17 11:50 | 5 |

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 480-341676/2-A**
**Matrix: Solid**
**Analysis Batch: 342006**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 341676**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/27/17 10:20 | 01/30/17 13:58 | 1 |

**Lab Sample ID: LCS 480-341676/3-A**
**Matrix: Solid**
**Analysis Batch: 342006**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 341676**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 0.962 | | mg/L | | 96 | 80 - 120 |

**Lab Sample ID: LB2 480-341503/1-B**
**Matrix: Solid**
**Analysis Batch: 342006**

**Client Sample ID: Method Blank**
**Prep Type: TCLP**
**Prep Batch: 341676**

| Analyte | LB2 Result | LB2 Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 01/27/17 10:20 | 01/30/17 13:54 | 1 |

# QC Association Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

## Metals

### Leach Batch: 341503

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 1311 | |
| LB2 480-341503/1-B | Method Blank | TCLP | Solid | 1311 | |

### Prep Batch: 341676

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 3010A | 341503 |
| LB2 480-341503/1-B | Method Blank | TCLP | Solid | 3010A | 341503 |
| MB 480-341676/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-341676/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |

### Analysis Batch: 342006

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| LB2 480-341503/1-B | Method Blank | TCLP | Solid | 6010C | 341676 |
| MB 480-341676/2-A | Method Blank | Total/NA | Solid | 6010C | 341676 |
| LCS 480-341676/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 341676 |

### Analysis Batch: 342079

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | TCLP | Solid | 6010C | 341676 |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

**Client Sample ID: LEAD1-0117**
**Date Collected: 01/11/17 12:00**
**Date Received: 01/11/17 15:50**

**Lab Sample ID: 480-112103-1**
**Matrix: Solid**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 341503 | 01/26/17 15:41 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 341676 | 01/27/17 10:20 | MVZ | TAL BUF |
| TCLP | Analysis | 6010C | | 5 | 342079 | 01/31/17 11:50 | LMH | TAL BUF |

**Laboratory References:**

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

# Certification Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

## Laboratory: TestAmerica Buffalo

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

| Authority | Program | EPA Region | Certification ID | Expiration Date |
|---|---|---|---|---|
| New York | NELAP | 2 | 10026 | 03-31-17 * |

| Analysis Method | Prep Method | Matrix | Analyte |
|---|---|---|---|

* Certification renewal pending - certification considered valid.

# Method Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6010C | Metals (ICP) | SW846 | TAL BUF |

**Protocol References:**

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

**Laboratory References:**

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

# Sample Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: OV2 KROG-XOM Test Cells

TestAmerica Job ID: 480-112103-2

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 480-112103-1 | LEAD1-0117 | Solid | 01/11/17 12:00 | 01/11/17 15:50 |

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228
Phone: 716.691.2600 Fax: 716.691.7991

# Chain of Custody Record

184018

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

2/1/2017

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

| Client Contact | Project Manager: D. CROWLEY | Site Contact: | Date: | COC No: |
|---|---|---|---|---|
| Company Name: AMEC FW | Tel/Fax: 412-279-6661 | Lab Contact: | Carrier: | ____ of ____ COCs |
| Address: 300 N. BELLAVE SUITE 200 | Analysis Turnaround Time | | | Sampler: S. HULBURT |
| City/State/Zip: CARNEGIE, PA 15106 | ☐ CALENDAR DAYS ☐ WORKING DAYS | | | For Lab Use Only |
| Phone: 412-279-6661 | TAT if different from Below ____ | | | Walk-in Client: |
| Fax: | ☑ 2 weeks STANDARD | | | Lab Sampling: |
| Project Name: OU2 KROG-XOM TEST CELLS | ☐ 1 week | | | Job / SDG: |
| Site: OU2 FORMER XOM BUFFALO | ☐ 2 days | | | 480-112103 COC |
| P O # | ☐ 1 day | | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=Grab) | Matrix | # of Cont. | Filtered Sample (Y/N) | Perform MS / MSD (Y/N) | 6010-TCLP LEAD | 8260C-TCLP BENZENE | 1010A-FLASH POINT | 8015D-DRO-DRO | 8015D-GRO-GRO | 6010C 7471B | 8082A 8270D | 8260C-TCL-STARS | 1010C 7470A | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LEAD1-0117 | 1/11/17 | 1200 | C | SOLID | 10 | X | X | X | X | X | X | X | X | X | X | X | HOLD RCRA METALS UNTIL NOTICE |
| GCM1-0117 | ↓ | 1300 | ↓ | ↓ | 6 | | | X | X | X | X | X | | | | | |
| GCM2-0117 | ↓ | 1310 | ↓ | ↓ | 6 | | | ↓ | ↓ | ↓ | ↓ | ↓ | | | | | |
| GCM-3-0117 | ↓ | 1320 | ↓ | ↓ | 6 | | | ↓ | ↓ | ↓ | ↓ | ↓ | | | | | |

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

**Possible Hazard Identification:**
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

**Special Instructions/QC Requirements & Comments:**

3-0 #1

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
|---|---|---|---|---|---|
| SEAN HULBURT | AMEC FW | 1/11/17 1550 | Karen Kuhl | TAB | 15:50 1/11/17 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: |

# Login Sample Receipt Checklist

Client: AMEC Foster Wheeler E & I, Inc

Job Number: 480-112103-2

**Login Number: 112103**
**List Number: 1**
**Creator: Conway, Curtis R**

**List Source: TestAmerica Buffalo**

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

September 5, 2017

Project No. 2017-427-001

Mr. Dayne Crowley
AMEC Foster Wheeler
800 N. Bell Ave, Suite 200
Carnegie, PA 15106

**Transmittal**
**Laboratory Test Results**
**Buffalo, NY (ISS Pilot)**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
***Geotechnics, Inc***.

David R. Backstrom
Laboratory Director

***We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.***

# PERMEABILITY TEST

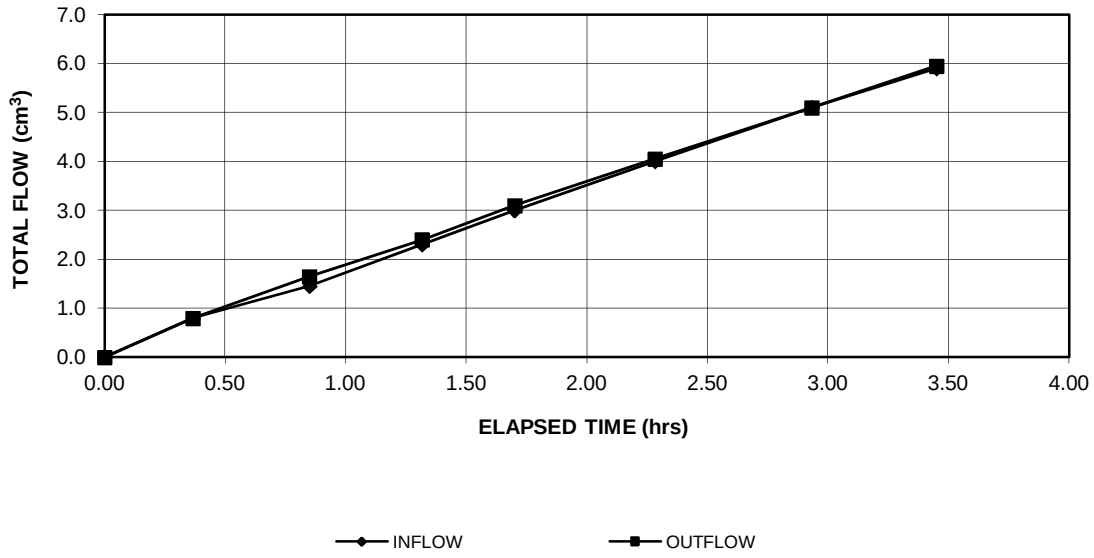
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 BW |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-001 | Avg. Conf. Pressure (psi): | 6.25 |

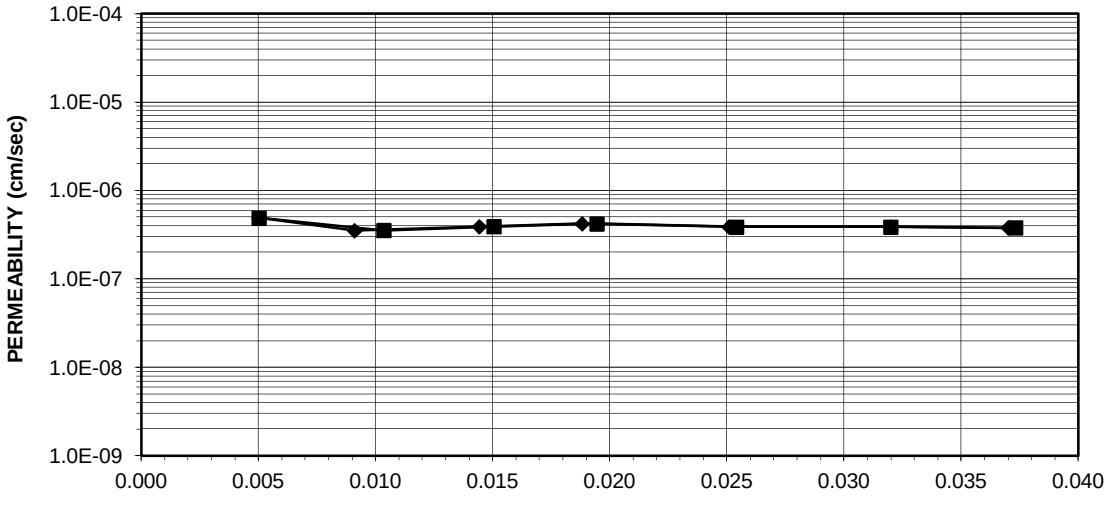
**AVERAGE PERMEABILITY = 3.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.9E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 BW |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-001 | Avg. Conf. Pressure (psi): | 6.25 |

Specific Gravity: 2.70 Assumed

Sample Condition: Previously Remolded

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 629 | 909 |
| Weight of Tare & Wet Sample (g) | 676.56 | 791.82 |
| Weight of Tare & Dry Sample (g) | 558.97 | 660.70 |
| Weight of Tare (g) | 86.28 | 109.33 |
| Weight of Water (g) | 117.59 | 131.12 |
| Weight of Dry Sample (g) | 472.69 | 551.37 |
| Moisture Content (%) | **24.9** | **23.8** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 671.32 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 671.32 | 665.43 |
| Length 1 (in) | 3.103 | 3.085 |
| Length 2 (in) | 3.100 | 3.089 |
| Length 3 (in) | 3.107 | 3.087 |
| Top Diameter (in) | 3.011 | 3.007 |
| Middle Diameter (in) | 3.001 | 3.001 |
| Bottom Diameter (in) | 3.011 | 3.004 |
| Average Length (in) | 3.10 | 3.09 |
| Average Area ($in^2$) | 7.10 | 7.09 |
| Sample Volume ($cm^3$) | 361.31 | 358.53 |
| Unit Wet Weight ($g/cm^3$) | 1.86 | 1.86 |
| Unit Wet Weight (pcf) | 116.0 | 115.9 |
| Unit Dry Weight (pcf) | 92.9 | 93.6 |
| Unit Dry Weight ($g/cm^3$) | 1.49 | 1.50 |
| Void Ratio, e | 0.81 | 0.80 |
| Porosity, n | 0.45 | 0.44 |
| Pore Volume ($cm^3$) | 162.2 | 159.4 |
| Total Weight of Sample After Test (g) | | 683.28 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 BW |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-001 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.42 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.84 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.73 |
| Inflow Burette Area ($cm^2$), a-in | 0.912 |
| Outflow Burette Area ($cm^2$), a-out | 0.861 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 3.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.9E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 7 | 42 | 0.000 | 0.0 | 0.0 | 202.6 | 0 | 22.0 | NA |
| 8/28/17 | 8 | 4 | 0.367 | 0.8 | 0.8 | 200.8 | 0 | 22.0 | 4.9E-07 |
| 8/28/17 | 8 | 33 | 0.850 | 1.5 | 1.7 | 199.1 | 0 | 22.0 | 3.5E-07 |
| 8/28/17 | 9 | 1 | 1.317 | 2.3 | 2.4 | 197.3 | 0 | 22.0 | 3.9E-07 |
| 8/28/17 | 9 | 24 | 1.700 | 3.0 | 3.1 | 195.7 | 0 | 22.0 | 4.2E-07 |
| 8/28/17 | 9 | 59 | 2.283 | 4.0 | 4.1 | 193.5 | 0 | 22.1 | 3.9E-07 |
| 8/28/17 | 10 | 38 | 2.933 | 5.1 | 5.1 | 191.1 | 0 | 22.1 | 3.9E-07 |
| 8/28/17 | 11 | 9 | 3.450 | 5.9 | 6.0 | 189.2 | 1 | 22.1 | 3.8E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

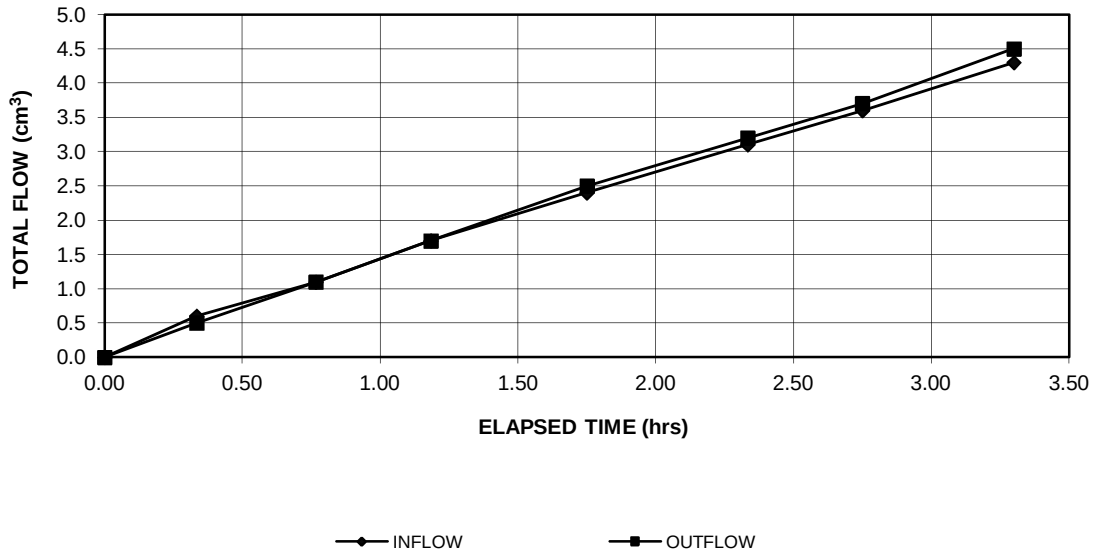
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-002 | Avg. Conf. Pressure (psi): | 6.25 |

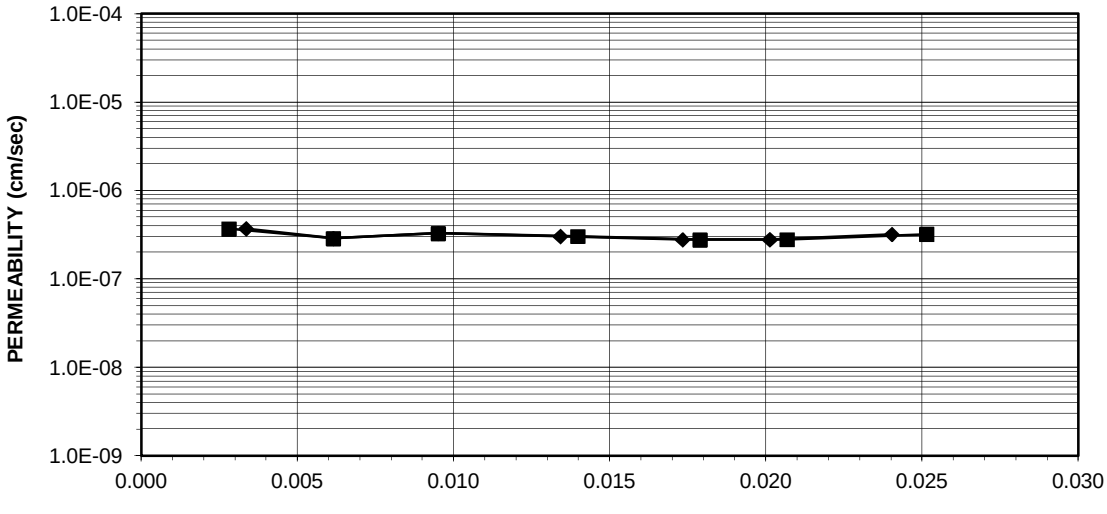
**AVERAGE PERMEABILITY = 2.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 2.9E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-002 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 552 | 1718 |
| Weight of Tare & Wet Sample (g) | 525.50 | 720.85 |
| Weight of Tare & Dry Sample (g) | 422.54 | 563.72 |
| Weight of Tare (g) | 81.19 | 82.01 |
| Weight of Water (g) | 102.96 | 157.13 |
| Weight of Dry Sample (g) | 341.35 | 481.71 |
| Moisture Content (%) | **30.2** | **32.6** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 634.53 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 634.53 | 646.51 |
| Length 1 (in) | 3.118 | 3.102 |
| Length 2 (in) | 3.120 | 3.111 |
| Length 3 (in) | 3.128 | 3.104 |
| Top Diameter (in) | 3.000 | 2.999 |
| Middle Diameter (in) | 3.008 | 3.000 |
| Bottom Diameter (in) | 2.990 | 2.998 |
| Average Length (in) | 3.12 | 3.11 |
| Average Area ($in^2$) | 7.07 | 7.06 |
| Sample Volume ($cm^3$) | 361.47 | 359.50 |
| Unit Wet Weight ($g/cm^3$) | 1.76 | 1.80 |
| Unit Wet Weight (pcf) | 109.6 | 112.3 |
| Unit Dry Weight (pcf) | 84.2 | 84.6 |
| Unit Dry Weight ($g/cm^3$) | 1.35 | 1.36 |
| Void Ratio, e | 1.00 | 0.99 |
| Porosity, n | 0.50 | 0.50 |
| Pore Volume ($cm^3$) | 180.9 | 178.9 |
| Total Weight of Sample After Test (g) | | 643.96 |

Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-002 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.28 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.89 |
| Sample Diameter (cm) | 7.62 |
| Sample Area ($cm^2$), A | 45.57 |
| Inflow Burette Area ($cm^2$), a-in | 0.890 |
| Outflow Burette Area ($cm^2$), a-out | 0.873 |
| B Parameter (%) | 97 |

**AVERAGE PERMEABILITY = 2.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 2.9E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/11/17 | 11 | 15 | 0.000 | 0.0 | 0.0 | 203.4 | 0 | 22.3 | NA |
| 8/11/17 | 11 | 35 | 0.333 | 0.6 | 0.5 | 202.1 | 0 | 22.3 | 3.7E-07 |
| 8/11/17 | 12 | 1 | 0.767 | 1.1 | 1.1 | 200.9 | 0 | 22.3 | 2.9E-07 |
| 8/11/17 | 12 | 26 | 1.183 | 1.7 | 1.7 | 199.5 | 0 | 22.3 | 3.3E-07 |
| 8/11/17 | 13 | 0 | 1.750 | 2.4 | 2.5 | 197.8 | 0 | 22.3 | 3.0E-07 |
| 8/11/17 | 13 | 35 | 2.333 | 3.1 | 3.2 | 196.2 | 0 | 22.3 | 2.8E-07 |
| 8/11/17 | 14 | 0 | 2.750 | 3.6 | 3.7 | 195.1 | 0 | 22.3 | 2.8E-07 |
| 8/11/17 | 14 | 33 | 3.300 | 4.3 | 4.5 | 193.4 | 1 | 22.3 | 3.2E-07 |

Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

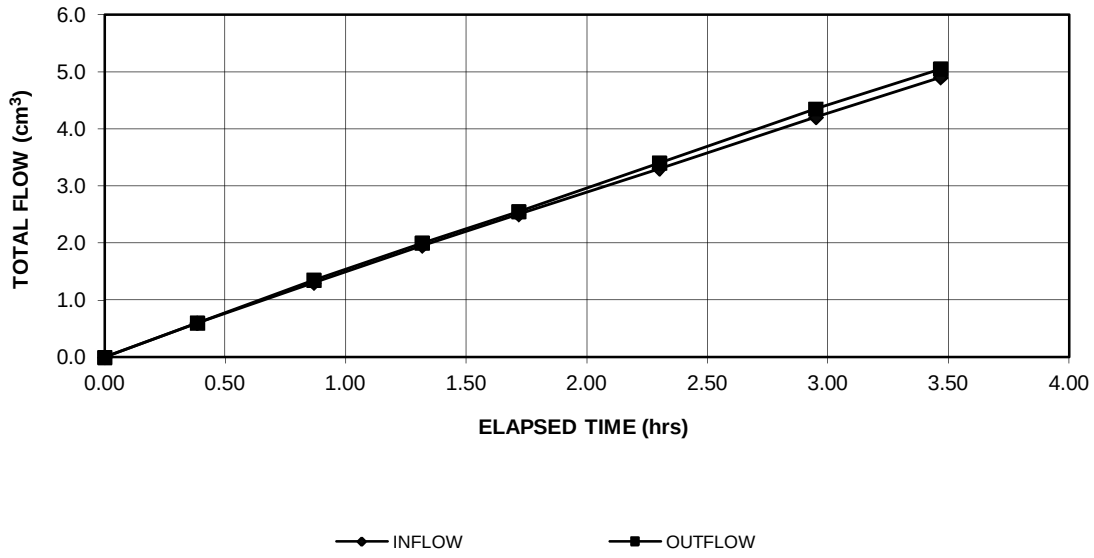
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-003 | Avg. Conf. Pressure (psi): | 6.25 |

