FOR CONTRACT NO.: 07-278301

INFORMATION HANDOUT

MATERIALS INFORMATION

AERIALLY DEPOSITED LEAD INVESTIGATION REPORT, ROUTE 405 TEMPLE AVENUE BRIDGE REPAIR, PM 3.4/4.5 CONTRACT NO. 07A2730, TASK ORDER NO. 17, PREPARED BY AMEC GEOMATRIX, INC., NOVEMBER 4, 2011

FINAL FOUNDATION REPORT FOR TEMPLE AVENUE OVERCROSSING REPAIR
BRIDGE NO. 53-1198
07-LA-405-PM 4.3, APRIL 27, 2012

GEOTECHNICAL REVIEW FORM
TEMPLE AVENUE OVERCROSSING REPAIR
07-278301, 07-LA-405 PM 4.3

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ROUTE 405 TEMPLE AVENUE BRIDGE REPAIR, AERIALLY DEPOSITED LEAD SITE INVESTIGATION, PM 3.4/4.5

Caltrans Contract Number 07A2730, Task Order 17
EA 07-278301
Long Beach, California

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November 4, 2011

Project No. 0153240170

ROUTE 405 TEMPLE AVENUE BRIDGE REPAIR, AERIALLY DEPOSITED LEAD SITE INVESTIGATION, PM 3.4/4.5

Caltrans Contract Number 07A2730, Task Order 17
EA 07-278301
Long Beach, California

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SITE INVESTIGATION REPORT
Route 405 Temple Avenue Bridge Repair,
Aerially Deposited Lead Site Investigation, P.M. 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
EA-07-278301
Long Beach, California

November 4, 2011

Project No. 0153240170

This report was prepared by the staff of AMEC Geomatrix, Inc., under the supervision of the Geologists and/or Engineers whose signatures appear hereon.

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ROUTE 405 TEMPLE AVENUE BRIDGE REPAIR, AERIALLY DEPOSITED LEAD SITE INVESTIGATION, PM 3.4/4.5

Caltrans Contract Number 07A2730, Task Order 17
EA 07-278301
Long Beach, California

EXECUTIVE SUMMARY

AMEC Geomatrix, Inc. (AMEC) prepared this Aerially Deposited Lead (ADL) Investigation Report (Report) on behalf of the California Department of Transportation (Caltrans) to evaluate constituents of concern (COCs) including lead, volatile organic compounds (VOCs), and total petroleum hydrocarbons (TPH) in soil at boring locations selected by Caltrans.
This investigation was performed in support of the Route 405 Temple Avenue Bridge Repair (Project) located in the City of Long Beach, Los Angeles County, California (Figure 1).
This Report has been prepared in accordance with Caltrans Contract 07A2730, Task Order 17 (Caltrans, 2011).

The Temple Avenue Bridge reportedly was constructed in 1964 and consists of a two-span, nine-cell, reinforced concrete box girder structure with closed end cantilever abutments and column/pier bent supported on spread footings. Damage to the bridge was observed in the form of acute delamination and spalling of concrete in the soffit of cells #8 and #9 for the entire bridge length, in three bearings in abutment no. 3, and deep corrosion of the majority of the rebar located in the bottom of cells #8 and #9 (Caltrans, 2011). The planned Project includes the following elements:

- demolishing cells #8 and #9,
- removing the concrete barrier,
- replacing the chain-link railing and concrete sidewalk,
- reconstructing bridge cells as PC/PS post-tensioned bulb-T girder with a Type 26 Modified concrete barrier and chain link railing,
- replacing the median barrier, and
- widening shoulders to current standards.

This investigation was conducted to provide data regarding subsurface conditions adjacent to the existing bridge abutment to allow Caltrans to determine potential reuse and/or disposal

options, as appropriate in accordance with the Department of Toxic Substances Control (DTSC) Lead Variance for ADL-impacted soil. The data will also be used by the construction contractor to develop appropriate health and safety measures and to support developing soil management protocols for soil spoils generated during construction.