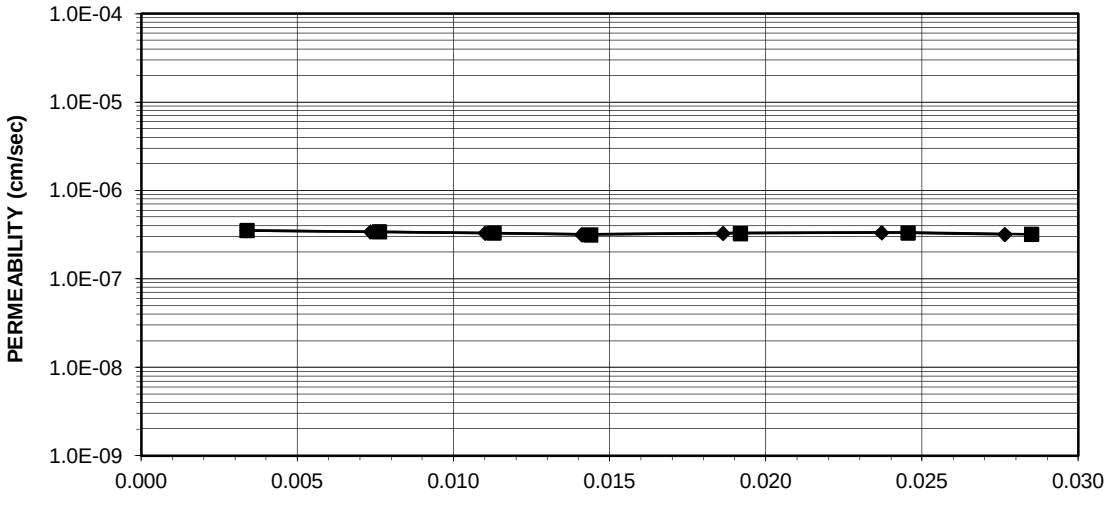
**AVERAGE PERMEABILITY = 3.3E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.3E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-003 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 872 | 1504 |
| Weight of Tare & Wet Sample (g) | 670.87 | 788.39 |
| Weight of Tare & Dry Sample (g) | 539.07 | 633.28 |
| Weight of Tare (g) | 110.39 | 148.15 |
| Weight of Water (g) | 131.80 | 155.11 |
| Weight of Dry Sample (g) | 428.68 | 485.13 |
| Moisture Content (%) | **30.7** | **32.0** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 631.19 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 631.19 | 637.11 |
| Length 1 (in) | 3.104 | 3.078 |
| Length 2 (in) | 3.108 | 3.083 |
| Length 3 (in) | 3.096 | 3.081 |
| Top Diameter (in) | 3.005 | 2.991 |
| Middle Diameter (in) | 3.006 | 2.998 |
| Bottom Diameter (in) | 3.001 | 3.001 |
| Average Length (in) | 3.10 | 3.08 |
| Average Area ($in^2$) | 7.09 | 7.05 |
| Sample Volume ($cm^3$) | 360.35 | 356.05 |
| Unit Wet Weight ($g/cm^3$) | 1.75 | 1.79 |
| Unit Wet Weight (pcf) | 109.3 | 111.7 |
| Unit Dry Weight (pcf) | 83.6 | 84.6 |
| Unit Dry Weight ($g/cm^3$) | 1.34 | 1.36 |
| Void Ratio, e | 1.02 | 0.99 |
| Porosity, n | 0.50 | 0.50 |
| Pore Volume ($cm^3$) | 181.6 | 177.3 |
| Total Weight of Sample After Test (g) | | 641.17 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-003 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.46 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.82 |
| Sample Diameter (cm) | 7.61 |
| Sample Area ($cm^2$), A | 45.50 |
| Inflow Burette Area ($cm^2$), a-in | 0.907 |
| Outflow Burette Area ($cm^2$), a-out | 0.904 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 3.3E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.3E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 7 | 41 | 0.000 | 0.0 | 0.0 | 202.5 | 0 | 22.0 | NA |
| 8/28/17 | 8 | 4 | 0.383 | 0.6 | 0.6 | 201.1 | 0 | 22.0 | 3.5E-07 |
| 8/28/17 | 8 | 33 | 0.867 | 1.3 | 1.4 | 199.5 | 0 | 22.0 | 3.4E-07 |
| 8/28/17 | 9 | 0 | 1.317 | 2.0 | 2.0 | 198.1 | 0 | 22.0 | 3.3E-07 |
| 8/28/17 | 9 | 24 | 1.717 | 2.5 | 2.6 | 196.9 | 0 | 22.0 | 3.2E-07 |
| 8/28/17 | 9 | 59 | 2.300 | 3.3 | 3.4 | 195.0 | 0 | 22.1 | 3.3E-07 |
| 8/28/17 | 10 | 38 | 2.950 | 4.2 | 4.4 | 193.0 | 0 | 22.1 | 3.3E-07 |
| 8/28/17 | 11 | 9 | 3.467 | 4.9 | 5.1 | 191.4 | 1 | 22.1 | 3.2E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

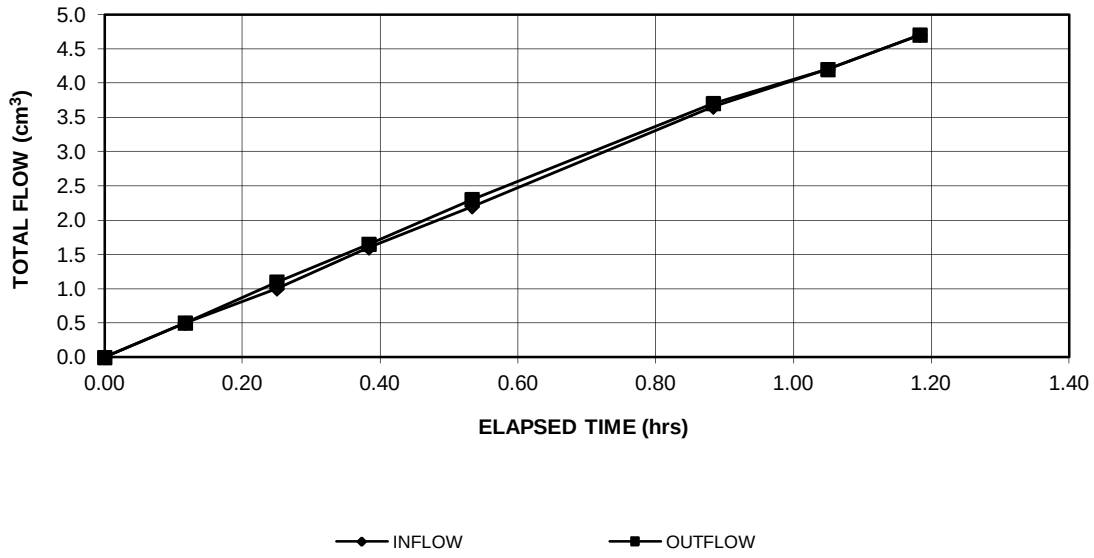
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-005 | Avg. Conf. Pressure (psi): | 6.25 |

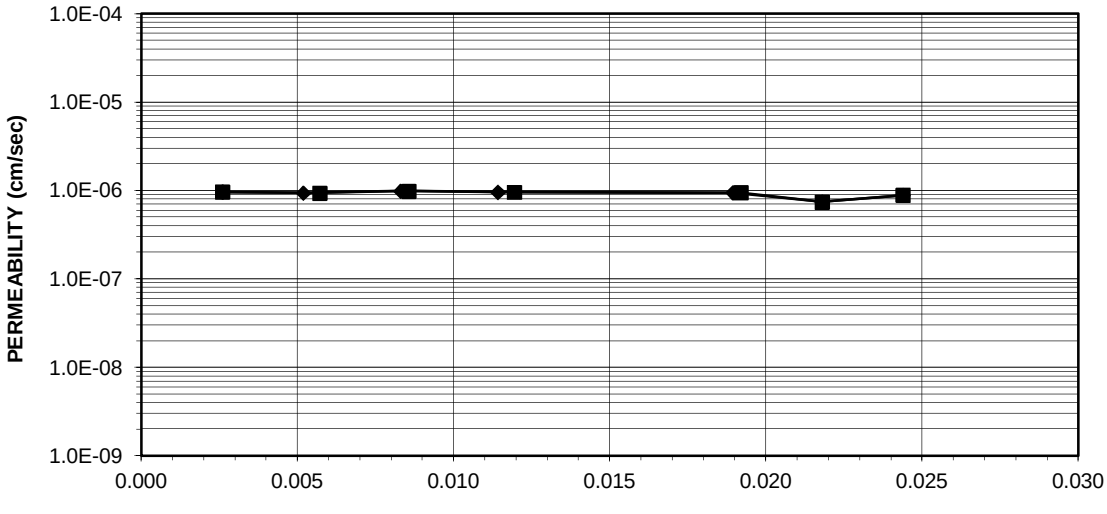
**AVERAGE PERMEABILITY = 8.8E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 8.8E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-005 | Avg. Conf. Pressure (psi): | 6.25 |

Specific Gravity: 2.70 Assumed

Sample Condition: Previously Remolded

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 913 | 542 |
| Weight of Tare & Wet Sample (g) | 637.37 | 703.85 |
| Weight of Tare & Dry Sample (g) | 504.29 | 539.67 |
| Weight of Tare (g) | 110.52 | 82.10 |
| Weight of Water (g) | 133.08 | 164.18 |
| Weight of Dry Sample (g) | 393.77 | 457.57 |
| Moisture Content (%) | **33.8** | **35.9** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 607.75 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 607.75 | 617.22 |
| Length 1 (in) | 3.117 | 3.108 |
| Length 2 (in) | 3.112 | 3.109 |
| Length 3 (in) | 3.114 | 3.111 |
| Top Diameter (in) | 3.008 | 3.001 |
| Middle Diameter (in) | 3.004 | 3.004 |
| Bottom Diameter (in) | 3.000 | 3.005 |
| Average Length (in) | 3.11 | 3.11 |
| Average Area ($in^2$) | 7.09 | 7.08 |
| Sample Volume ($cm^3$) | 361.71 | 360.97 |
| Unit Wet Weight ($g/cm^3$) | 1.68 | 1.71 |
| Unit Wet Weight (pcf) | 104.9 | 106.7 |
| Unit Dry Weight (pcf) | 78.4 | 78.6 |
| Unit Dry Weight ($g/cm^3$) | 1.26 | 1.26 |
| Void Ratio, e | 1.15 | 1.15 |
| Porosity, n | 0.53 | 0.53 |
| Pore Volume ($cm^3$) | 193.5 | 192.7 |
| Total Weight of Sample After Test (g) | | 622.12 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-005 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.25 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.90 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.71 |
| Inflow Burette Area ($cm^2$), a-in | 0.852 |
| Outflow Burette Area ($cm^2$), a-out | 0.862 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 8.8E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 8.8E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/25/17 | 8 | 26 | 0.000 | 0.0 | 0.0 | 203.7 | 0 | 21.9 | NA |
| 8/25/17 | 8 | 33 | 0.117 | 0.5 | 0.5 | 202.5 | 0 | 21.9 | 9.7E-07 |
| 8/25/17 | 8 | 41 | 0.250 | 1.0 | 1.1 | 201.3 | 0 | 21.9 | 9.3E-07 |
| 8/25/17 | 8 | 49 | 0.383 | 1.6 | 1.7 | 199.9 | 0 | 21.9 | 9.8E-07 |
| 8/25/17 | 8 | 58 | 0.533 | 2.2 | 2.3 | 198.5 | 0 | 21.9 | 9.6E-07 |
| 8/25/17 | 9 | 19 | 0.883 | 3.7 | 3.7 | 195.1 | 0 | 21.9 | 9.5E-07 |
| 8/25/17 | 9 | 29 | 1.050 | 4.2 | 4.2 | 193.9 | 0 | 21.9 | 7.4E-07 |
| 8/25/17 | 9 | 37 | 1.183 | 4.7 | 4.7 | 192.8 | 1 | 21.9 | 8.9E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

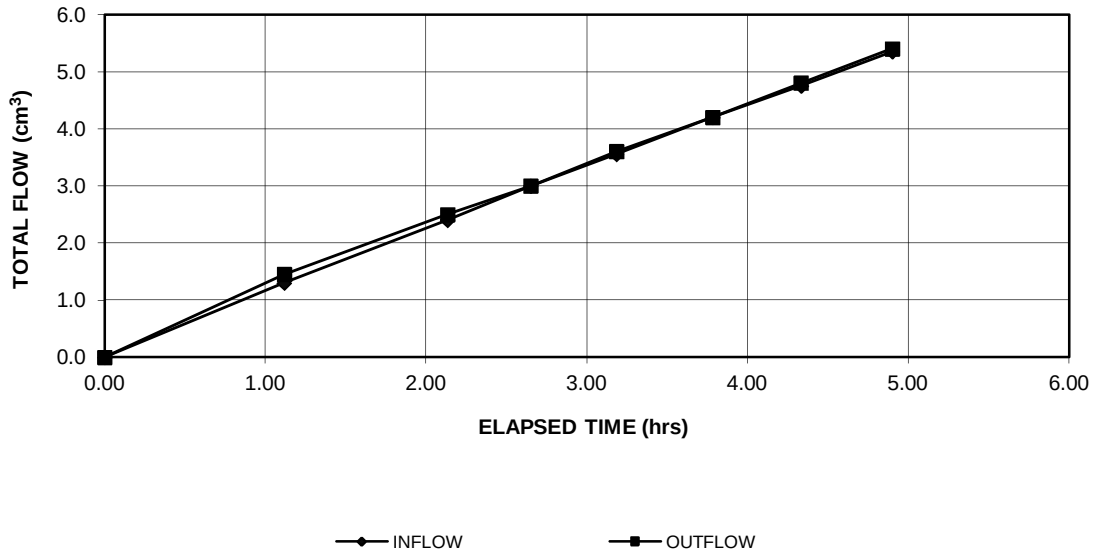
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-006 | Avg. Conf. Pressure (psi): | 6.25 |

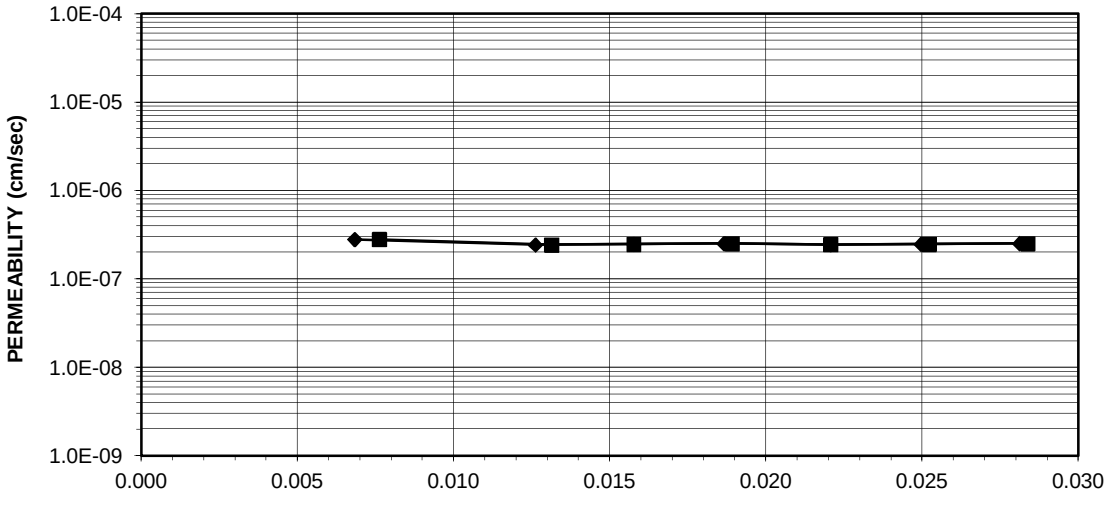
**AVERAGE PERMEABILITY = 2.5E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 2.5E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-006 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 203 | 615 |
| Weight of Tare & Wet Sample (g) | 647.77 | 712.21 |
| Weight of Tare & Dry Sample (g) | 510.40 | 546.00 |
| Weight of Tare (g) | 98.82 | 83.97 |
| Weight of Water (g) | 137.37 | 166.21 |
| Weight of Dry Sample (g) | 411.58 | 462.03 |
| Moisture Content (%) | **33.4** | **36.0** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 614.75 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 614.75 | 626.72 |
| Length 1 (in) | 3.096 | 3.090 |
| Length 2 (in) | 3.108 | 3.096 |
| Length 3 (in) | 3.122 | 3.096 |
| Top Diameter (in) | 3.005 | 3.014 |
| Middle Diameter (in) | 3.005 | 3.011 |
| Bottom Diameter (in) | 3.010 | 3.008 |
| Average Length (in) | 3.11 | 3.09 |
| Average Area ($in^2$) | 7.10 | 7.12 |
| Sample Volume ($cm^3$) | 361.69 | 361.02 |
| Unit Wet Weight ($g/cm^3$) | 1.70 | 1.74 |
| Unit Wet Weight (pcf) | 106.1 | 108.4 |
| Unit Dry Weight (pcf) | 79.5 | 79.7 |
| Unit Dry Weight ($g/cm^3$) | 1.27 | 1.28 |
| Void Ratio, e | 1.12 | 1.11 |
| Porosity, n | 0.53 | 0.53 |
| Pore Volume ($cm^3$) | 191.0 | 190.3 |
| Total Weight of Sample After Test (g) | | 628.68 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-006 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.36 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.86 |
| Sample Diameter (cm) | 7.65 |
| Sample Area ($cm^2$), A | 45.94 |
| Inflow Burette Area ($cm^2$), a-in | 0.968 |
| Outflow Burette Area ($cm^2$), a-out | 0.970 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 2.5E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 2.5E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/25/17 | 10 | 49 | 0.000 | 0.0 | 0.0 | 200.8 | 0 | 21.9 | NA |
| 8/25/17 | 11 | 56 | 1.117 | 1.3 | 1.5 | 197.9 | 0 | 21.9 | 2.8E-07 |
| 8/25/17 | 12 | 57 | 2.133 | 2.4 | 2.5 | 195.7 | 0 | 21.9 | 2.4E-07 |
| 8/25/17 | 13 | 28 | 2.650 | 3.0 | 3.0 | 194.6 | 0 | 21.9 | 2.5E-07 |
| 8/25/17 | 14 | 0 | 3.183 | 3.6 | 3.6 | 193.4 | 0 | 21.9 | 2.5E-07 |
| 8/25/17 | 14 | 36 | 3.783 | 4.2 | 4.2 | 192.1 | 0 | 21.9 | 2.4E-07 |
| 8/25/17 | 15 | 9 | 4.333 | 4.8 | 4.8 | 190.9 | 0 | 21.9 | 2.5E-07 |
| 8/25/17 | 15 | 43 | 4.900 | 5.4 | 5.4 | 189.7 | 1 | 21.9 | 2.5E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

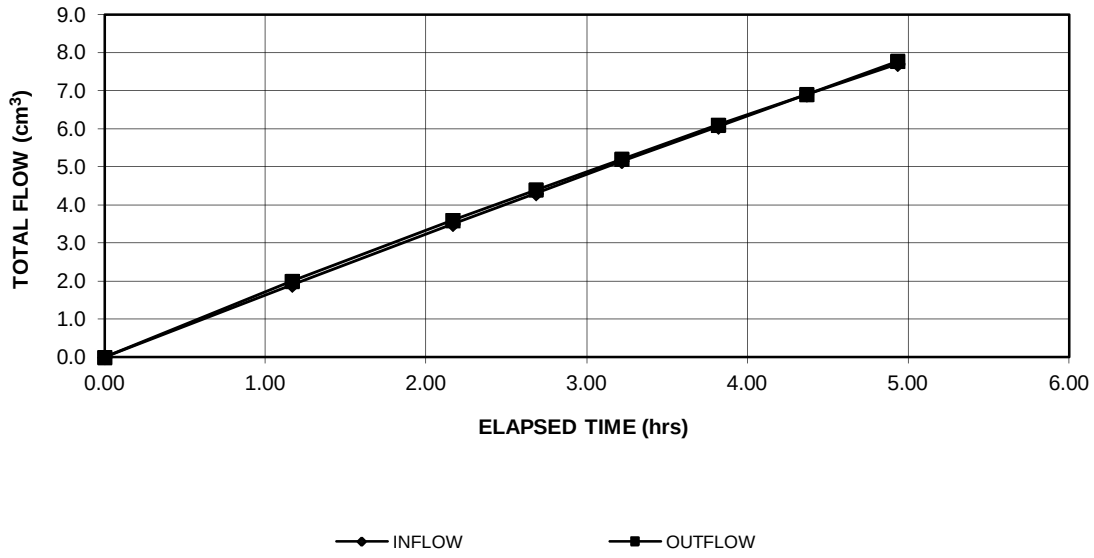
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-007 | Avg. Conf. Pressure (psi): | 6.25 |