Scope of Work

The scope of work for this ADL investigation included advancing four borings at the locations and depths specified by Caltrans in the Task Order. The drilling and sampling was conducted using hand auger and a slide hammer drive sampler that was lined with a stainless steel sample sleeve to facilitate the collection of soil samples.

Soil samples that were analyzed total lead concentration (Total Threshold Limit Concentration [TTLC]) were collected in 6-inch long intervals using a hand auger beginning at the sample depth specified by Caltrans. Each soil sample was placed in a resealable plastic bag, homogenized, and then transferred to a glass sample jar. Soil samples that contained total lead concentrations greater than or equal to 50 milligrams per kilogram (mg/Kg) were analyzed for soluble lead using the Waste Extraction Test method with citric acid as the extractant (WET-citric acid). Soil samples that contained total lead concentrations greater than or equal to 1,000 mg/Kg were also analyzed for soluble lead by using the Toxicity Characteristic Leaching Procedures [TCLP]). Only one sample had a reported lead concentration that exceeded 1,000 mg/Kg. To satisfy the project requirements, 10 percent of the project samples (three samples) with the highest total lead concentration were further analyzed for leachable lead using the TCLP method. Ten percent of the samples were randomly selected and analyzed for pH. Five percent of the soil samples with the highest total lead concentration were analyzed for Title 22 metals.

Selected soil samples were also analyzed for VOCs and TPH carbon chain speciation in the gasoline range (C4 to C8). These soil samples were field preserved using U.S. EPA Method 5035 before submittal to the laboratory. Each soil sample for VOC and TPH analyses was collected directly from the stainless steel sample sleeve using lab-supplied a Terracore sampler to obtain three 5-gram aliquots of soil. Each aliquot of soil was extruded from the Terracore sampler into a pre-labeled 40 milliliter (mL) volatile organic analysis (VOA) vial containing a pre-measured quantity of a preservative. One VOA vial contained 10 mL of methanol preservative and the other two VOA vials each contained 5 mL of sodium bisulfate preservative. After a 5-gram aliquot of soil was extruded into each VOA vial, the vial was immediately capped, labeled, and placed in an ice-chilled shipping container.

For the remainder of the required analyses, AMEC provided the laboratory with a soil sample that was in a stainless steel sleeve capped with Teflon® sheeting and plastic end caps, or in a 4-ounce (oz) glass sample jar.

Summary of Results

Soil samples were collected from four boring locations located within the Project area and were analyzed in accordance with the analytical criteria specified in the Task Order. The analytical data reported by Advanced Technology Laboratories for this Project meet the Quality Assurance/Quality Control (QA/QC) requirements and are considered useable for their intended purpose. A summary of laboratory results for the soil samples collected during the ADL investigation is provided below.

Lead and pH Results:

A total of 24 soil samples were collected from the four boring locations and were analyzed for total lead concentrations. The reported concentrations ranged from 5.0U to 1,100J mg/Kg, where "U" represents an estimated concentration less than or equal to the practical quantitation limit (PQL) and "J" represents and estimated concentration. Of the 24 samples, five samples that contained total lead concentrations greater than or equal to 50 mg/Kg were analyzed for soluble lead using the WET-citric acid method. One of the five samples analyzed for soluble lead using the WET-citric acid method contained a concentration greater than 5.0 milligrams per liter (mg/L). That sample (1139-101-0.0) was then analyzed for soluble lead concentrations using the WET-de-ionized (WET-DI) water method and reported a non-detect concentration. To meet the project goals, 10 percent of the samples (three samples) with the highest total lead concentration were also analyzed for leachable lead using the Toxicity Characteristic Leaching Procedure (TCLP) method. Only one of the three soils samples analyzed using the TCLP method reported a detectable soluble lead concentration (0.25 mg/L).

The pH values of four soil samples analyzed ranged from 7.2 to 7.9 units.

VOCs and TPH Results:

A total of seven soil samples were selected and analyzed for VOCs and TPH in carbon chain ranges C4 to C8 and from C9 to C32 with individual carbon chain speciation. VOCs were detected in three of the seven soil samples collected and appeared to be related to aromatic petroleum hydrocarbon compounds. The VOCs and maximum reported concentrations in these soil samples were: 1,2,4-trimethylbenzene (21 micrograms per kilogram [µg/Kg]); 1,3,5-trimethlybenzene (7.7 µg/Kg); 2-chlorotoluene (3.2J µg/Kg); 4-isopropyltoluene

(1.3J µg/Kg); benzene (42 µg/Kg); ethylbenzene (32 µg/Kg); isopropylbenzene (10 µg/Kg); naphthalene (0.95 µg/Kg); n-propylbenzene (10 µg/Kg); sec-butylbenzene (1.5J µg/Kg); tert-butanol (200 µg/Kg); toluene (20 µg/Kg); m,p-xylenes (18 µg/Kg); o-xylenes (1.6J µg/Kg); and total xylenes (19 µg/Kg). TPH in the C4 to C8 range was detected at estimated concentrations in 5 of the soil samples at a maximum reported concentration of 2.1 mg/Kg. TPH in the C9 to C32 range was not detected in any of the soil samples.

ROUTE 405 TEMPLE AVENUE BRIDGE REPAIR, AERIALLY DEPOSITED LEAD SITE INVESTIGATION, PM 3.4/4.5

Caltrans Contract Number 07A2730, Task Order 17
EA 07-278301
Long Beach, California

1.0 INTRODUCTION

AMEC Geomatrix, Inc. (AMEC), prepared this Aerially Deposited Lead (ADL) Investigation Report (Report) on behalf of the California Department of Transportation (Caltrans) to evaluate constituents of concern (COCs) including lead, volatile organic compounds (VOCs), and total petroleum hydrocarbons (TPH) in soil. This investigation was performed in support of the Route 405 Temple Avenue Bridge Repair (Project) located in the City of Long Beach, Los Angeles County, California (Figure 1). This Report has been prepared in accordance with Caltrans Contract 07A2730, Task Order 17 (Caltrans, 2011).

The Temple Avenue Bridge was reportedly constructed in 1964 and consists of a two-span, nine-cell, reinforced concrete box girder structure with closed end cantilever abutments and column/pier bent supported on spread footings. Damage to the bridge was observed in the form of acute delamination and spalling of concrete in the soffit of cells #8 and #9 for the entire bridge length, in three bearings in abutment no. 3, and deep corrosion of the majority of the rebar located in the bottom of cells #8 and #9 (Caltrans, 2011). The planned Project includes the following elements:

- demolishing of cells #8 and #9,
- removing the concrete barrier,
- replacing the chain link railing and concrete sidewalk,
- reconstructing bridge cells as PC/PS post-tensioned bulb-T girder with a Type 26 Modified concrete barrier and chain link railing;
- replacing the median barrier; and
- widening shoulders to current standards.

This investigation was conducted to evaluate if the surface and subsurface soil within the footprint of the proposed bridge foundation poses a risk to human health and the environment,

to identify the vertical extent of lead-impacted soil, and to provide data to support developing soil management protocols for soil spoils produced during construction.

1.1 OBJECTIVE

The objectives of the investigation are to:

- evaluate the type, extent, and concentrations of lead, VOCs, and TPH in soil that may be present at and below ground surface within the footprint of the proposed bridge construction; and

- provide data to Caltrans to support developing requirements for protection of worker health and safety and appropriate management protocols for soil spoils generated during construction.

Statistical evaluation of the data will be performed by Caltrans, which will then be used to develop soil management protocols.

1.2 SCOPE OF WORK

AMEC's field investigation was conducted to satisfy the project objectives in accordance with Caltrans Contract 07A2730 Task Order 17 (Caltrans, 2011). The scope of this investigation included the following tasks.