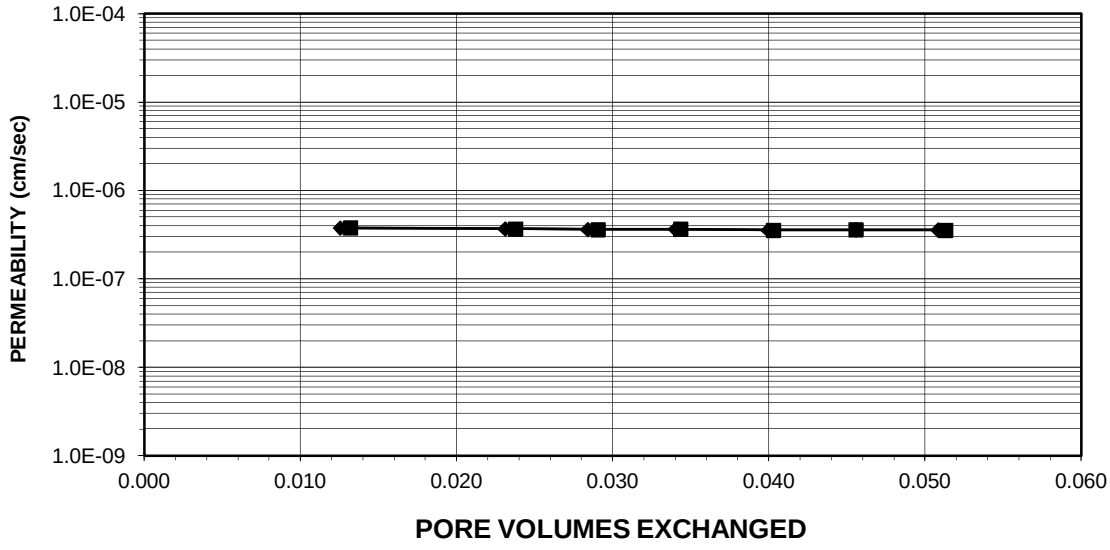
**AVERAGE PERMEABILITY = 3.6E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.6E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-007 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Dark Brown Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1699 | 562 |
| Weight of Tare & Wet Sample (g) | 693.40 | 777.64 |
| Weight of Tare & Dry Sample (g) | 577.51 | 639.46 |
| Weight of Tare (g) | 83.45 | 84.22 |
| Weight of Water (g) | 115.89 | 138.18 |
| Weight of Dry Sample (g) | 494.06 | 555.24 |
| Moisture Content (%) | **23.5** | **24.9** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 681.28 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 681.28 | 689.17 |
| Length 1 (in) | 3.072 | 3.050 |
| Length 2 (in) | 3.078 | 3.070 |
| Length 3 (in) | 3.061 | 3.060 |
| Top Diameter (in) | 3.006 | 3.002 |
| Middle Diameter (in) | 3.008 | 3.006 |
| Bottom Diameter (in) | 3.004 | 3.010 |
| Average Length (in) | 3.07 | 3.06 |
| Average Area ($in^2$) | 7.10 | 7.10 |
| Sample Volume ($cm^3$) | 357.07 | 355.87 |
| Unit Wet Weight ($g/cm^3$) | 1.91 | 1.94 |
| Unit Wet Weight (pcf) | 119.1 | 120.9 |
| Unit Dry Weight (pcf) | 96.5 | 96.8 |
| Unit Dry Weight ($g/cm^3$) | 1.55 | 1.55 |
| Void Ratio, e | 0.75 | 0.74 |
| Porosity, n | 0.43 | 0.43 |
| Pore Volume ($cm^3$) | 152.7 | 151.5 |
| Total Weight of Sample After Test (g) | | 694.89 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-007 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.61 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.77 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.79 |
| Inflow Burette Area ($cm^2$), a-in | 0.890 |
| Outflow Burette Area ($cm^2$), a-out | 0.911 |
| B Parameter (%) | 96 |

**AVERAGE PERMEABILITY = 3.6E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.6E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/25/17 | 10 | 47 | 0.000 | 0.0 | 0.0 | 202.8 | 0 | 21.9 | NA |
| 8/25/17 | 11 | 57 | 1.167 | 1.9 | 2.0 | 198.4 | 0 | 21.9 | 3.8E-07 |
| 8/25/17 | 12 | 57 | 2.167 | 3.5 | 3.6 | 194.8 | 0 | 21.9 | 3.7E-07 |
| 8/25/17 | 13 | 28 | 2.683 | 4.3 | 4.4 | 193.0 | 0 | 21.9 | 3.6E-07 |
| 8/25/17 | 14 | 0 | 3.217 | 5.2 | 5.2 | 191.2 | 0 | 21.9 | 3.6E-07 |
| 8/25/17 | 14 | 36 | 3.817 | 6.1 | 6.1 | 189.2 | 0 | 21.9 | 3.6E-07 |
| 8/25/17 | 15 | 9 | 4.367 | 6.9 | 6.9 | 187.3 | 0 | 21.9 | 3.6E-07 |
| 8/25/17 | 15 | 43 | 4.933 | 7.7 | 7.8 | 185.5 | 1 | 21.9 | 3.6E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/28/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

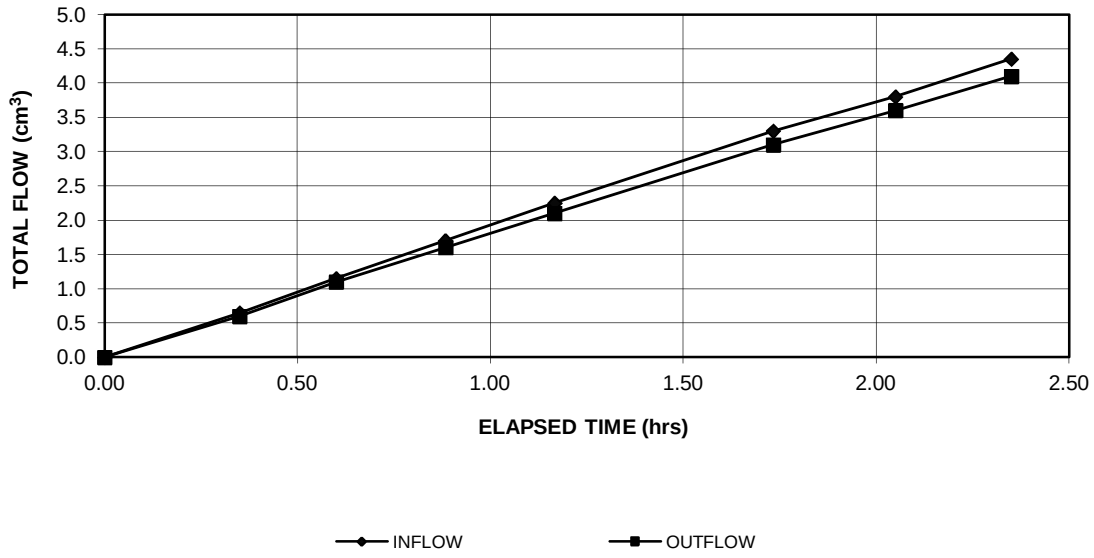
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-009 | Avg. Conf. Pressure (psi): | 6.25 |

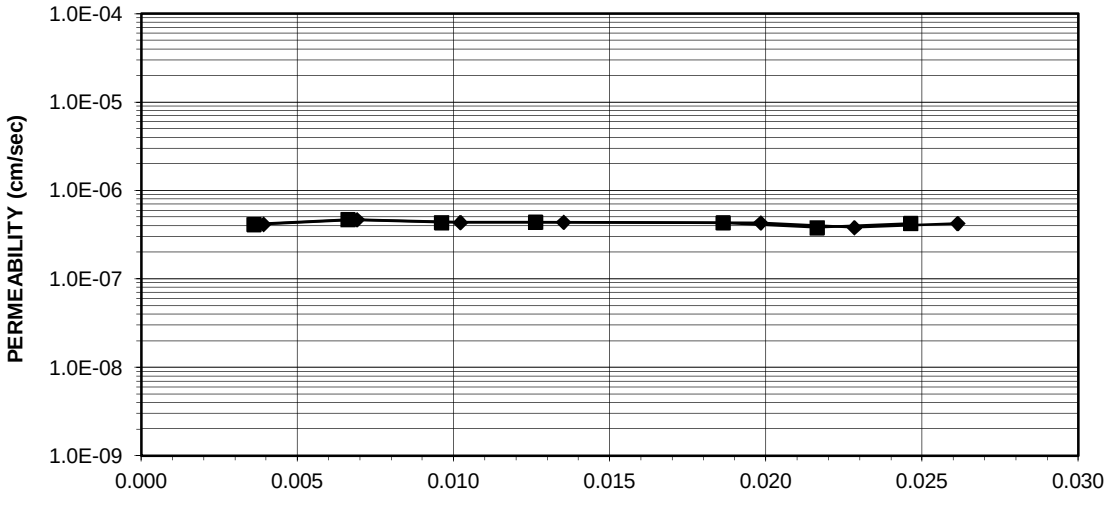
**AVERAGE PERMEABILITY = 4.2E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 4.2E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-009 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 882 | 1128 |
| Weight of Tare & Wet Sample (g) | 627.32 | 792.06 |
| Weight of Tare & Dry Sample (g) | 525.81 | 649.41 |
| Weight of Tare (g) | 110.19 | 84.96 |
| Weight of Water (g) | 101.51 | 142.65 |
| Weight of Dry Sample (g) | 415.62 | 564.45 |
| Moisture Content (%) | **24.4** | **25.3** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 695.34 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 695.34 | 700.08 |
| Length 1 (in) | 3.194 | 3.193 |
| Length 2 (in) | 3.211 | 3.213 |
| Length 3 (in) | 3.201 | 3.202 |
| Top Diameter (in) | 3.002 | 3.008 |
| Middle Diameter (in) | 3.008 | 3.010 |
| Bottom Diameter (in) | 3.015 | 3.012 |
| Average Length (in) | 3.20 | 3.20 |
| Average Area ($in^2$) | 7.11 | 7.12 |
| Sample Volume ($cm^3$) | 372.96 | 373.45 |
| Unit Wet Weight ($g/cm^3$) | 1.86 | 1.87 |
| Unit Wet Weight (pcf) | 116.4 | 117.0 |
| Unit Dry Weight (pcf) | 93.5 | 93.4 |
| Unit Dry Weight ($g/cm^3$) | 1.50 | 1.50 |
| Void Ratio, e | 0.80 | 0.80 |
| Porosity, n | 0.45 | 0.45 |
| Pore Volume ($cm^3$) | 166.0 | 166.5 |
| Total Weight of Sample After Test (g) | | 709.51 |

Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-009 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 21.61 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 8.13 |
| Sample Diameter (cm) | 7.65 |
| Sample Area ($cm^2$), A | 45.91 |
| Inflow Burette Area ($cm^2$), a-in | 0.960 |
| Outflow Burette Area ($cm^2$), a-out | 0.882 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 4.2E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 4.2E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/11/17 | 11 | 15 | 0.000 | 0.0 | 0.0 | 200.5 | 0 | 22.3 | NA |
| 8/11/17 | 11 | 36 | 0.350 | 0.7 | 0.6 | 199.1 | 0 | 22.3 | 4.2E-07 |
| 8/11/17 | 11 | 51 | 0.600 | 1.2 | 1.1 | 198.0 | 0 | 22.3 | 4.7E-07 |
| 8/11/17 | 12 | 8 | 0.883 | 1.7 | 1.6 | 196.9 | 0 | 22.3 | 4.4E-07 |
| 8/11/17 | 12 | 25 | 1.167 | 2.3 | 2.1 | 195.7 | 0 | 22.3 | 4.4E-07 |
| 8/11/17 | 12 | 59 | 1.733 | 3.3 | 3.1 | 193.5 | 0 | 22.3 | 4.3E-07 |
| 8/11/17 | 13 | 18 | 2.050 | 3.8 | 3.6 | 192.4 | 0 | 22.3 | 3.8E-07 |
| 8/11/17 | 13 | 36 | 2.350 | 4.4 | 4.1 | 191.3 | 1 | 22.3 | 4.2E-07 |

Tested By: TRE Date: 8/10/17 Checked By: KC Date: 8/14/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

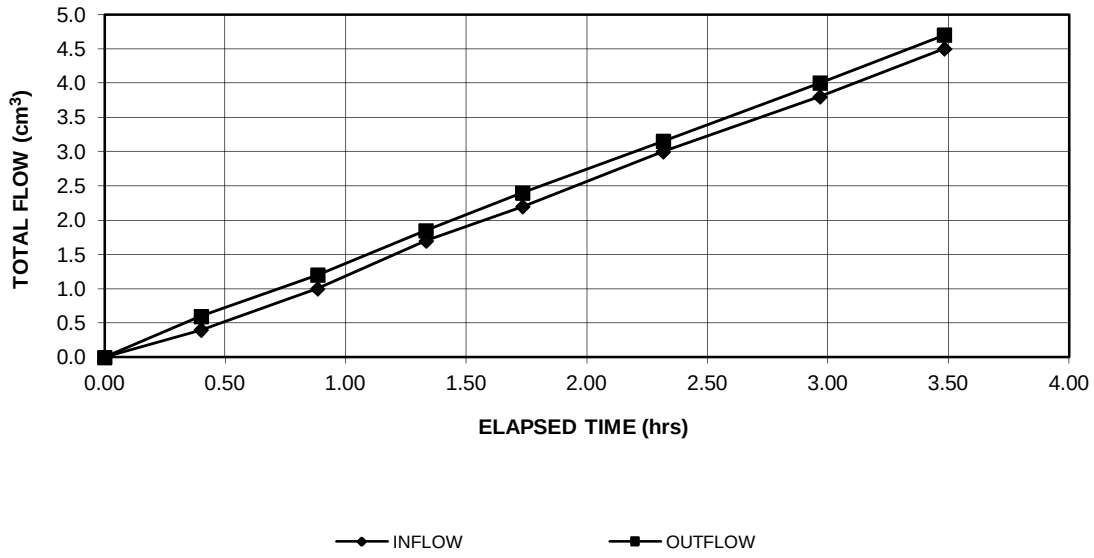
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-010 | Avg. Conf. Pressure (psi): | 6.25 |

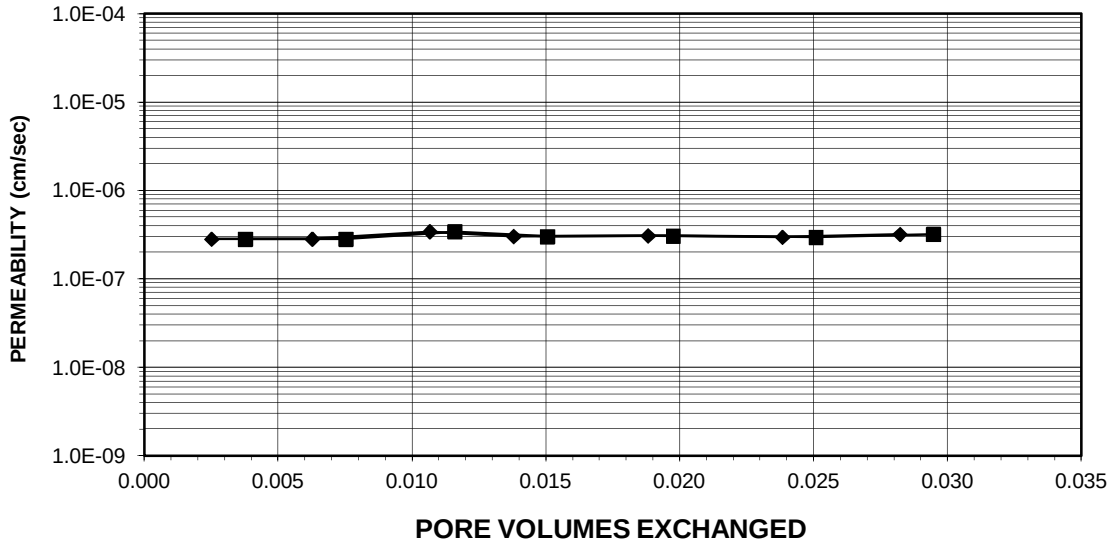
**AVERAGE PERMEABILITY = 3.1E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.1E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-010 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1741 | 1486 |
| Weight of Tare & Wet Sample (g) | 662.80 | 830.47 |
| Weight of Tare & Dry Sample (g) | 552.34 | 691.51 |
| Weight of Tare (g) | 82.96 | 145.13 |
| Weight of Water (g) | 110.46 | 138.96 |
| Weight of Dry Sample (g) | 469.38 | 546.38 |
| Moisture Content (%) | **23.5** | **25.4** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 671.24 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 671.24 | 681.56 |
| Length 1 (in) | 3.102 | 3.095 |
| Length 2 (in) | 3.099 | 3.109 |
| Length 3 (in) | 3.113 | 3.103 |
| Top Diameter (in) | 3.010 | 3.003 |
| Middle Diameter (in) | 3.005 | 3.005 |
| Bottom Diameter (in) | 3.000 | 3.009 |
| Average Length (in) | 3.10 | 3.10 |
| Average Area ($in^2$) | 7.09 | 7.10 |
| Sample Volume ($cm^3$) | 360.82 | 360.71 |
| Unit Wet Weight ($g/cm^3$) | 1.86 | 1.89 |
| Unit Wet Weight (pcf) | 116.1 | 117.9 |
| Unit Dry Weight (pcf) | 94.0 | 94.0 |
| Unit Dry Weight ($g/cm^3$) | 1.51 | 1.51 |
| Void Ratio, e | 0.79 | 0.79 |
| Porosity, n | 0.44 | 0.44 |
| Pore Volume ($cm^3$) | 159.6 | 159.5 |
| Total Weight of Sample After Test (g) | | 687.77 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17





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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-010 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.30 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.88 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.78 |
| Inflow Burette Area ($cm^2$), a-in | 0.906 |
| Outflow Burette Area ($cm^2$), a-out | 0.895 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 3.1E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 3.1E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 7 | 40 | 0.000 | 0.0 | 0.0 | 202.6 | 0 | 22.0 | NA |
| 8/28/17 | 8 | 4 | 0.400 | 0.4 | 0.6 | 201.5 | 0 | 22.0 | 2.8E-07 |
| 8/28/17 | 8 | 33 | 0.883 | 1.0 | 1.2 | 200.2 | 0 | 22.0 | 2.8E-07 |
| 8/28/17 | 9 | 0 | 1.333 | 1.7 | 1.9 | 198.7 | 0 | 22.0 | 3.4E-07 |
| 8/28/17 | 9 | 24 | 1.733 | 2.2 | 2.4 | 197.5 | 0 | 22.0 | 3.0E-07 |
| 8/28/17 | 9 | 59 | 2.317 | 3.0 | 3.2 | 195.8 | 0 | 22.1 | 3.1E-07 |
| 8/28/17 | 10 | 38 | 2.967 | 3.8 | 4.0 | 193.9 | 0 | 22.1 | 3.0E-07 |
| 8/28/17 | 11 | 9 | 3.483 | 4.5 | 4.7 | 192.4 | 1 | 22.1 | 3.2E-07 |

Tested By: JAB Date: 8/24/17 Checked By: TMP Date: 8/29/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

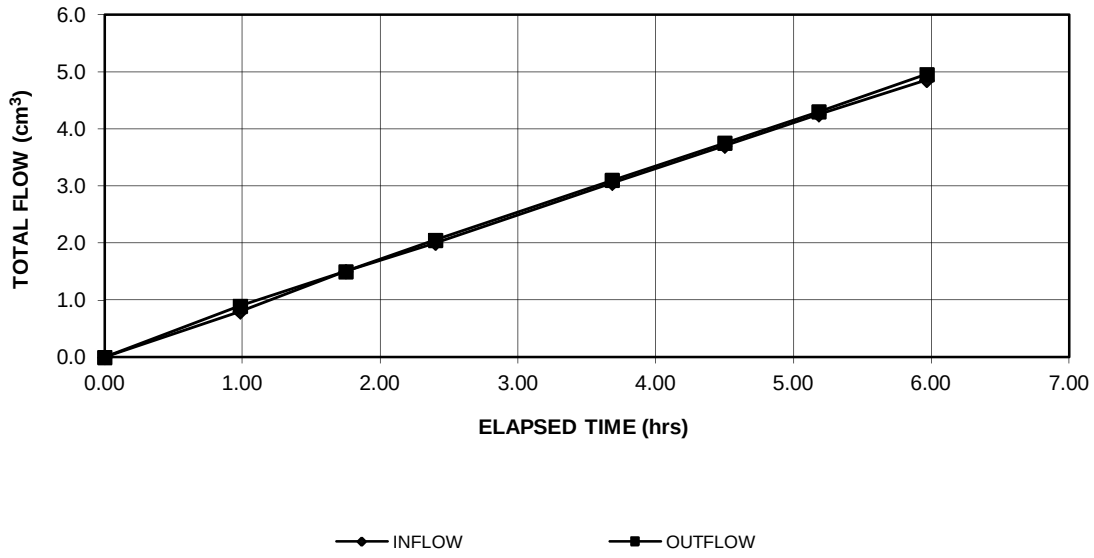
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-011 | Avg. Conf. Pressure (psi): | 16.25 |