- Prepare a Health and Safety Plan (HASP) for protection of workers specific to the proposed project tasks;

- Advance soil borings and collect soil samples to:

    - evaluate the presence of total lead at selected depth intervals between ground surface and a depth of 10 feet;

    - analyze soil samples for soluble lead concentrations using the Waste Extraction Test method using citric acid (WET-citric acid) if the total lead concentration is greater than or equal to 50 milligrams per kilogram (mg/Kg);

    - analyze soil samples for soluble lead concentrations using de-ionized water (WET-DI) if the WET-citric acid test result is greater than or equal to 5 milligrams per liter (mg/L);

    - analyze soil samples using Toxicity Characteristic Leaching Procedures (TCLP) if the total lead concentration is greater than or equal to 1,000 mg/Kg;

- analyze five percent of the samples with the highest total lead concentrations for Title 22 metals;
- analyze ten percent of the total samples for pH (samples selected randomly), and
- analyze soil samples at depths 5 feet below grade and greater for VOCs and TPH.

- Destroy hand auger borings by backfilling with soil cuttings.
- Locate soil borings using a global positioning satellite (GPS) unit; and
- Prepare a report to summarize the analytical results.

2.0 PROJECT BACKGROUND

This section describes the Project setting, geographic location, regional geology, and local lithology and hydrogeology. This information was derived from published reference materials and subsurface investigations performed by others in the vicinity of the Project.

2.1 PHYSIOGRAPHIC SETTING

As shown on the Long Beach United States Geological Survey 7.5 Minute Series Quadrangle, the Project is located along Route 405 at the Temple Avenue Bridge in Los Angeles County, California (Figure 1) (United States Geological Survey [USGS], 1981). The average elevation of the Project is approximately 55 feet above mean sea level. The topography of the Project area is predominately flat sloping downward to the northeast. Features within the vicinity of the Site include Long Beach Airport located to the north across Spring Street, Signal Hill located approximately ¾ miles to the south, and the Los Angeles River located approximately 2.5 miles to west of the Project area.

2.2 REGIONAL GEOLOGY

The Project is situated on the Bouton Plain within the Central Basin Pressure Area, a physiographic lowland area bordered by the Santa Monica Mountains to the west and the Santa Ana Mountains to the east. Prominent features include the Los Angeles River to the west, the San Gabriel River and Coyote Creek to the east, and Signal Hill to the south. The Central Basin Pressure Area surficial geology generally consists of alluvial sediments from the Lakewood and San Pedro Formations deposited by the Los Angeles and San Gabriel Rivers due to erosion of the San Gabriel Mountains during the late Pleistocene age (California Department of Water Resources [CDWR], 1961).

2.3 SUBSURFACE CONDITIONS

The soil in the Project's vicinity is described primarily as non-marine alluvial and shallow marine sediments including interbedded sand, silt, and clay. Regional groundwater beneath the Project area is reported at approximately 40 to 50 feet below ground surface (bgs) according to monitoring conducted in the vicinity by others (Miller Brooks Environmental Inc. [Miller Brooks], 2005).

2.3.1 Local Lithology

Based on previous subsurface investigations immediately north of the Project, the local lithology consists of the upper Pleistocene Lakewood Formation and the lower Pleistocene San Pedro Formation (Miller Brooks, 2005). The Lakewood Formation is mostly comprised of unconsolidated sand, silt, and clay, while the San Pedro Formation is comprised mostly of more coarsely grained sands and gravel, with some marine deposits. In the regional vicinity of the Project, the Lakewood Formation is approximately 195 feet thick and the San Pedro Formation approximately 560 feet thick (CDWR, 1961).

2.3.2 Local Hydrogeology

Based on review of the data obtained during nearby investigations, the aquifers beneath the vicinity of the site area include, in descending order: Exposition, Gage, Hollydale, Jefferson, Lynwood, Silverado, and Sunnyside aquifers. The shallowest aquifer, Exposition, can be expected to be present at approximately 100 feet bgs at the Project (CDWR, 1961).