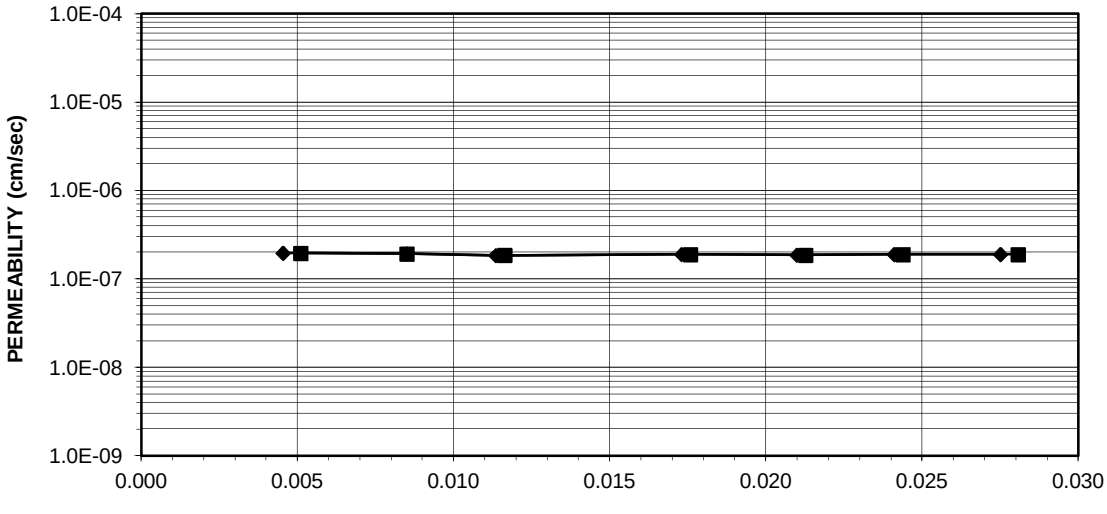
**AVERAGE PERMEABILITY = 1.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-011 | Avg. Conf. Pressure (psi): | 16.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 901 | 898 |
| Weight of Tare & Wet Sample (g) | 653.36 | 760.65 |
| Weight of Tare & Dry Sample (g) | 535.73 | 609.98 |
| Weight of Tare (g) | 110.30 | 109.78 |
| Weight of Water (g) | 117.63 | 150.67 |
| Weight of Dry Sample (g) | 425.43 | 500.20 |
| Moisture Content (%) | **27.6** | **30.1** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 636.67 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 636.67 | 649.00 |
| Length 1 (in) | 3.114 | 3.114 |
| Length 2 (in) | 3.107 | 3.096 |
| Length 3 (in) | 3.102 | 3.100 |
| Top Diameter (in) | 3.008 | 3.006 |
| Middle Diameter (in) | 3.005 | 3.007 |
| Bottom Diameter (in) | 3.007 | 3.007 |
| Average Length (in) | 3.11 | 3.10 |
| Average Area ($in^2$) | 7.10 | 7.10 |
| Sample Volume ($cm^3$) | 361.57 | 361.07 |
| Unit Wet Weight ($g/cm^3$) | 1.76 | 1.80 |
| Unit Wet Weight (pcf) | 109.9 | 112.2 |
| Unit Dry Weight (pcf) | 86.1 | 86.2 |
| Unit Dry Weight ($g/cm^3$) | 1.38 | 1.38 |
| Void Ratio, e | 0.96 | 0.95 |
| Porosity, n | 0.49 | 0.49 |
| Pore Volume ($cm^3$) | 176.8 | 176.3 |
| Total Weight of Sample After Test (g) | | 652.16 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17





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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-011 | Avg. Conf. Pressure (psi): | 16.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 85.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.30 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.88 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.81 |
| Inflow Burette Area ($cm^2$), a-in | 0.901 |
| Outflow Burette Area ($cm^2$), a-out | 0.842 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 1.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/29/17 | 9 | 38 | 0.000 | 0.0 | 0.0 | 202.9 | 0 | 22.0 | NA |
| 8/29/17 | 10 | 37 | 0.983 | 0.8 | 0.9 | 200.9 | 0 | 22.1 | 2.0E-07 |
| 8/29/17 | 11 | 23 | 1.750 | 1.5 | 1.5 | 199.4 | 0 | 22.1 | 1.9E-07 |
| 8/29/17 | 12 | 2 | 2.400 | 2.0 | 2.1 | 198.2 | 0 | 22.1 | 1.9E-07 |
| 8/29/17 | 13 | 19 | 3.683 | 3.1 | 3.1 | 195.8 | 0 | 22.1 | 1.9E-07 |
| 8/29/17 | 14 | 8 | 4.500 | 3.7 | 3.8 | 194.3 | 0 | 22.1 | 1.9E-07 |
| 8/29/17 | 14 | 49 | 5.183 | 4.3 | 4.3 | 193.0 | 0 | 22.1 | 1.9E-07 |
| 8/29/17 | 15 | 36 | 5.967 | 4.9 | 5.0 | 191.6 | 1 | 22.1 | 1.9E-07 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

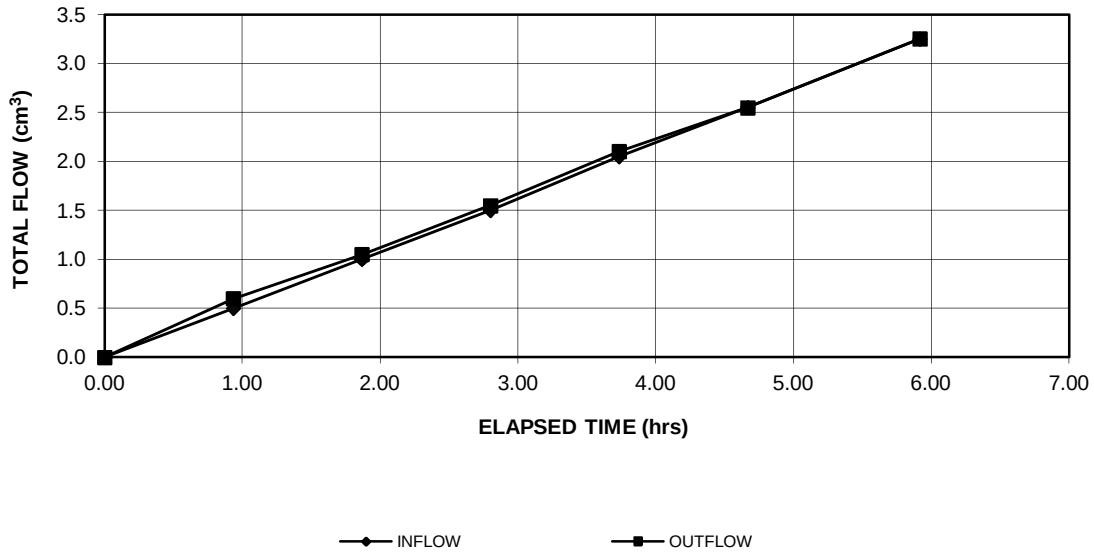
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-013 | Avg. Conf. Pressure (psi): | 6.25 |

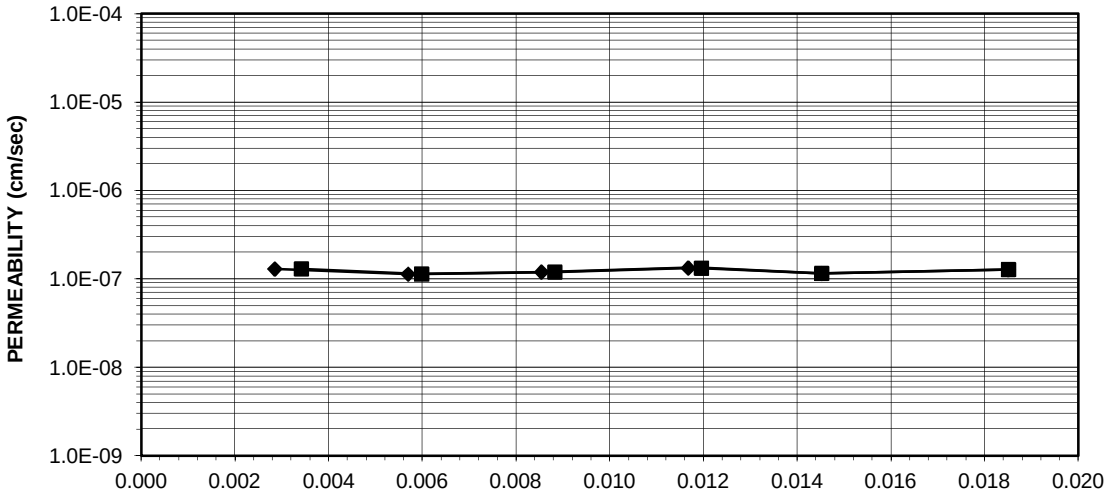
**AVERAGE PERMEABILITY = 1.2E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.2E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-013 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1460 | 1699 |
| Weight of Tare & Wet Sample (g) | 513.48 | 755.38 |
| Weight of Tare & Dry Sample (g) | 410.03 | 589.09 |
| Weight of Tare (g) | 82.63 | 83.46 |
| Weight of Water (g) | 103.45 | 166.29 |
| Weight of Dry Sample (g) | 327.40 | 505.63 |
| Moisture Content (%) | **31.6** | **32.9** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 663.06 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 663.06 | 669.56 |
| Length 1 (in) | 3.086 | 3.102 |
| Length 2 (in) | 3.093 | 3.098 |
| Length 3 (in) | 3.096 | 3.100 |
| Top Diameter (in) | 3.000 | 3.024 |
| Middle Diameter (in) | 3.010 | 3.012 |
| Bottom Diameter (in) | 3.013 | 3.004 |
| Average Length (in) | 3.09 | 3.10 |
| Average Area ($in^2$) | 7.10 | 7.13 |
| Sample Volume ($cm^3$) | 359.95 | 362.28 |
| Unit Wet Weight ($g/cm^3$) | 1.84 | 1.85 |
| Unit Wet Weight (pcf) | 115.0 | 115.4 |
| Unit Dry Weight (pcf) | 87.4 | 86.8 |
| Unit Dry Weight ($g/cm^3$) | 1.40 | 1.39 |
| Void Ratio, e | 0.93 | 0.94 |
| Porosity, n | 0.48 | 0.48 |
| Pore Volume ($cm^3$) | 173.3 | 175.7 |
| Total Weight of Sample After Test (g) | | 673.13 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-013 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.32 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.87 |
| Sample Diameter (cm) | 7.65 |
| Sample Area ($cm^2$), A | 46.01 |
| Inflow Burette Area ($cm^2$), a-in | 0.875 |
| Outflow Burette Area ($cm^2$), a-out | 0.961 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 1.2E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.2E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/14/17 | 10 | 0 | 0.000 | 0.0 | 0.0 | 202.9 | 0 | 22.2 | NA |
| 8/14/17 | 10 | 56 | 0.933 | 0.5 | 0.6 | 201.7 | 0 | 22.3 | 1.3E-07 |
| 8/14/17 | 11 | 52 | 1.867 | 1.0 | 1.1 | 200.6 | 0 | 22.3 | 1.1E-07 |
| 8/14/17 | 12 | 48 | 2.800 | 1.5 | 1.6 | 199.5 | 0 | 22.3 | 1.2E-07 |
| 8/14/17 | 13 | 44 | 3.733 | 2.1 | 2.1 | 198.3 | 0 | 22.3 | 1.3E-07 |
| 8/14/17 | 14 | 40 | 4.667 | 2.6 | 2.6 | 197.3 | 0 | 22.2 | 1.2E-07 |
| 8/14/17 | 15 | 55 | 5.917 | 3.3 | 3.3 | 195.8 | 1 | 22.2 | 1.3E-07 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

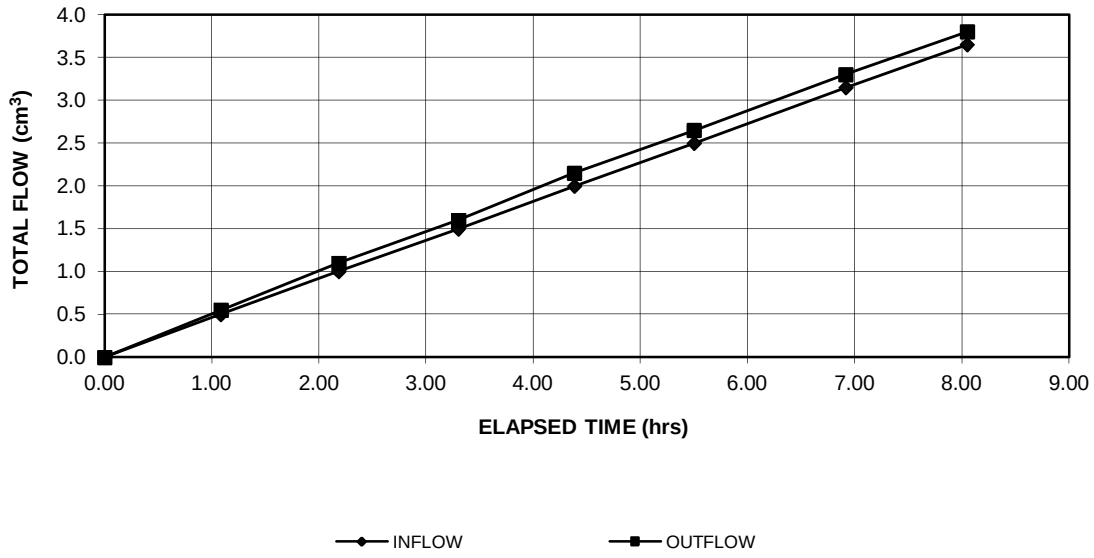
ASTM D 5084-16a

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-014 | Avg. Conf. Pressure (psi): | 6.25 |

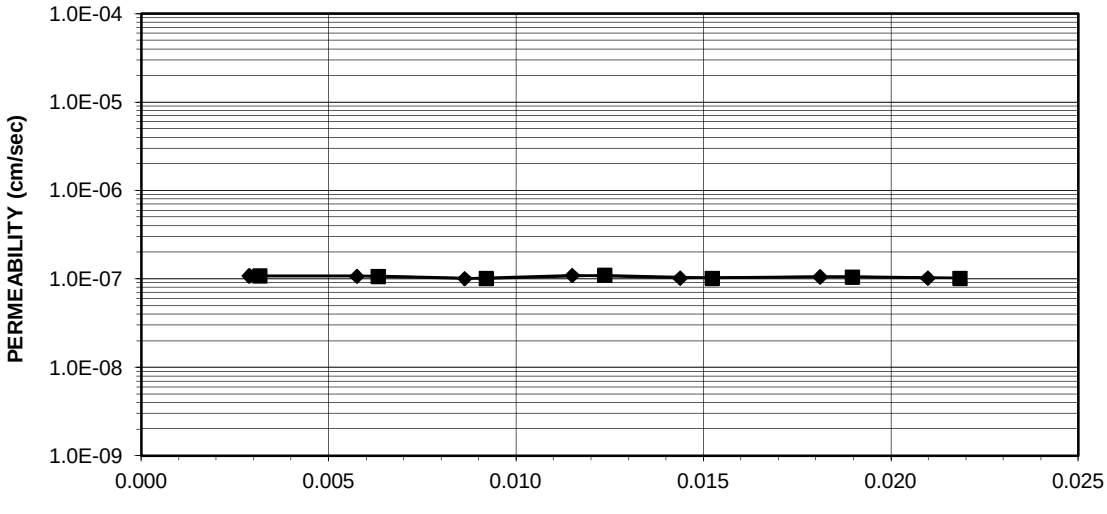
**AVERAGE PERMEABILITY = 1.1E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.1E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-16a

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-014 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 886 | 1701 |
| Weight of Tare & Wet Sample (g) | 689.44 | 751.07 |
| Weight of Tare & Dry Sample (g) | 550.39 | 585.79 |
| Weight of Tare (g) | 109.67 | 80.79 |
| Weight of Water (g) | 139.05 | 165.28 |
| Weight of Dry Sample (g) | 440.72 | 505.00 |
| Moisture Content (%) | **31.6** | **32.7** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 662.26 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 662.26 | 668.19 |
| Length 1 (in) | 3.102 | 3.104 |
| Length 2 (in) | 3.096 | 3.098 |
| Length 3 (in) | 3.093 | 3.096 |
| Top Diameter (in) | 3.001 | 3.007 |
| Middle Diameter (in) | 3.008 | 3.007 |
| Bottom Diameter (in) | 3.009 | 3.004 |
| Average Length (in) | 3.10 | 3.10 |
| Average Area ($in^2$) | 7.10 | 7.10 |
| Sample Volume ($cm^3$) | 360.17 | 360.44 |
| Unit Wet Weight ($g/cm^3$) | 1.84 | 1.85 |
| Unit Wet Weight (pcf) | 114.8 | 115.7 |
| Unit Dry Weight (pcf) | 87.2 | 87.2 |
| Unit Dry Weight ($g/cm^3$) | 1.40 | 1.40 |
| Void Ratio, e | 0.93 | 0.93 |
| Porosity, n | 0.48 | 0.48 |
| Pore Volume ($cm^3$) | 173.7 | 174.0 |
| Total Weight of Sample After Test (g) | | 671.99 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



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# PERMEABILITY TEST

ASTM D 5084-16a

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-014 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.33 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.87 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.79 |
| Inflow Burette Area ($cm^2$), a-in | 0.860 |
| Outflow Burette Area ($cm^2$), a-out | 0.888 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 1.1E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.1E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/29/17 | 7 | 32 | 0.000 | 0.0 | 0.0 | 203.2 | 0 | 22.0 | NA |
| 8/29/17 | 8 | 37 | 1.083 | 0.5 | 0.6 | 202.0 | 0 | 22.0 | 1.1E-07 |
| 8/29/17 | 9 | 43 | 2.183 | 1.0 | 1.1 | 200.8 | 0 | 22.1 | 1.1E-07 |
| 8/29/17 | 10 | 50 | 3.300 | 1.5 | 1.6 | 199.6 | 0 | 22.1 | 1.0E-07 |
| 8/29/17 | 11 | 55 | 4.383 | 2.0 | 2.2 | 198.4 | 0 | 22.2 | 1.1E-07 |
| 8/29/17 | 13 | 2 | 5.500 | 2.5 | 2.7 | 197.3 | 0 | 22.2 | 1.0E-07 |
| 8/29/17 | 14 | 27 | 6.917 | 3.2 | 3.3 | 195.8 | 0 | 22.1 | 1.1E-07 |
| 8/29/17 | 15 | 35 | 8.050 | 3.7 | 3.8 | 194.6 | 1 | 22.1 | 1.0E-07 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

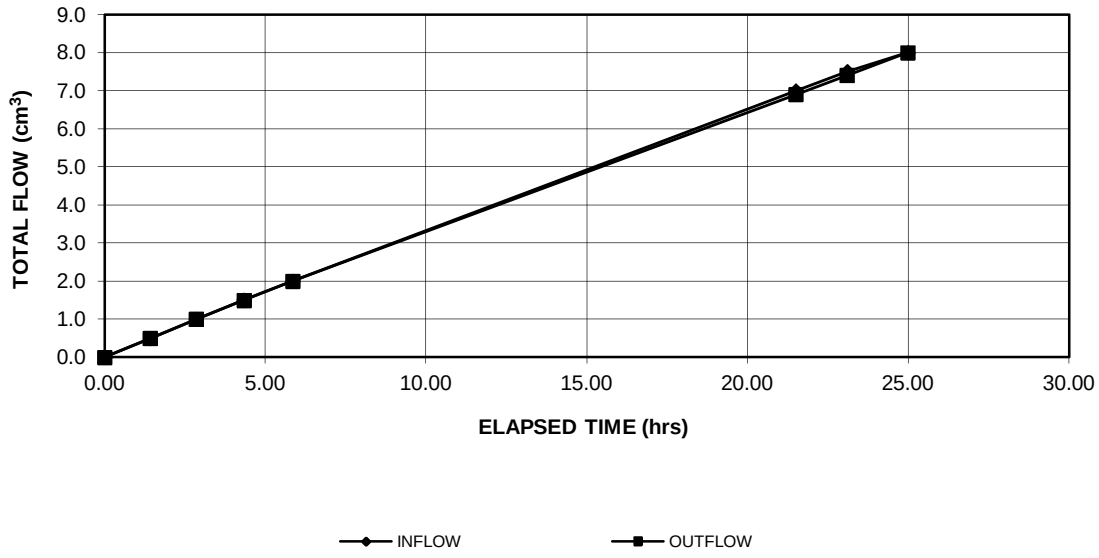
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-016 | Avg. Conf. Pressure (psi): | 6.25 |

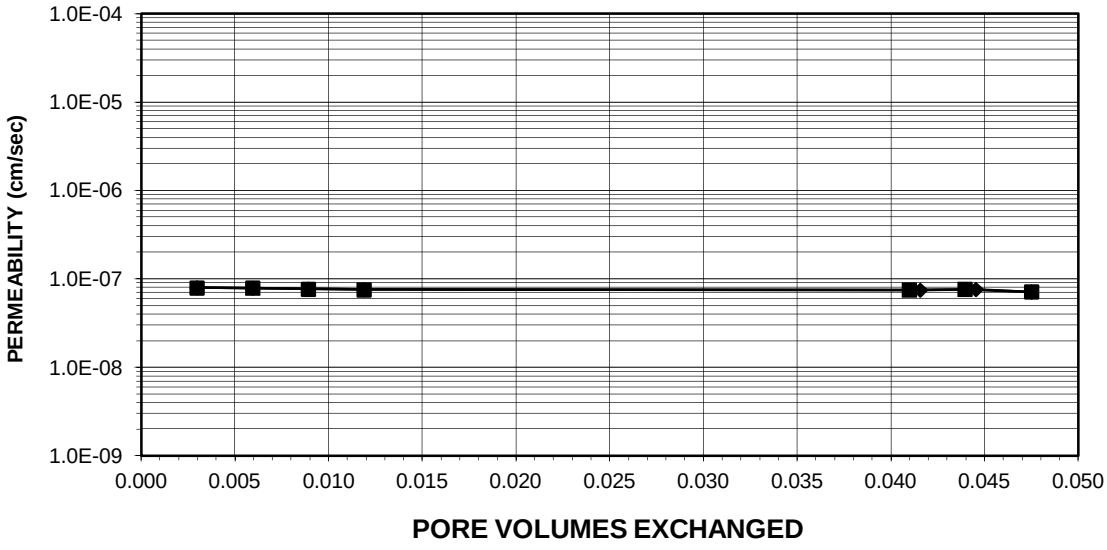
**AVERAGE PERMEABILITY = 7.5E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 7.5E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-016 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1731 | 1122 |
| Weight of Tare & Wet Sample (g) | 490.61 | 783.73 |
| Weight of Tare & Dry Sample (g) | 408.07 | 631.87 |
| Weight of Tare (g) | 83.28 | 84.13 |
| Weight of Water (g) | 82.54 | 151.86 |
| Weight of Dry Sample (g) | 324.79 | 547.74 |
| Moisture Content (%) | **25.4** | **27.7** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 686.34 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 686.34 | 698.99 |
| Length 1 (in) | 3.138 | 3.160 |
| Length 2 (in) | 3.151 | 3.162 |
| Length 3 (in) | 3.140 | 3.159 |
| Top Diameter (in) | 3.016 | 3.015 |
| Middle Diameter (in) | 3.018 | 3.022 |
| Bottom Diameter (in) | 3.024 | 3.025 |
| Average Length (in) | 3.14 | 3.16 |
| Average Area ($in^2$) | 7.16 | 7.17 |
| Sample Volume ($cm^3$) | 368.77 | 371.13 |
| Unit Wet Weight ($g/cm^3$) | 1.86 | 1.88 |
| Unit Wet Weight (pcf) | 116.2 | 117.6 |
| Unit Dry Weight (pcf) | 92.6 | 92.0 |
| Unit Dry Weight ($g/cm^3$) | 1.48 | 1.47 |
| Void Ratio, e | 0.82 | 0.83 |
| Porosity, n | 0.45 | 0.45 |
| Pore Volume ($cm^3$) | 166.1 | 168.4 |
| Total Weight of Sample After Test (g) | | 700.96 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-016 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 21.89 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 8.03 |
| Sample Diameter (cm) | 7.67 |
| Sample Area ($cm^2$), A | 46.23 |
| Inflow Burette Area ($cm^2$), a-in | 0.898 |
| Outflow Burette Area ($cm^2$), a-out | 0.899 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 7.5E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 7.5E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/14/17 | 10 | 20 | 0.000 | 0.0 | 0.0 | 202.4 | 0 | 22.2 | NA |
| 8/14/17 | 11 | 45 | 1.417 | 0.5 | 0.5 | 201.3 | 0 | 22.3 | 7.9E-08 |
| 8/14/17 | 13 | 11 | 2.850 | 1.0 | 1.0 | 200.1 | 0 | 22.3 | 7.9E-08 |
| 8/14/17 | 14 | 40 | 4.333 | 1.5 | 1.5 | 199.0 | 0 | 22.2 | 7.7E-08 |
| 8/14/17 | 16 | 11 | 5.850 | 2.0 | 2.0 | 197.9 | 0 | 22.2 | 7.6E-08 |
| 8/15/17 | 7 | 50 | 21.500 | 7.0 | 6.9 | 187.0 | 0 | 22.0 | 7.5E-08 |
| 8/15/17 | 9 | 26 | 23.100 | 7.5 | 7.4 | 185.9 | 0 | 22.1 | 7.6E-08 |
| 8/15/17 | 11 | 19 | 24.983 | 8.0 | 8.0 | 184.7 | 1 | 22.2 | 7.2E-08 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/16/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

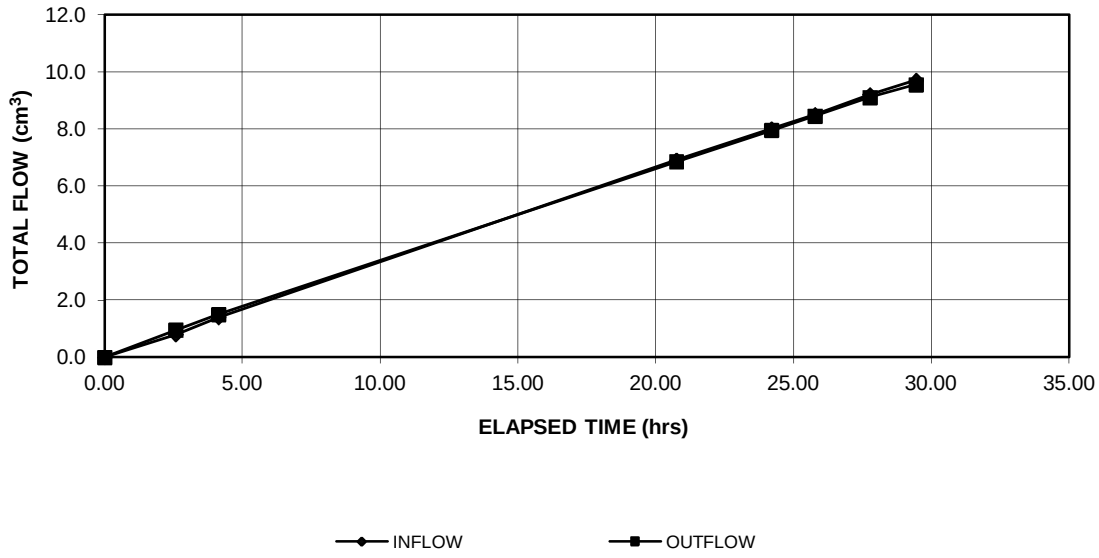
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-017 | Avg. Conf. Pressure (psi): | 6.25 |

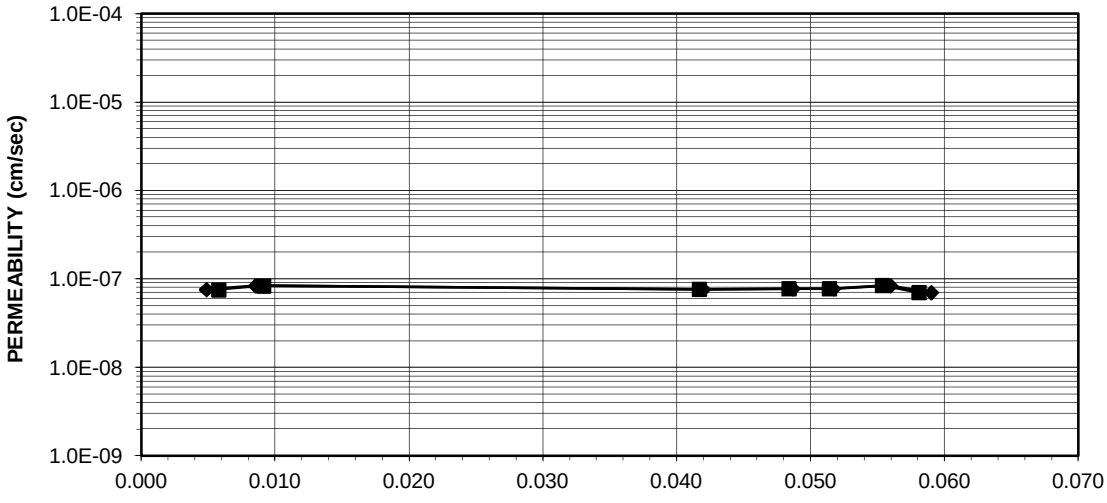
**AVERAGE PERMEABILITY = 7.7E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 7.7E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-017 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 610 | 912 |
| Weight of Tare & Wet Sample (g) | 661.12 | 795.57 |
| Weight of Tare & Dry Sample (g) | 540.27 | 647.02 |
| Weight of Tare (g) | 83.09 | 110.45 |
| Weight of Water (g) | 120.85 | 148.55 |
| Weight of Dry Sample (g) | 457.18 | 536.57 |
| Moisture Content (%) | **26.4** | **27.7** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 673.01 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 673.01 | 679.67 |
| Length 1 (in) | 3.096 | 3.101 |
| Length 2 (in) | 3.090 | 3.094 |
| Length 3 (in) | 3.099 | 3.096 |
| Top Diameter (in) | 3.011 | 3.011 |
| Middle Diameter (in) | 3.012 | 3.014 |
| Bottom Diameter (in) | 3.000 | 3.010 |
| Average Length (in) | 3.10 | 3.10 |
| Average Area ($in^2$) | 7.10 | 7.12 |
| Sample Volume ($cm^3$) | 360.34 | 361.53 |
| Unit Wet Weight ($g/cm^3$) | 1.87 | 1.88 |
| Unit Wet Weight (pcf) | 116.6 | 117.4 |
| Unit Dry Weight (pcf) | 92.2 | 91.9 |
| Unit Dry Weight ($g/cm^3$) | 1.48 | 1.47 |
| Void Ratio, e | 0.83 | 0.83 |
| Porosity, n | 0.45 | 0.45 |
| Pore Volume ($cm^3$) | 163.2 | 164.4 |
| Total Weight of Sample After Test (g) | | 678.20 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-5 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-017 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.34 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.87 |
| Sample Diameter (cm) | 7.65 |
| Sample Area ($cm^2$), A | 45.96 |
| Inflow Burette Area ($cm^2$), a-in | 0.889 |
| Outflow Burette Area ($cm^2$), a-out | 0.867 |
| B Parameter (%) | 98 |

**AVERAGE PERMEABILITY = 7.7E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 7.7E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 10 | 43 | 0.000 | 0.0 | 0.0 | 202.6 | 0 | 22.1 | NA |
| 8/28/17 | 13 | 18 | 2.583 | 0.8 | 0.9 | 200.6 | 0 | 22.1 | 7.6E-08 |
| 8/28/17 | 14 | 51 | 4.133 | 1.4 | 1.5 | 199.3 | 0 | 22.1 | 8.4E-08 |
| 8/29/17 | 7 | 28 | 20.750 | 6.9 | 6.9 | 186.9 | 0 | 22.0 | 7.7E-08 |
| 8/29/17 | 10 | 55 | 24.200 | 8.0 | 8.0 | 184.4 | 0 | 22.1 | 7.8E-08 |
| 8/29/17 | 12 | 30 | 25.783 | 8.5 | 8.5 | 183.3 | 0 | 22.1 | 7.8E-08 |
| 8/29/17 | 14 | 29 | 27.767 | 9.2 | 9.1 | 181.7 | 0 | 22.1 | 8.4E-08 |
| 8/29/17 | 16 | 10 | 29.450 | 9.7 | 9.6 | 180.7 | 1 | 22.0 | 7.0E-08 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

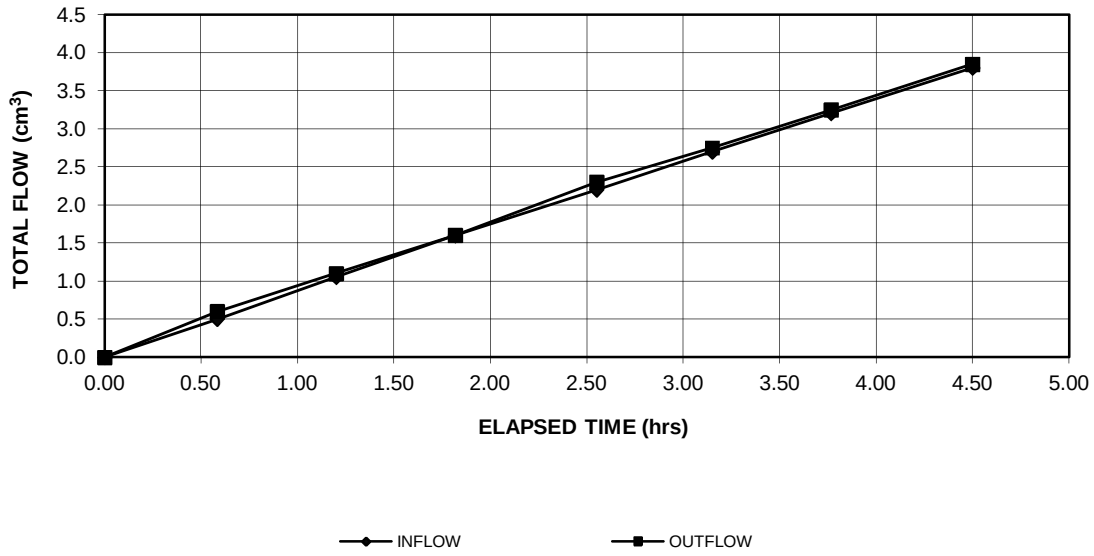
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-018 | Avg. Conf. Pressure (psi): | 6.25 |

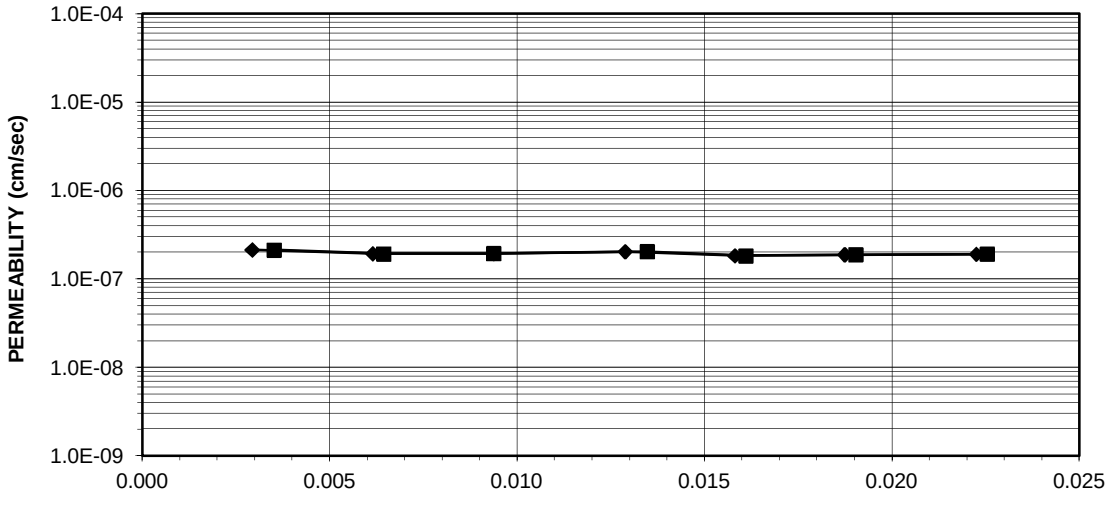
**AVERAGE PERMEABILITY = 1.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/15/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-018 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1722 | 591 |
| Weight of Tare & Wet Sample (g) | 516.36 | 759.84 |
| Weight of Tare & Dry Sample (g) | 425.10 | 608.50 |
| Weight of Tare (g) | 81.32 | 87.28 |
| Weight of Water (g) | 91.26 | 151.34 |
| Weight of Dry Sample (g) | 343.78 | 521.22 |
| Moisture Content (%) | **26.5** | **29.0** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 657.76 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 657.76 | 670.70 |
| Length 1 (in) | 3.100 | 3.122 |
| Length 2 (in) | 3.116 | 3.129 |
| Length 3 (in) | 3.109 | 3.098 |
| Top Diameter (in) | 3.005 | 3.008 |
| Middle Diameter (in) | 3.008 | 3.010 |
| Bottom Diameter (in) | 3.015 | 3.011 |
| Average Length (in) | 3.11 | 3.12 |
| Average Area ($in^2$) | 7.11 | 7.11 |
| Sample Volume ($cm^3$) | 362.29 | 363.31 |
| Unit Wet Weight ($g/cm^3$) | 1.82 | 1.85 |
| Unit Wet Weight (pcf) | 113.3 | 115.2 |
| Unit Dry Weight (pcf) | 89.6 | 89.3 |
| Unit Dry Weight ($g/cm^3$) | 1.43 | 1.43 |
| Void Ratio, e | 0.88 | 0.89 |
| Porosity, n | 0.47 | 0.47 |
| Pore Volume ($cm^3$) | 169.8 | 170.8 |
| Total Weight of Sample After Test (g) | | 673.48 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/15/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 14 Day |
| Lab ID No.: | 2017-427-001-018 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.20 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.92 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.90 |
| Inflow Burette Area ($cm^2$), a-in | 0.904 |
| Outflow Burette Area ($cm^2$), a-out | 0.876 |
| B Parameter (%) | 100 |

**AVERAGE PERMEABILITY = 1.9E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/14/17 | 9 | 59 | 0.000 | 0.0 | 0.0 | 202.3 | 0 | 22.2 | NA |
| 8/14/17 | 10 | 34 | 0.583 | 0.5 | 0.6 | 201.0 | 0 | 22.2 | 2.1E-07 |
| 8/14/17 | 11 | 11 | 1.200 | 1.1 | 1.1 | 199.8 | 0 | 22.3 | 1.9E-07 |
| 8/14/17 | 11 | 48 | 1.817 | 1.6 | 1.6 | 198.6 | 0 | 22.3 | 1.9E-07 |
| 8/14/17 | 12 | 32 | 2.550 | 2.2 | 2.3 | 197.2 | 0 | 22.3 | 2.0E-07 |
| 8/14/17 | 13 | 8 | 3.150 | 2.7 | 2.8 | 196.1 | 0 | 22.3 | 1.8E-07 |
| 8/14/17 | 13 | 45 | 3.767 | 3.2 | 3.3 | 195.0 | 0 | 22.3 | 1.9E-07 |
| 8/14/17 | 14 | 29 | 4.500 | 3.8 | 3.9 | 193.6 | 1 | 22.3 | 1.9E-07 |

Tested By: TRE Date: 8/11/17 Checked By: KC Date: 8/15/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

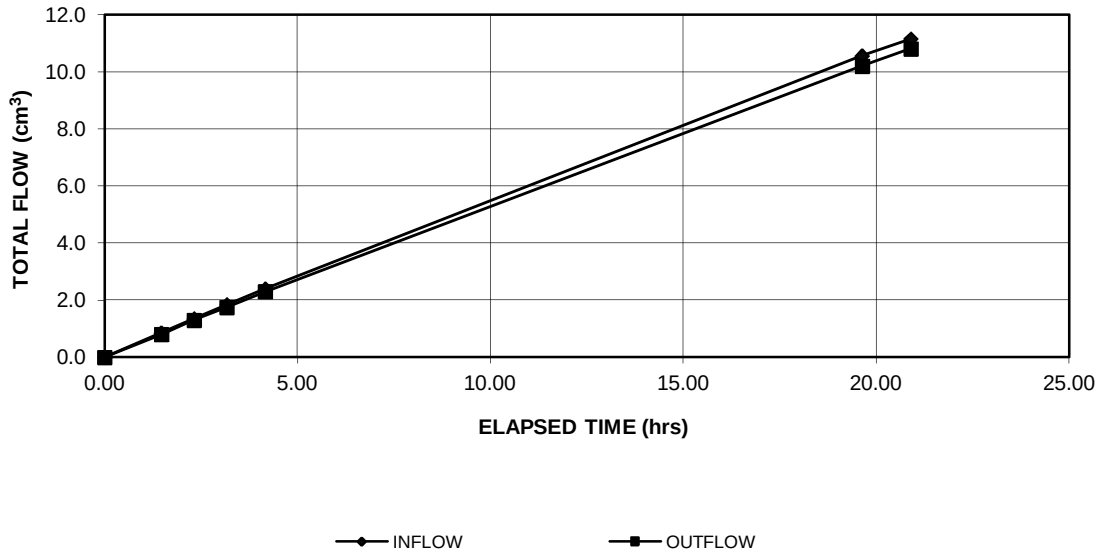
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-019 | Avg. Conf. Pressure (psi): | 6.25 |