3.0 FIELD INVESTIGATION

The field investigation was performed on June 2, 2011, in accordance with the Task Order and as requested by Caltrans field representatives.

The field tasks included advancing four borings adjacent to Route 405 (Figure 2) for the collection of soil samples. Caltrans provided traffic control services during the field investigation. AMEC provided direction and oversight of all staff to ensure that appropriate quality control and applicable regulatory guidelines were followed while conducting the field tasks.

3.1 PRE-FIELD ACTIVITIES

The following subsections describe the pre-field activities performed prior to beginning the field investigation.

3.1.1 Environmental Health and Safety Plan

AMEC implemented necessary measures for the safe performance of the field tasks during this investigation. The HASP, which describes these safety measures was prepared and approved by Caltrans prior to performing any field tasks.

A health and safety pre-field meeting was conducted at the Project between AMEC and all personnel prior to initiating the field activities. During the meeting, AMEC confirmed the work to be performed, the health and safety measures that were to be implemented, and the anticipated project schedule. A discussion of the health and safety procedures implemented in the field is included in the HASP. No unexpected conditions were encountered that resulted in implementation of a contingency plan or work stoppage. A copy of the final HASP, associated health and safety field meeting forms are included in Appendix A.

3.1.2 Site Reconnaissance

On May 20, 2011, prior to commencing sampling for the investigation, AMEC conducted a site reconnaissance to evaluate access to each of the proposed boring locations. The boring locations were cleared of underground public and private utilities by notifying Underground Service Alert at least two business days before any intrusive work was performed.

Site conditions were reviewed by AMEC staff before commencing field tasks.
The investigation includes the following tasks:

- evaluate existing and identified utilities in relation to the proposed sampling locations;
- provide safe access and movement within work area;
- identify operational and safety requirements;
- secure work area with barricades or temporary fencing, if applicable; and
- assess health and safety conditions.

3.1.3 Permitting

Boring permits were not obtained for this Project. Boring permits are only required by the County of Los Angeles for soil borings intended to encounter groundwater.

3.2 INVESTIGATION METHODS

The field exploration program included advancing soil borings using either a hand auger or slide hammer equipment for collecting depth-specific soil samples. Field tasks were

conducted on June 2, 2011, by AMEC staff, which included a California Professional Geologist. Aspects of the field program are described below.

3.2.1 Sampling Program

All sampling locations were given a unique identification number provided by Caltrans beginning with 1139 (Caltrans, 2011).

All borings were advanced and sampled using hand auger or slide hammer equipment. Soil sampling was conducted by collecting soil from a 6-inch long interval beginning at the sample depths selected by Caltrans. Soil samples collected for total lead analysis consisted of placing the collected soil sample interval into a resealable plastic bag. The soil then was homogenized and placed into a glass sample jar. Soil samples also were collected at depths of 5 feet below grade and deeper for VOC and TPH analysis.

Soil samples collected for VOCs and total petroleum hydrocarbon (TPH) carbon chain speciation in the gasoline range (C4 to C8) analyses were field preserved onsite using U.S. EPA Method 5035 before submittal to the laboratory. Soil samples collected for VOCs and TPH analyses were collected from the stainless steel sleeves using lab-supplied Terracore samplers to collect three 5-gram aliquots of soil. Each aliquot of soil was extruded from the Terracore sampler into a pre-labeled 40 milliliter (mL) volatile organic analysis (VOA) vial containing a pre-measured quantity of a preservative. One VOA vial contained 10 mL of methanol preservative and the other two VOA vials each contained 5 mL of sodium bisulfate preservative. After a 5-gram aliquot of soil was extruded into each VOA vial, the vial was immediately capped and placed in an ice-chilled shipping container.

For the remainder of the required analyses, AMEC provided the laboratory with the soil samples in stainless steel sleeves capped with Teflon® sheeting and plastic end caps or in 4-ounce (oz) glass jars for each soil sample interval.