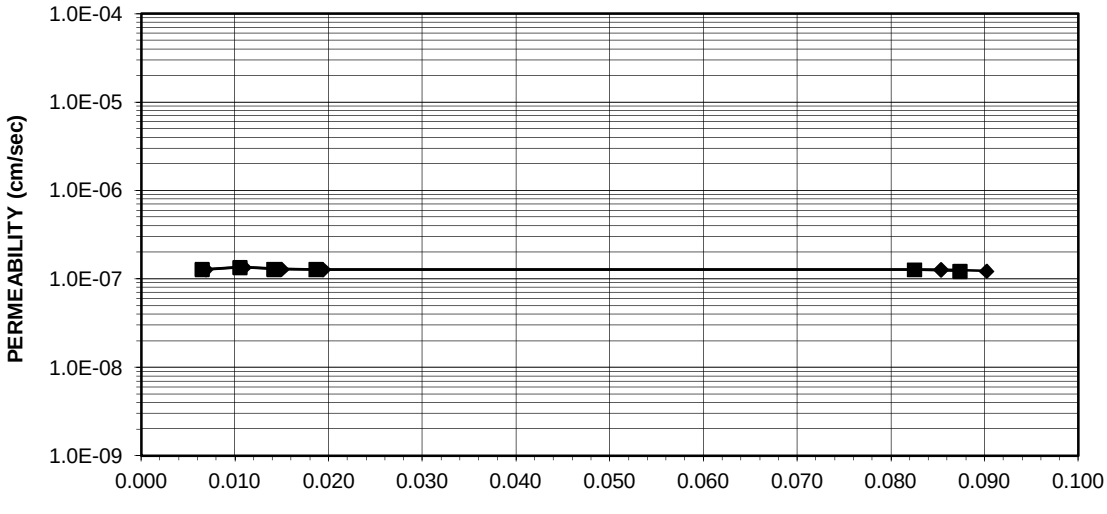
**AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-019 | Avg. Conf. Pressure (psi): | 6.25 |

Specific Gravity: 2.70 Assumed

Sample Condition: Previously Remolded

Visual Description: Dark Brown Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1728 | 882 |
| Weight of Tare & Wet Sample (g) | 639.42 | 786.26 |
| Weight of Tare & Dry Sample (g) | 620.43 | 638.18 |
| Weight of Tare (g) | 81.33 | 110.22 |
| Weight of Water (g) | 18.99 | 148.08 |
| Weight of Dry Sample (g) | 539.10 | 527.96 |
| Moisture Content (%) | **3.5** | **28.0** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 664.27 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 664.27 | 821.64 |
| Length 1 (in) | 3.118 | 3.117 |
| Length 2 (in) | 3.110 | 3.109 |
| Length 3 (in) | 3.114 | 3.100 |
| Top Diameter (in) | 3.003 | 3.003 |
| Middle Diameter (in) | 3.013 | 3.004 |
| Bottom Diameter (in) | 3.009 | 3.008 |
| Average Length (in) | 3.11 | 3.11 |
| Average Area ($in^2$) | 7.11 | 7.09 |
| Sample Volume ($cm^3$) | 362.71 | 361.29 |
| Unit Wet Weight ($g/cm^3$) | 1.83 | 2.27 |
| Unit Wet Weight (pcf) | 114.3 | 142.0 |
| Unit Dry Weight (pcf) | 110.4 | 110.9 |
| Unit Dry Weight ($g/cm^3$) | 1.77 | 1.78 |
| Void Ratio, e | 0.53 | 0.52 |
| Porosity, n | 0.34 | 0.34 |
| Pore Volume ($cm^3$) | 125.1 | 123.6 |
| Total Weight of Sample After Test (g) | | 679.19 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-6 |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-019 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.26 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.90 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.76 |
| Inflow Burette Area ($cm^2$), a-in | 0.872 |
| Outflow Burette Area ($cm^2$), a-out | 0.886 |
| B Parameter (%) | 97 |

**AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 11 | 50 | 0.000 | 0.0 | 0.0 | 201.1 | 0 | 22.1 | NA |
| 8/28/17 | 13 | 18 | 1.467 | 0.9 | 0.8 | 199.2 | 0 | 22.1 | 1.3E-07 |
| 8/28/17 | 14 | 9 | 2.317 | 1.4 | 1.3 | 198.1 | 0 | 22.1 | 1.4E-07 |
| 8/28/17 | 15 | 0 | 3.167 | 1.9 | 1.8 | 197.0 | 0 | 22.1 | 1.3E-07 |
| 8/28/17 | 16 | 0 | 4.167 | 2.4 | 2.3 | 195.8 | 0 | 22.1 | 1.3E-07 |
| 8/29/17 | 7 | 28 | 19.633 | 10.6 | 10.2 | 177.5 | 0 | 22.0 | 1.3E-07 |
| 8/29/17 | 8 | 44 | 20.900 | 11.2 | 10.8 | 176.1 | 1 | 22.0 | 1.2E-07 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

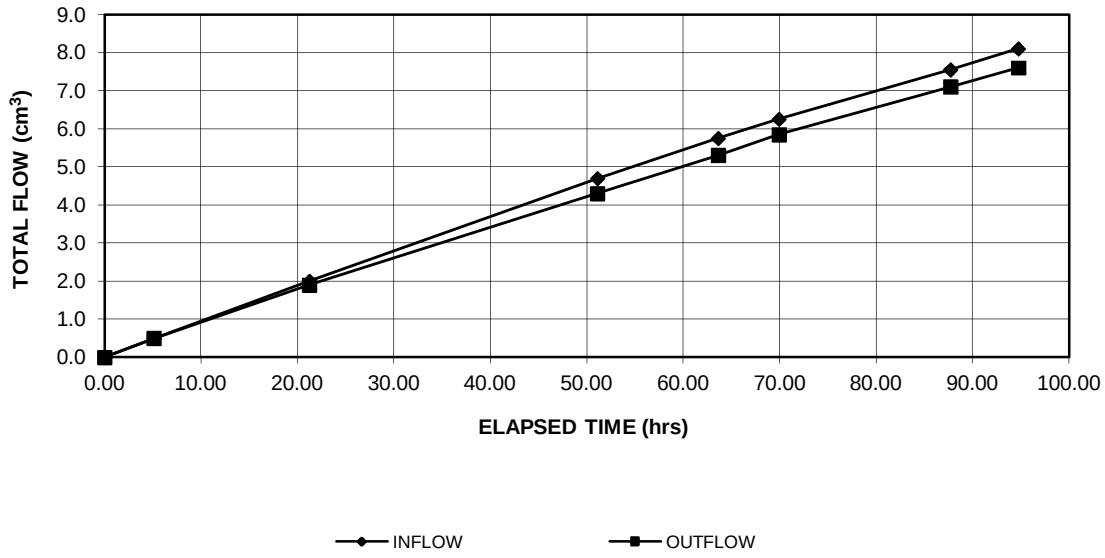
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-020 | Avg. Conf. Pressure (psi): | 6.25 |

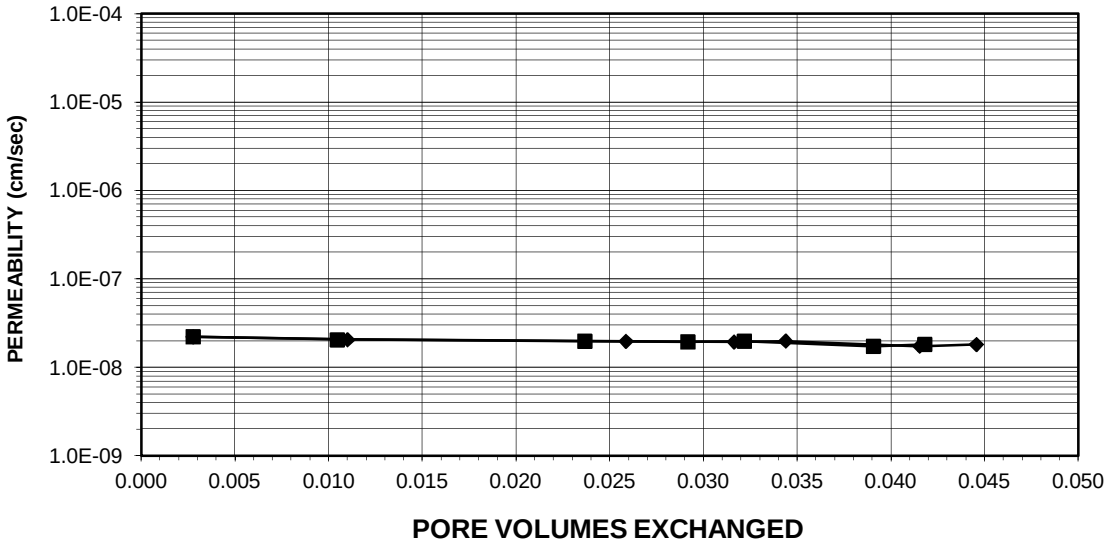
**AVERAGE PERMEABILITY = 1.9E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-020 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1692 | 591 |
| Weight of Tare & Wet Sample (g) | 623.30 | 720.09 |
| Weight of Tare & Dry Sample (g) | 503.22 | 568.61 |
| Weight of Tare (g) | 82.44 | 87.35 |
| Weight of Water (g) | 120.08 | 151.48 |
| Weight of Dry Sample (g) | 420.78 | 481.26 |
| Moisture Content (%) | **28.5** | **31.5** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 623.53 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 623.53 | 637.78 |
| Length 1 (in) | 3.129 | 3.112 |
| Length 2 (in) | 3.117 | 3.109 |
| Length 3 (in) | 3.131 | 3.110 |
| Top Diameter (in) | 3.008 | 3.004 |
| Middle Diameter (in) | 3.004 | 3.001 |
| Bottom Diameter (in) | 3.000 | 3.010 |
| Average Length (in) | 3.13 | 3.11 |
| Average Area ($in^2$) | 7.09 | 7.09 |
| Sample Volume ($cm^3$) | 363.02 | 361.48 |
| Unit Wet Weight ($g/cm^3$) | 1.72 | 1.76 |
| Unit Wet Weight (pcf) | 107.2 | 110.1 |
| Unit Dry Weight (pcf) | 83.4 | 83.8 |
| Unit Dry Weight ($g/cm^3$) | 1.34 | 1.34 |
| Void Ratio, e | 1.02 | 1.01 |
| Porosity, n | 0.51 | 0.50 |
| Pore Volume ($cm^3$) | 183.4 | 181.8 |
| Total Weight of Sample After Test (g) | | 641.15 |

Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-020 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.25 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.90 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.76 |
| Inflow Burette Area ($cm^2$), a-in | 0.852 |
| Outflow Burette Area ($cm^2$), a-out | 0.862 |
| B Parameter (%) | 96 |

**AVERAGE PERMEABILITY = 1.9E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.9E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/25/17 | 15 | 51 | 0.000 | 0.0 | 0.0 | 203.7 | 0 | 21.9 | NA |
| 8/25/17 | 20 | 58 | 5.117 | 0.5 | 0.5 | 202.5 | 0 | 21.5 | 2.2E-08 |
| 8/26/17 | 13 | 5 | 21.233 | 2.0 | 1.9 | 199.2 | 0 | 21.7 | 2.1E-08 |
| 8/27/17 | 18 | 57 | 51.100 | 4.7 | 4.3 | 193.2 | 0 | 22.1 | 2.0E-08 |
| 8/28/17 | 7 | 28 | 63.617 | 5.8 | 5.3 | 190.8 | 0 | 22.0 | 1.9E-08 |
| 8/28/17 | 13 | 47 | 69.933 | 6.3 | 5.9 | 189.6 | 0 | 22.1 | 2.0E-08 |
| 8/29/17 | 7 | 33 | 87.700 | 7.6 | 7.1 | 186.6 | 0 | 22.0 | 1.7E-08 |
| 8/29/17 | 14 | 35 | 94.733 | 8.1 | 7.6 | 185.4 | 1 | 22.1 | 1.8E-08 |

Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

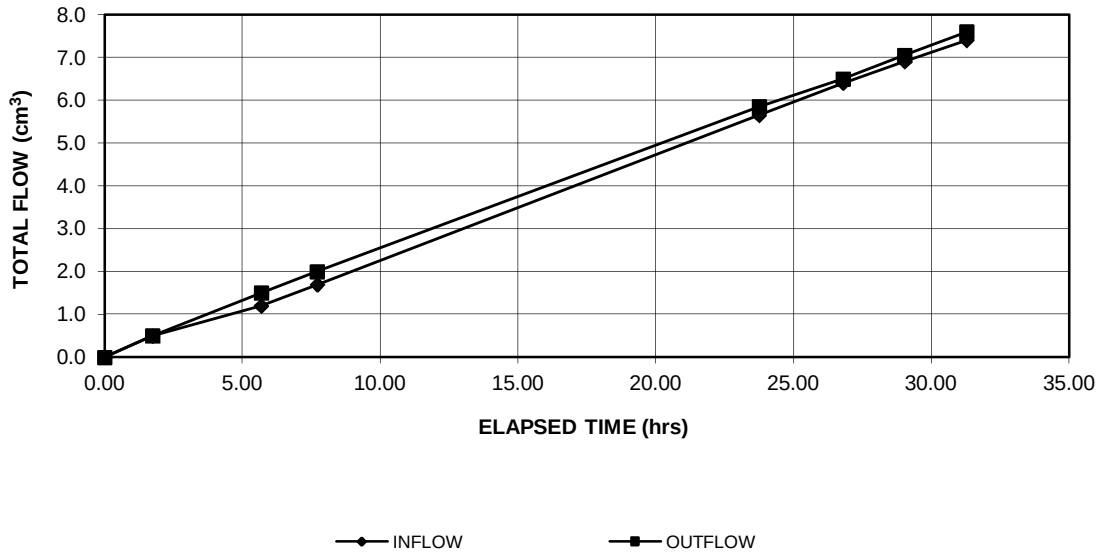
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-022 | Avg. Conf. Pressure (psi): | 6.25 |

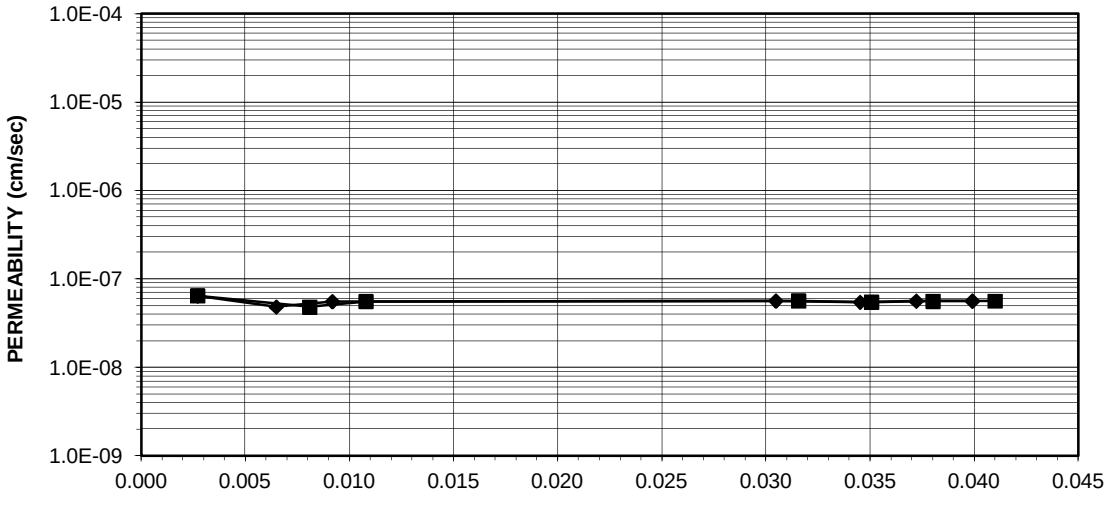
**AVERAGE PERMEABILITY = 5.6E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 5.6E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17



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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-022 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 627 | 917 |
| Weight of Tare & Wet Sample (g) | 639.43 | 722.44 |
| Weight of Tare & Dry Sample (g) | 510.70 | 571.54 |
| Weight of Tare (g) | 86.51 | 109.73 |
| Weight of Water (g) | 128.73 | 150.90 |
| Weight of Dry Sample (g) | 424.19 | 461.81 |
| Moisture Content (%) | **30.3** | **32.7** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 614.40 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 614.40 | 625.38 |
| Length 1 (in) | 3.101 | 3.101 |
| Length 2 (in) | 3.102 | 3.088 |
| Length 3 (in) | 3.104 | 3.092 |
| Top Diameter (in) | 3.010 | 3.001 |
| Middle Diameter (in) | 3.012 | 3.008 |
| Bottom Diameter (in) | 3.006 | 3.012 |
| Average Length (in) | 3.10 | 3.09 |
| Average Area ($in^2$) | 7.11 | 7.10 |
| Sample Volume ($cm^3$) | 361.59 | 360.02 |
| Unit Wet Weight ($g/cm^3$) | 1.70 | 1.74 |
| Unit Wet Weight (pcf) | 106.1 | 108.4 |
| Unit Dry Weight (pcf) | 81.4 | 81.7 |
| Unit Dry Weight ($g/cm^3$) | 1.30 | 1.31 |
| Void Ratio, e | 1.07 | 1.06 |
| Porosity, n | 0.52 | 0.52 |
| Pore Volume ($cm^3$) | 187.0 | 185.4 |
| Total Weight of Sample After Test (g) | | 630.06 |

Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-022 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.37 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.86 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.82 |
| Inflow Burette Area ($cm^2$), a-in | 0.890 |
| Outflow Burette Area ($cm^2$), a-out | 0.906 |
| B Parameter (%) | 95 |

**AVERAGE PERMEABILITY = 5.6E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 5.6E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 7 | 40 | 0.000 | 0.0 | 0.0 | 202.5 | 0 | 22.0 | NA |
| 8/28/17 | 9 | 24 | 1.733 | 0.5 | 0.5 | 201.4 | 0 | 22.0 | 6.4E-08 |
| 8/28/17 | 13 | 21 | 5.683 | 1.2 | 1.5 | 199.5 | 0 | 22.1 | 4.8E-08 |
| 8/28/17 | 15 | 23 | 7.717 | 1.7 | 2.0 | 198.4 | 0 | 22.1 | 5.6E-08 |
| 8/29/17 | 7 | 25 | 23.750 | 5.7 | 5.9 | 189.7 | 0 | 22.0 | 5.7E-08 |
| 8/29/17 | 10 | 28 | 26.800 | 6.4 | 6.5 | 188.2 | 0 | 22.1 | 5.5E-08 |
| 8/29/17 | 12 | 42 | 29.033 | 6.9 | 7.1 | 187.0 | 0 | 22.2 | 5.6E-08 |
| 8/29/17 | 14 | 57 | 31.283 | 7.4 | 7.6 | 185.9 | 1 | 22.1 | 5.6E-08 |

Tested By: JAB Date: 8/24/17 Checked By: KC Date: 8/30/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

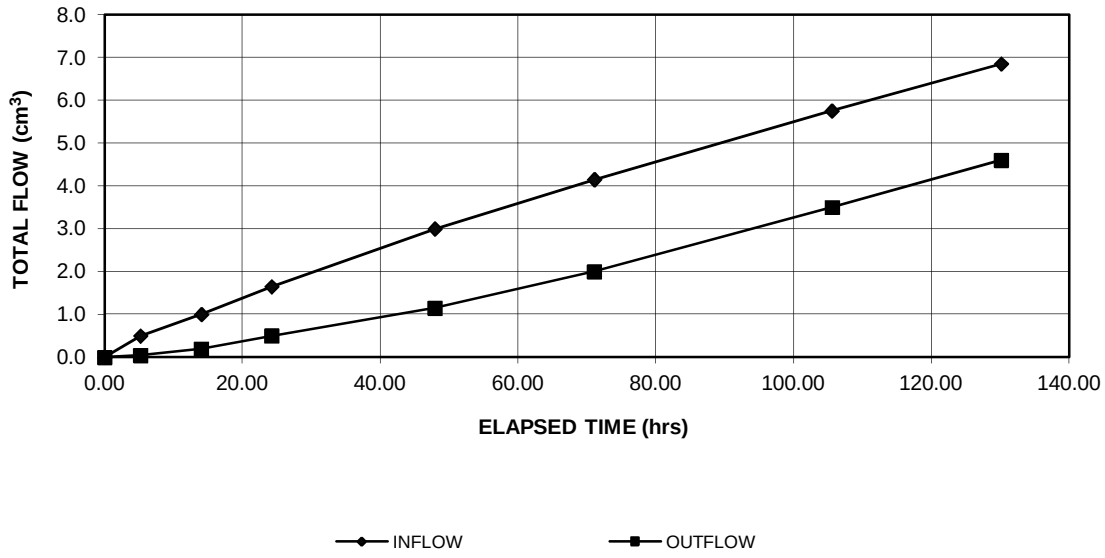
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-023 | Avg. Conf. Pressure (psi): | 6.25 |