During advancement of each boring, AMEC field staff prepared lithologic descriptions of the soil borings and documented daily activities (Daily Field Records and boring logs are included in Appendix B). Soil was described in the field, based on the observed or measured condition of the subsurface soils (i.e., moisture content, Munsell color, changes in soil structure, etc).

All boring locations were backfilled using soil cuttings. Decontamination rinsate also was disposed on site and in accordance with the Task Order. Personal protective equipment (PPE) was properly disposed in accordance with applicable federal, state, and local rules and regulations.

3.2.2 Soil Sampling and Analysis

In general, soil samples were retrieved from either hand auger or slide hammer sampling equipment as the borings were advanced.

In general, all sample depths began at ground surface and extended to total depths ranging from 0.0 feet to 15 feet bgs. Tables 1 through 4 include the boring identification, sample identification, sample depths, and the analytical suite performed on each sample.

A chain-of-custody form identifying requested sample analyses and documenting sample custody was completed. Soil samples were collected in laboratory-supplied, preserved (where applicable) containers, placed in ice chests containing ice and shipped to the analytical laboratory at the end of each day of field work. Samples were transported to Advanced Technology Laboratories (ATL) of Signal Hill, California, a laboratory certified by the California Environmental Laboratory Accreditation Program.

Soil samples were collected in the order of volatilization (VOCs, TPH [C4-C8], TPH [C9-C32], metals, and pH) and analyzed by the following methods listed:

- soil samples collected at depths of 5 feet, 10 feet, and 15 feet below grade were analyzed for VOCs using U.S. EPA Method 8260B,
- soil samples collected at depths of 5 feet, 10 feet, and 15 feet below grade were analyzed for TPH (C4 to C8) and TPH (C9-C32; with individual carbon chain speciation) using EPA Method 8015B;
- soil samples collected at depths of 0 ft, 1 ft, 2 ft, 3 ft, 5 ft, 7.5 ft and 10 ft below grade were analyzed for total lead using U.S. EPA Method 6010B;
- samples with total lead concentrations greater than or equal to 50 mg/Kg were analyzed for soluble lead (U.S. EPA Method 7420) using the WET-citric acid method;
- samples with WET results greater than or equal to 5 mg/L were analyzed for soluble lead (U.S. EPA Method 7420) using the WET-DI method;
- samples with lead concentrations greater than or equal to 1,000 mg/Kg total lead were analyzed for leachable lead using the TCLP method (U.S. EPA Method 1311/7420);
- approximately ten percent of the soil samples were analyzed for pH using U.S. EPA Method 9045; and

- approximately five percent of the soil samples were analyzed for Title 22 metals (including mercury) using U.S. EPA Methods 6010B and 7471A.

Copies of the laboratory analytical reports for the soil samples and chain-of-custody documentation are included in Appendix C.

3.2.3 Field Quality Assurance/Quality Control

Equipment rinsate, field, and trip blanks were collected as specified in the Task Order to evaluate the adequacy of the equipment decontamination process and to evaluate any contamination in the sample collection process. A source water blank also was collected to measure potential impacts from the water used for the equipment blank and field blank samples.

All field QA/QC samples were collected in 500 mL, unpreserved plastic bottles. ATL filtered the samples, then preserved with nitric acid prior to analysis for total lead (TTLC) and title 22 metals using U.S. EPA Method 6010B.

3.2.4 Equipment Decontamination

Sampling equipment was decontaminated before first use, before sample collection, and before demobilization from the Project. The sampling equipment was decontaminated between each use by washing the equipment with a non-phosphate detergent (Alconox) and water followed by a triple rinse with distilled water.

3.2.5 Boring Destruction Procedure

All borings were backfilled with cuttings. Photographic documentation of the field tasks performed, including boring destruction and Project restoration, is included in Appendix D.