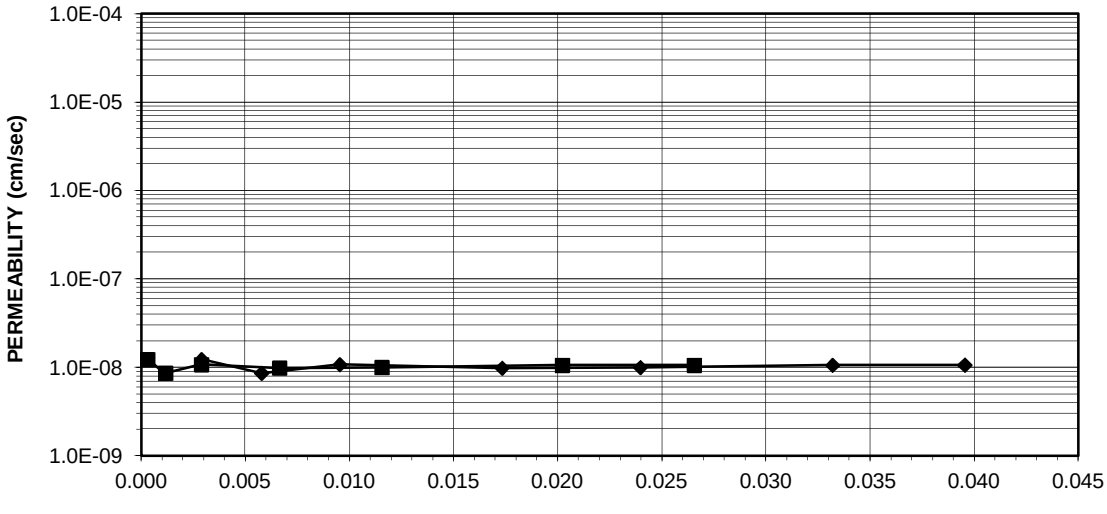
**AVERAGE PERMEABILITY = 1.0E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.0E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/5/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-023 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Black Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 1693 | 544 |
| Weight of Tare & Wet Sample (g) | 664.06 | 735.66 |
| Weight of Tare & Dry Sample (g) | 546.15 | 596.77 |
| Weight of Tare (g) | 82.80 | 84.31 |
| Weight of Water (g) | 117.91 | 138.89 |
| Weight of Dry Sample (g) | 463.35 | 512.46 |
| Moisture Content (%) | **25.4** | **27.1** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 646.10 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 646.10 | 654.63 |
| Length 1 (in) | 3.127 | 3.127 |
| Length 2 (in) | 3.112 | 3.111 |
| Length 3 (in) | 3.109 | 3.120 |
| Top Diameter (in) | 3.005 | 3.022 |
| Middle Diameter (in) | 3.005 | 3.010 |
| Bottom Diameter (in) | 3.010 | 3.001 |
| Average Length (in) | 3.12 | 3.12 |
| Average Area ($in^2$) | 7.10 | 7.12 |
| Sample Volume ($cm^3$) | 362.54 | 363.98 |
| Unit Wet Weight ($g/cm^3$) | 1.78 | 1.80 |
| Unit Wet Weight (pcf) | 111.2 | 112.3 |
| Unit Dry Weight (pcf) | 88.7 | 88.3 |
| Unit Dry Weight ($g/cm^3$) | 1.42 | 1.42 |
| Void Ratio, e | 0.90 | 0.91 |
| Porosity, n | 0.47 | 0.48 |
| Pore Volume ($cm^3$) | 171.8 | 173.2 |
| Total Weight of Sample After Test (g) | | 665.80 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/5/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-5-6 (1:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-023 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.18 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.92 |
| Sample Diameter (cm) | 7.65 |
| Sample Area ($cm^2$), A | 45.94 |
| Inflow Burette Area ($cm^2$), a-in | 0.870 |
| Outflow Burette Area ($cm^2$), a-out | 0.960 |
| B Parameter (%) | 97 |

**AVERAGE PERMEABILITY = 1.0E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.0E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/29/17 | 7 | 31 | 0.000 | 0.0 | 0.0 | 204.3 | 0 | 22.0 | NA |
| 8/29/17 | 12 | 44 | 5.217 | 0.5 | 0.1 | 203.6 | 0 | 22.2 | 1.2E-08 |
| 8/29/17 | 21 | 34 | 14.050 | 1.0 | 0.2 | 202.9 | 0 | 21.7 | 8.6E-09 |
| 8/30/17 | 7 | 46 | 24.250 | 1.7 | 0.5 | 201.8 | 0 | 21.9 | 1.1E-08 |
| 8/31/17 | 7 | 28 | 47.950 | 3.0 | 1.2 | 199.6 | 0 | 21.8 | 9.9E-09 |
| 9/01/17 | 6 | 37 | 71.100 | 4.2 | 2.0 | 197.4 | 0 | 22.2 | 1.0E-08 |
| 9/02/17 | 17 | 6 | 105.583 | 5.8 | 3.5 | 194.0 | 0 | 21.7 | 1.1E-08 |
| 9/03/17 | 17 | 41 | 130.167 | 6.9 | 4.6 | 191.5 | 1 | 22.0 | 1.1E-08 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/5/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

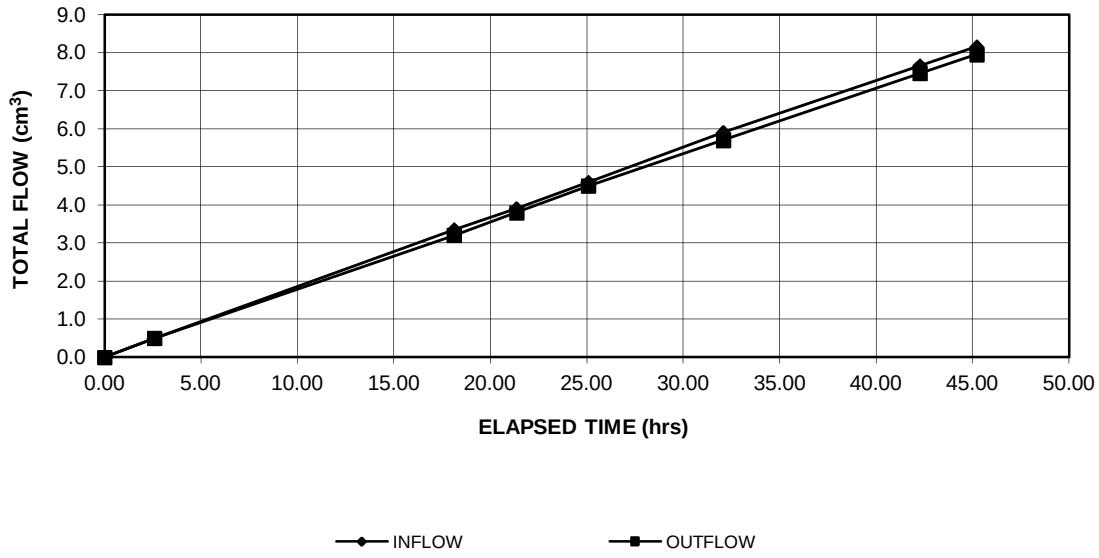
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-025 | Avg. Conf. Pressure (psi): | 6.25 |

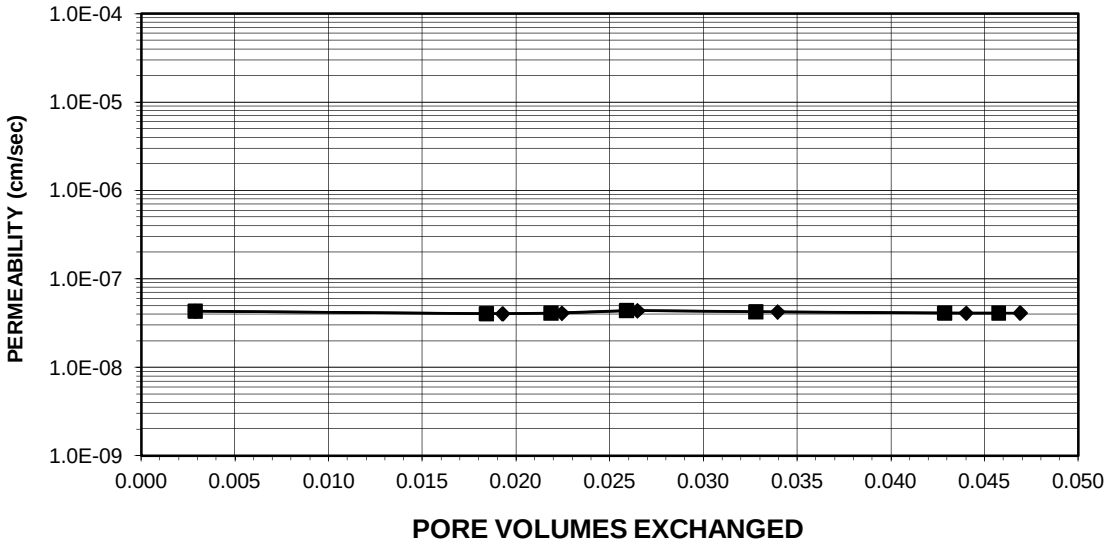
**AVERAGE PERMEABILITY = 4.2E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 4.2E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-025 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Dark Brown Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 560 | 1723 |
| Weight of Tare & Wet Sample (g) | 667.49 | 748.06 |
| Weight of Tare & Dry Sample (g) | 527.64 | 581.56 |
| Weight of Tare (g) | 82.36 | 83.13 |
| Weight of Water (g) | 139.85 | 166.50 |
| Weight of Dry Sample (g) | 445.28 | 498.43 |
| Moisture Content (%) | **31.4** | **33.4** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 655.66 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 655.66 | 665.63 |
| Length 1 (in) | 3.070 | 3.103 |
| Length 2 (in) | 3.119 | 3.075 |
| Length 3 (in) | 3.086 | 3.081 |
| Top Diameter (in) | 3.012 | 3.001 |
| Middle Diameter (in) | 3.005 | 3.004 |
| Bottom Diameter (in) | 3.001 | 3.009 |
| Average Length (in) | 3.09 | 3.09 |
| Average Area ($in^2$) | 7.10 | 7.09 |
| Sample Volume ($cm^3$) | 359.55 | 358.61 |
| Unit Wet Weight ($g/cm^3$) | 1.82 | 1.86 |
| Unit Wet Weight (pcf) | 113.8 | 115.9 |
| Unit Dry Weight (pcf) | 86.6 | 86.9 |
| Unit Dry Weight ($g/cm^3$) | 1.39 | 1.39 |
| Void Ratio, e | 0.95 | 0.94 |
| Porosity, n | 0.49 | 0.48 |
| Pore Volume ($cm^3$) | 174.8 | 173.8 |
| Total Weight of Sample After Test (g) | | 665.94 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17







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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (1:2) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-025 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.42 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.84 |
| Sample Diameter (cm) | 7.63 |
| Sample Area ($cm^2$), A | 45.75 |
| Inflow Burette Area ($cm^2$), a-in | 0.891 |
| Outflow Burette Area ($cm^2$), a-out | 0.915 |
| B Parameter (%) | 97 |

**AVERAGE PERMEABILITY = 4.2E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 4.2E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 13 | 32 | 0.000 | 0.0 | 0.0 | 202.6 | 0 | 22.1 | NA |
| 8/28/17 | 16 | 6 | 2.567 | 0.5 | 0.5 | 201.5 | 0 | 22.1 | 4.3E-08 |
| 8/29/17 | 7 | 39 | 18.117 | 3.4 | 3.2 | 195.3 | 0 | 22.0 | 4.1E-08 |
| 8/29/17 | 10 | 53 | 21.350 | 3.9 | 3.8 | 194.1 | 0 | 22.1 | 4.1E-08 |
| 8/29/17 | 14 | 36 | 25.067 | 4.6 | 4.5 | 192.5 | 0 | 22.1 | 4.4E-08 |
| 8/29/17 | 21 | 36 | 32.067 | 5.9 | 5.7 | 189.8 | 0 | 21.7 | 4.3E-08 |
| 8/30/17 | 7 | 48 | 42.267 | 7.7 | 7.5 | 185.9 | 0 | 21.9 | 4.1E-08 |
| 8/30/17 | 10 | 45 | 45.217 | 8.2 | 8.0 | 184.8 | 1 | 21.9 | 4.1E-08 |

Tested By: JAB Date: 8/25/17 Checked By: TMP Date: 8/31/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

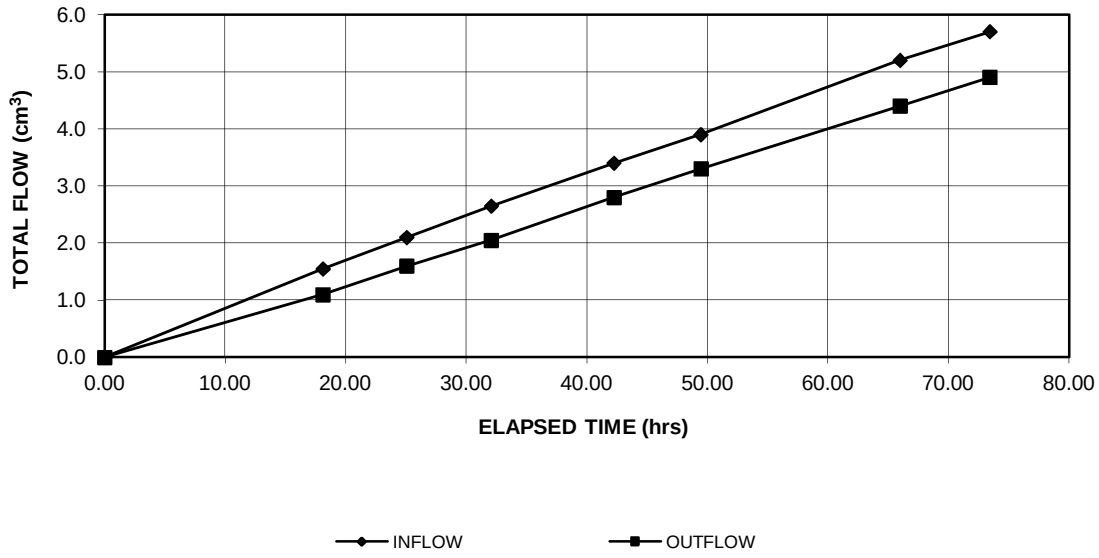
ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (2:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-027 | Avg. Conf. Pressure (psi): | 6.25 |

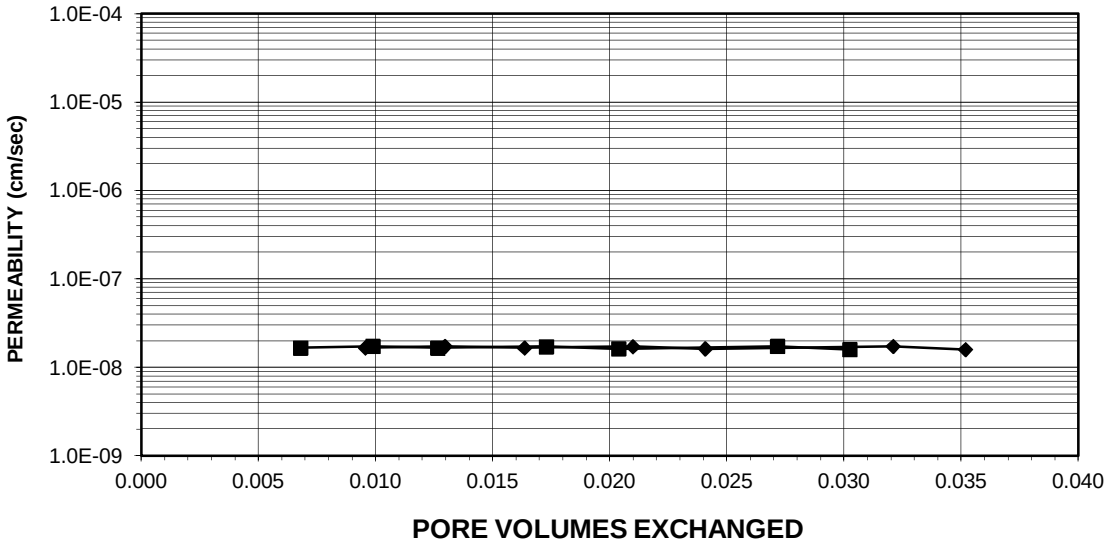
**AVERAGE PERMEABILITY = 1.7E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.7E-10 m/sec @ 20°C**

## TOTAL FLOW vs. ELAPSED TIME




## PORE VOLUMES EXCHANGED vs. PERMEABILITY




Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/1/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (2:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-027 | Avg. Conf. Pressure (psi): | 6.25 |

| | | |
|---|---|---|
| Specific Gravity: | 2.70 | Assumed |
| Sample Condition: | Previously | Remolded |

Visual Description: Dark Brown Stabilized Material

| **MOISTURE CONTENT:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 874 | 630 |
| Weight of Tare & Wet Sample (g) | 698.30 | 774.72 |
| Weight of Tare & Dry Sample (g) | 578.68 | 621.77 |
| Weight of Tare (g) | 110.25 | 82.12 |
| Weight of Water (g) | 119.62 | 152.95 |
| Weight of Dry Sample (g) | 468.43 | 539.65 |
| Moisture Content (%) | **25.5** | **28.3** |

| **SPECIMEN:** | BEFORE TEST | AFTER TEST |
|---|---|---|
| Weight of Tube & Wet Sample (g) | 684.59 | NA |
| Weight of Tube (g) | 0.00 | NA |
| Weight of Wet Sample (g) | 684.59 | 699.89 |
| Length 1 (in) | 3.117 | 3.097 |
| Length 2 (in) | 3.106 | 3.157 |
| Length 3 (in) | 3.099 | 3.115 |
| Top Diameter (in) | 3.008 | 3.015 |
| Middle Diameter (in) | 3.026 | 3.010 |
| Bottom Diameter (in) | 3.000 | 3.003 |
| Average Length (in) | 3.11 | 3.12 |
| Average Area ($in^2$) | 7.12 | 7.11 |
| Sample Volume ($cm^3$) | 362.66 | 364.00 |
| Unit Wet Weight ($g/cm^3$) | 1.89 | 1.92 |
| Unit Wet Weight (pcf) | 117.8 | 120.0 |
| Unit Dry Weight (pcf) | 93.9 | 93.5 |
| Unit Dry Weight ($g/cm^3$) | 1.50 | 1.50 |
| Void Ratio, e | 0.80 | 0.80 |
| Porosity, n | 0.44 | 0.45 |
| Pore Volume ($cm^3$) | 160.7 | 162.0 |
| Total Weight of Sample After Test (g) | | 698.35 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/1/17





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# PERMEABILITY TEST

ASTM D 5084-10

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (2:1) |
| Client Project: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID No.: | 2017-427-001-027 | Avg. Conf. Pressure (psi): | 6.25 |

| **Pressure Heads (Constant)** | |
|---|---|
| Top Cap (psi) | 67.5 |
| Bottom Cap (psi) | 70.0 |
| Cell (psi) | 75.0 |
| Total Pressure Head (cm) | 175.8 |
| Hydraulic Gradient | 22.16 |

| **Final Sample Dimensions** | |
|---|---|
| Sample Length (cm), L | 7.93 |
| Sample Diameter (cm) | 7.64 |
| Sample Area ($cm^2$), A | 45.89 |
| Inflow Burette Area ($cm^2$), a-in | 0.879 |
| Outflow Burette Area ($cm^2$), a-out | 0.896 |
| B Parameter (%) | 97 |

**AVERAGE PERMEABILITY = 1.7E-08 cm/sec @ 20°C**

**AVERAGE PERMEABILITY = 1.7E-10 m/sec @ 20°C**

| DATE | TIME | | ELAPSED TIME t | TOTAL INFLOW | TOTAL OUTFLOW | TOTAL HEAD h | FLOW (0 flow) | TEMP. | INCREMENTAL PERMEABILITY @ 20°C |
|---|---|---|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (hr) | ($cm^3$) | ($cm^3$) | (cm) | (1 stop) | (°C) | (cm/sec) |
| 8/28/17 | 13 | 33 | 0.000 | 0.0 | 0.0 | 203.3 | 0 | 22.1 | NA |
| 8/29/17 | 7 | 39 | 18.100 | 1.6 | 1.1 | 200.3 | 0 | 22.0 | 1.7E-08 |
| 8/29/17 | 14 | 36 | 25.050 | 2.1 | 1.6 | 199.1 | 0 | 22.1 | 1.7E-08 |
| 8/29/17 | 21 | 37 | 32.067 | 2.7 | 2.1 | 197.9 | 0 | 21.7 | 1.7E-08 |
| 8/30/17 | 7 | 48 | 42.250 | 3.4 | 2.8 | 196.2 | 0 | 21.9 | 1.7E-08 |
| 8/30/17 | 15 | 0 | 49.450 | 3.9 | 3.3 | 195.1 | 0 | 22.0 | 1.6E-08 |
| 8/31/17 | 7 | 31 | 65.967 | 5.2 | 4.4 | 192.4 | 0 | 21.8 | 1.7E-08 |
| 8/31/17 | 14 | 59 | 73.433 | 5.7 | 4.9 | 191.3 | 1 | 22.2 | 1.6E-08 |

Tested By: JAB Date: 8/25/17 Checked By: KC Date: 9/1/17



DCN: CT-22 DATE: 1/1/17 REVISION: 11

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# UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (Modified-Peak Load Only) (SOP S-30)

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (1:2) |
| Client Reference: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID: | 2017-427-001-029 | Visual Description: | Brown Stabilized Material |

**INITIAL SAMPLE DIMENSIONS**

| | | | |
|---|---|---|---|
| Length 1 (in): | 5.790 | Top Dia. (in): | 3.006 |
| Length 2 (in): | 5.791 | Mid. Dia. (in): | 3.000 |
| Length 3 (in): | 5.790 | Bot. Dia. (in): | 2.992 |
| Avg. Length (in): | 5.790 | Area ($in^2$): | 7.065 |

**WATER CONTENT (AFTER TEST)**

| | |
|---|---|
| Tare No.: | 1438 |
| Weight of Tare & Wet Sample (g): | 1379.00 |
| Weight of Tare & Dry Sample (g): | 1088.58 |
| Weight of Tare (g): | 144.42 |
| % Moisture: | 30.76 |

**UNIT WEIGHT**

| | | | |
|---|---|---|---|
| Weight of Tube & Wet Sample (g): | 1235.6 | Sample Volume ($cm^3$): | 670.4 |
| Weight of Tube (g): | 0.00 | Unit Wet Weight ($g/cm^3$): | 1.84 |
| Weight of Wet Sample (g): | 1235.56 | Unit Wet Weight (pcf): | 115.00 |
| Avg. Diameter (in): | 3.00 | Moisture Content (%): | 30.76 |
| Avg. Length (in): | 5.79 | Unit Dry Weight (pcf): | 87.95 |
| Avg. Length (cm): | 14.71 | | |

| *ELECTRONIC DEVICE LOAD (lb)* | *STRESS (psi)* |
|---|---|
| **1440** | **203.81** |

Tested By JAC Date 8/25/17 Input Checked By TMP Date 8/28/17



DCN: CT-S30A Date: 11/09/09 Revision: 4

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# UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (Modified-Peak Load Only) (SOP S-30)

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-6-4 (2:1) |
| Client Reference: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/28/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID: | 2017-427-001-031 | Visual Description: | Gray Stabilized Material |

## INITIAL SAMPLE DIMENSIONS

| | | | |
|---|---|---|---|
| Length 1 (in): | 5.704 | Top Dia. (in): | 3.009 |
| Length 2 (in): | 5.706 | Mid. Dia. (in): | 3.001 |
| Length 3 (in): | 5.706 | Bot. Dia. (in): | 2.993 |
| Avg. Length (in): | 5.705 | Area ($in^2$): | 7.073 |

## WATER CONTENT (AFTER TEST)

| | |
|---|---|
| Tare No.: | 1425 |
| Weight of Tare & Wet Sample (g): | 1401.64 |
| Weight of Tare & Dry Sample (g): | 1146.42 |
| Weight of Tare (g): | 144.88 |
| % Moisture: | 25.48 |

## UNIT WEIGHT

| | | | |
|---|---|---|---|
| Weight of Tube & Wet Sample (g): | 1258.1 | Sample Volume ($cm^3$): | 661.3 |
| Weight of Tube (g): | 0.00 | Unit Wet Weight ($g/cm^3$): | 1.90 |
| Weight of Wet Sample (g): | 1258.14 | Unit Wet Weight (pcf): | 118.72 |
| Avg. Diameter (in): | 3.00 | Moisture Content (%): | 25.48 |
| Avg. Length (in): | 5.71 | Unit Dry Weight (pcf): | 94.61 |
| Avg. Length (cm): | 14.49 | | |

| *ELECTRONIC DEVICE LOAD (lb)* | *STRESS (psi)* |
|---|---|
| **3190** | **450.99** |

Tested By JAC Date 8/25/17 Input Checked By TMP Date 8/28/17



DCN: CT-S30A Date: 11/09/09 Revision: 4

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# UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (Modified-Peak Load Only) (SOP S-30)

| | | | |
|---|---|---|---|
| Client: | AMEC Foster Wheeler | Boring No.: | GCM-4-5 (1:2) |
| Client Reference: | Buffalo, NY (ISS Pilot) | Depth (ft): | 7/27/17 |
| Project No.: | 2017-427-001 | Sample No.: | 28 Day |
| Lab ID: | 2017-427-001-033 | Visual Description: | Gray Stabilized Material |

## INITIAL SAMPLE DIMENSIONS

| | | | |
|---|---|---|---|
| Length 1 (in): | 5.511 | Top Dia. (in): | 3.007 |
| Length 2 (in): | 5.511 | Mid. Dia. (in): | 2.999 |
| Length 3 (in): | 5.512 | Bot. Dia. (in): | 2.987 |
| Avg. Length (in): | 5.511 | Area ($in^2$): | 7.058 |

## WATER CONTENT (AFTER TEST)

| | |
|---|---|
| Tare No.: | 66 |
| Weight of Tare & Wet Sample (g): | 1291.21 |
| Weight of Tare & Dry Sample (g): | 1045.48 |
| Weight of Tare (g): | 201.43 |
| % Moisture: | 29.11 |

## UNIT WEIGHT

| | | | |
|---|---|---|---|
| Weight of Tube & Wet Sample (g): | 1094.5 | Sample Volume ($cm^3$): | 637.4 |
| Weight of Tube (g): | 0.00 | Unit Wet Weight ($g/cm^3$): | 1.72 |
| Weight of Wet Sample (g): | 1094.48 | Unit Wet Weight (pcf): | 107.15 |
| Avg. Diameter (in): | 3.00 | Moisture Content (%): | 29.11 |
| Avg. Length (in): | 5.51 | Unit Dry Weight (pcf): | 82.99 |
| Avg. Length (cm): | 14.00 | | |

| *ELECTRONIC DEVICE LOAD (lb)* | *STRESS (psi)* |
|---|---|
| **1510** | **213.95** |

Tested By JAC Date 8/24/17 Input Checked By TMP Date 8/25/17



DCN: CT-S30A Date: 11/09/09 Revision: 4

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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

TestAmerica Job ID: 480-122014-1
Client Project/Site: KR Elk Street - AMEC

For:
AMEC Foster Wheeler E & I, Inc
800 North Bell Avenue, Suite 200
Pittsburgh, Pennsylvania 15106

Attn: Dayne Crowley

*Authorized for release by:*
*8/8/2017 12:00:05 PM*
Rebecca Jones, Project Management Assistant I
rebecca.jones@testamericainc.com

Designee for

John Schove, Project Manager II
(716)504-9838
john.schove@testamericainc.com

# Table of Contents

# Definitions/Glossary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| U | Indicates the analyte was analyzed for but not detected. |

## Glossary

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

## Job ID: 480-122014-1

### Laboratory: TestAmerica Buffalo

**Narrative**

**Job Narrative**
**480-122014-1**

**Comments**
No additional comments.

**Receipt**
The samples were received on 8/1/2017 3:05 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3º C.

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

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

# Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

## Client Sample ID: LEAD-1/2 — Lab Sample ID: 480-122014-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.0078 | J | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

## Client Sample ID: LEAD-1 — Lab Sample ID: 480-122014-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.023 | | 0.020 | 0.0030 | mg/L | 1 | | 6010C | TCLP |

This Detection Summary does not include radiochemical test results.

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

**Client Sample ID: LEAD-1/2** — **Lab Sample ID: 480-122014-1**
**Date Collected: 07/26/17 08:50** — **Matrix: Solid**
**Date Received: 08/01/17 15:05**

**Method: 6010C - TCLP Lead - TCLP**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.0078 | J | 0.020 | 0.0030 | mg/L | | 08/03/17 11:06 | 08/04/17 16:02 | 1 |

**Client Sample ID: LEAD-1** — **Lab Sample ID: 480-122014-2**
**Date Collected: 07/26/17 09:00** — **Matrix: Solid**
**Date Received: 08/01/17 15:05**

**Method: 6010C - TCLP Lead - TCLP**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.023 | | 0.020 | 0.0030 | mg/L | | 08/03/17 11:06 | 08/04/17 16:06 | 1 |

## Method: 6010C - TCLP Lead

**Lab Sample ID: MB 480-370279/2-A**
**Matrix: Solid**
**Analysis Batch: 370777**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 370279**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 08/03/17 11:06 | 08/04/17 15:10 | 1 |

**Lab Sample ID: LCS 480-370279/3-A**
**Matrix: Solid**
**Analysis Batch: 370777**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 370279**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Lead | 1.00 | 1.08 | | mg/L | | 108 | 80 - 120 |

**Lab Sample ID: LB 480-370094/1-B**
**Matrix: Solid**
**Analysis Batch: 370777**

**Client Sample ID: Method Blank**
**Prep Type: TCLP**
**Prep Batch: 370279**

| Analyte | LB Result | LB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.020 | U | 0.020 | 0.0030 | mg/L | | 08/03/17 11:06 | 08/04/17 15:07 | 1 |

# QC Association Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

## Metals

### Leach Batch: 370094

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | TCLP | Solid | 1311 | |
| 480-122014-2 | LEAD-1 | TCLP | Solid | 1311 | |
| LB 480-370094/1-B | Method Blank | TCLP | Solid | 1311 | |

### Prep Batch: 370279

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | TCLP | Solid | 3010A | 370094 |
| 480-122014-2 | LEAD-1 | TCLP | Solid | 3010A | 370094 |
| LB 480-370094/1-B | Method Blank | TCLP | Solid | 3010A | 370094 |
| MB 480-370279/2-A | Method Blank | Total/NA | Solid | 3010A | |
| LCS 480-370279/3-A | Lab Control Sample | Total/NA | Solid | 3010A | |

### Analysis Batch: 370777

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | TCLP | Solid | 6010C | 370279 |
| 480-122014-2 | LEAD-1 | TCLP | Solid | 6010C | 370279 |
| LB 480-370094/1-B | Method Blank | TCLP | Solid | 6010C | 370279 |
| MB 480-370279/2-A | Method Blank | Total/NA | Solid | 6010C | 370279 |
| LCS 480-370279/3-A | Lab Control Sample | Total/NA | Solid | 6010C | 370279 |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

## Client Sample ID: LEAD-1/2

**Lab Sample ID: 480-122014-1**

**Date Collected: 07/26/17 08:50**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 370094 | 08/02/17 12:13 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 370279 | 08/03/17 11:06 | EMB | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 370777 | 08/04/17 16:02 | AMH | TAL BUF |

## Client Sample ID: LEAD-1

**Lab Sample ID: 480-122014-2**

**Date Collected: 07/26/17 09:00**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| TCLP | Leach | 1311 | | | 370094 | 08/02/17 12:13 | MAS | TAL BUF |
| TCLP | Prep | 3010A | | | 370279 | 08/03/17 11:06 | EMB | TAL BUF |
| TCLP | Analysis | 6010C | | 1 | 370777 | 08/04/17 16:06 | AMH | TAL BUF |

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

## Laboratory: TestAmerica Buffalo

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

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

| Analysis Method | Prep Method | Matrix | Analyte |
|---|---|---|---|

# Method Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6010C | TCLP Lead | SW846 | TAL BUF |

**Protocol References:**

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

**Laboratory References:**

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

# Sample Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | Solid | 07/26/17 08:50 | 08/01/17 15:05 |
| 480-122014-2 | LEAD-1 | Solid | 07/26/17 09:00 | 08/01/17 15:05 |

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

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information | Sampler: John Luttinger | Lab PM: Schove, John R | Carrier Tracking No(s): | COC No: 480-100356-23889.1 |
|---|---|---|---|---|
| Client Contact: Dayne Crowley | Phone: 716 998 6973 | E-Mail: john.schove@testamericainc.com | | Page: Page 1 of 1 |
| Company: AMEC Foster Wheeler E & I, Inc | | | | Job #: |

| Address: 800 North Bell Avenue, Suite 200 | Due Date Requested: | Analysis Requested | Preservation Codes: |
|---|---|---|---|
| City: Pittsburgh | TAT Requested (days): Normal | | A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2 |
| State, Zip: PA, 15106 | | | |
| Phone: 412 446-3163 | PO #: 3617167397.02.01 | | |
| Email: dayne.crowley@amec.com | WO #: | | 480-122014 COC |
| Project Name: KR Elk Street - AMEC | Project #: 48015344 | | Other: |
| Site: | SSOW#: | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 6010C - TCLP Metals - Lead Extract Fluid #1 ONLY | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | N | | |
| Lead - 1/2 | 7/26/17 | 08:50 | G | Solid | | | X | | |
| Lead - 1 | 7/26/17 | 0900 | G | Solid | | | X | | |
| | | | | Solid | | | | | |
| | | | | Solid | | | | | |
| | | | | Solid | | | | | |

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

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

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

Special Instructions/QC Requirements:

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

| Relinquished by: John Luttinger | Date/Time: 8/1/17 1505 | Company: Amec | Received by: | Date/Time: 8/1/17 1505 | Company |
|---|---|---|---|---|---|
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 4.3 #1 |
|---|---|---|

# Login Sample Receipt Checklist

Client: AMEC Foster Wheeler E & I, Inc

Job Number: 480-122014-1

**Login Number: 122014**

**List Source: TestAmerica Buffalo**

**List Number: 1**

**Creator: Janish, Carl M**

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

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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

TestAmerica Job ID: 480-122014-2
Client Project/Site: KR Elk Street - AMEC

For:
AMEC Foster Wheeler E & I, Inc
800 North Bell Avenue, Suite 200
Pittsburgh, Pennsylvania 15106

Attn: Dayne Crowley

*Authorized for release by:*
*8/17/2017 4:10:21 PM*
Rebecca Jones, Project Management Assistant I
rebecca.jones@testamericainc.com

Designee for

John Schove, Project Manager II
(716)504-9838
john.schove@testamericainc.com

# Table of Contents

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| U | Indicates the analyte was analyzed for but not detected. |

## Glossary

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

## Job ID: 480-122014-2

### Laboratory: TestAmerica Buffalo

**Narrative**

**Job Narrative**
**480-122014-2**

**Comments**
No additional comments.

**Receipt**
The samples were received on 8/1/2017 3:05 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3º C.

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

# Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Client Sample ID: LEAD-1/2 — Lab Sample ID: 480-122014-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 702 | | 1.5 | 0.35 | mg/Kg | 1 | ☼ | 6010C | Total/NA |

## Client Sample ID: LEAD-1 — Lab Sample ID: 480-122014-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 7820 | | 1.1 | 0.25 | mg/Kg | 1 | ☼ | 6010C | Total/NA |

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Client Sample ID: LEAD-1/2

**Lab Sample ID: 480-122014-1**

**Date Collected: 07/26/17 08:50**
**Matrix: Solid**
**Date Received: 08/01/17 15:05**
**Percent Solids: 76.1**

### Method: 6010C - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 702 | | 1.5 | 0.35 | mg/Kg | ☼ | 08/14/17 15:30 | 08/15/17 16:53 | 1 |

## Client Sample ID: LEAD-1

**Lab Sample ID: 480-122014-2**

**Date Collected: 07/26/17 09:00**
**Matrix: Solid**
**Date Received: 08/01/17 15:05**
**Percent Solids: 90.2**

### Method: 6010C - Metals (ICP)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 7820 | | 1.1 | 0.25 | mg/Kg | ☼ | 08/14/17 15:30 | 08/15/17 16:56 | 1 |

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 480-372024/1-A**
**Matrix: Solid**
**Analysis Batch: 372382**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 372024**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 1.1 | U | 1.1 | 0.26 | mg/Kg | | 08/14/17 15:30 | 08/15/17 16:07 | 1 |

**Lab Sample ID: LCDSRM 480-372024/3-A**
**Matrix: Solid**
**Analysis Batch: 372382**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 372024**

| Analyte | | | Spike Added | LCDSRM Result | LCDSRM Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead | | | 88.4 | 92.35 | | mg/Kg | | 104.5 | 69.9 - 130.1 | 9 | 20 |

**Lab Sample ID: LCSSRM 480-372024/2-A**
**Matrix: Solid**
**Analysis Batch: 372382**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 372024**

| Analyte | | | Spike Added | LCSSRM Result | LCSSRM Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead | | | 88.4 | 100.9 | | mg/Kg | | 114.1 | 69.9 - 130.1 | | |

# QC Association Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Metals

### Prep Batch: 372024

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | Total/NA | Solid | 3050B | |
| 480-122014-2 | LEAD-1 | Total/NA | Solid | 3050B | |
| MB 480-372024/1-A | Method Blank | Total/NA | Solid | 3050B | |
| LCDSRM 480-372024/3-A | Lab Control Sample Dup | Total/NA | Solid | 3050B | |
| LCSSRM 480-372024/2-A | Lab Control Sample | Total/NA | Solid | 3050B | |

### Analysis Batch: 372382

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | Total/NA | Solid | 6010C | 372024 |
| 480-122014-2 | LEAD-1 | Total/NA | Solid | 6010C | 372024 |
| MB 480-372024/1-A | Method Blank | Total/NA | Solid | 6010C | 372024 |
| LCDSRM 480-372024/3-A | Lab Control Sample Dup | Total/NA | Solid | 6010C | 372024 |
| LCSSRM 480-372024/2-A | Lab Control Sample | Total/NA | Solid | 6010C | 372024 |

## General Chemistry

### Analysis Batch: 369968

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | Total/NA | Solid | Moisture | |
| 480-122014-2 | LEAD-1 | Total/NA | Solid | Moisture | |

# Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Client Sample ID: LEAD-1/2

**Lab Sample ID: 480-122014-1**

**Date Collected: 07/26/17 08:50**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 369968 | 08/02/17 06:21 | CSW | TAL BUF |

## Client Sample ID: LEAD-1/2

**Lab Sample ID: 480-122014-1**

**Date Collected: 07/26/17 08:50**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

**Percent Solids: 76.1**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 372024 | 08/14/17 15:30 | EMB | TAL BUF |
| Total/NA | Analysis | 6010C | | 1 | 372382 | 08/15/17 16:53 | LMH | TAL BUF |

## Client Sample ID: LEAD-1

**Lab Sample ID: 480-122014-2**

**Date Collected: 07/26/17 09:00**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Analysis | Moisture | | 1 | 369968 | 08/02/17 06:21 | CSW | TAL BUF |

## Client Sample ID: LEAD-1

**Lab Sample ID: 480-122014-2**

**Date Collected: 07/26/17 09:00**

**Matrix: Solid**

**Date Received: 08/01/17 15:05**

**Percent Solids: 90.2**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3050B | | | 372024 | 08/14/17 15:30 | EMB | TAL BUF |
| Total/NA | Analysis | 6010C | | 1 | 372382 | 08/15/17 16:56 | LMH | TAL BUF |

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

## Laboratory: TestAmerica Buffalo

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

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

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

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

# Method Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6010C | Metals (ICP) | SW846 | TAL BUF |
| Moisture | Percent Moisture | EPA | TAL BUF |

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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

# Sample Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: KR Elk Street - AMEC

TestAmerica Job ID: 480-122014-2

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 480-122014-1 | LEAD-1/2 | Solid | 07/26/17 08:50 | 08/01/17 15:05 |
| 480-122014-2 | LEAD-1 | Solid | 07/26/17 09:00 | 08/01/17 15:05 |

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

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information | Sampler: John Luttinger | Lab PM: Schove, John R | Carrier Tracking No(s): | COC No: 480-100356-23889.1 |
|---|---|---|---|---|
| Client Contact: Dayne Crowley | Phone: 716 998 6973 | E-Mail: john.schove@testamericainc.com | | Page: Page 1 of 1 |
| Company: AMEC Foster Wheeler E & I, Inc | | | | Job #: |

| Address: 800 North Bell Avenue, Suite 200 | Due Date Requested: | Analysis Requested | Preservation Codes: |
|---|---|---|---|
| City: Pittsburgh | TAT Requested (days): Normal | | A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2 |
| State, Zip: PA, 15106 | | | |
| Phone: 412 446-3163 | PO #: 3617167397.02.01 | | |
| Email: dayne.crowley@amec.com | WO #: | | 480-122014 COC |
| Project Name: KR Elk Street - AMEC | Project #: 48015344 | | Other: |
| Site: | SSOW#: | | |

| Sample Identification | Sample Date | Sample Time | Sample Type (C=Comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 6010C - TCLP Metals - Lead Extract Fluid #1 ONLY | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | N | | |
| Lead - 1/2 | 7/26/17 | 08:50 | G | Solid | | | X | | |
| Lead - 1 | 7/26/17 | 0900 | G | Solid | | | X | | |
| | | | | Solid | | | | | |
| | | | | Solid | | | | | |
| | | | | Solid | | | | | |

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

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

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

Special Instructions/QC Requirements:

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

| Relinquished by: John Luttinger | Date/Time: 8/1/17 1505 | Company: Amec | Received by: | Date/Time: 8/1/17 1505 | Company |
|---|---|---|---|---|---|
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 4.3 #1 |
|---|---|---|

# Login Sample Receipt Checklist

Client: AMEC Foster Wheeler E & I, Inc

Job Number: 480-122014-2

**Login Number: 122014**

**List Source: TestAmerica Buffalo**

**List Number: 1**

**Creator: Janish, Carl M**

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