3.2.6 GPS Survey and Photographic Log of Sampling Locations

Each boring location was surveyed using a Trimble GeoExplorer GPS unit to obtain the latitude and longitude coordinates. The measured coordinates have a horizontal accuracy of 1.5 feet or less. The GPS data are provided in Table 5.

A photographic log that contains photos taken from each of the boring locations is included as Appendix D.

3.3 INVESTIGATION-DERIVED WASTE

Soil cutting and equipment rinsate water produced during the field investigation was disposed on site. Measures were taken to prevent any rinsate water from entering the roadway, storm drains, or run-off from State right-of-way. Disposable equipment, such as used acetate liners and nitrile gloves, was disposed as municipal waste.

3.4 FIELD DEVIATIONS FROM SCOPE OF WORK

Deviations from the scope of work made during this the field investigation, as directed and/or agreed upon by Caltrans personnel included the following.

- Four proposed boring locations, 1139-105 through 1139-108 were removed from the scope of work due to time constraints.
- One soil sample (1139-104-3.0) was inadvertently not collected during the field investigation.
- One additional soil sample (1139-101-15.0) was collected and analyzed for VOCs and TPH.

4.0 INVESTIGATION AND ANALYTICAL RESULTS

During this investigation, 24 soil samples from four borings were submitted to ATL for analysis. Tables 1 through 4 summarize the analytical results for the soil samples analyzed.

4.1 SOIL SAMPLES AND LITHOLOGIC MATERIALS ENCOUNTERED

Soil samples for laboratory analysis were collected from depths indicated on Tables 1 through 4 at each of the sampling locations. Various soil types were observed throughout the Project area, including poorly graded sand, silty sand, clayey sand, sandy lean clay, lean clay with sand, and lean clay to approximately 15 feet bgs. The soils encountered in the field were highly variable and consistent with the regional alluvial materials. For a more detailed description of the soils encountered during this investigation, refer to the boring logs included in Appendix B.

4.2 SOIL ANALYTICAL RESULTS

Laboratory analytical reports and chain-of-custody documentation for the soil samples analyzed are included in Appendix C and a database (Microsoft Access Database is provided in Appendix E).

Lead

Lead analytical results are provided in Table 1. The reported concentrations ranged from 5.0U to 1,100J mg/Kg, where “U” represents an estimated concentration less than or equal to the practical quantitation limit (PQL) and “J” represents and estimated concentration. Of the 24 samples analyzed, five samples had total lead concentrations greater than or equal to 50 mg/Kg. These five soil samples were at the surface (0 ft bgs) to a depth of approximately one foot. These soil samples were further analyzed using the WET-citric acid method for

soluble lead (Table 1). Reported WET-citric acid soluble lead concentrations ranged from 1.6 mg/L in sample 1139-101-1.0 to a concentration of 29 mg/L in sample 1139-101-0.0. WET-citric acid soluble lead results exceeded the STLC of 5.0 mg/L in one of the five samples analyzed. Soil sample 1139-101-0.0, where citric acid soluble lead exceeded the STLC, was analyzed using the WET-DI method. Soluble lead was not detected at or above the method detection limit of 0.25 mg/L using the WET-DI method. Ten percent of the samples (three samples) with the highest total lead concentration were further analyzed for leachable lead using the TCLP method. Reported leachable lead concentrations using the TCLP method were non-detect in samples 1139-101-1.0 and 1139-102-0.0 and 0.51 mg/L in sample 1139-101-0.0. Based on the soil sample analyses, elevated concentrations of lead in soils appear to be localized in the depth interval from ground surface to a depth of approximately one foot, and the only concentration of lead reported that exceeded STLC guideline of 5 mg/L was the soil sample collected from 1139-101 at the surface (0 ft bgs).

Title 22 Metals

Five percent of the soil samples (two) with the highest total lead concentrations were further analyzed for Title 22 metals (not re-analyzing for lead in each of the two samples).
The Title 22 metals analytical results are provided in Table 4.

In addition to the total and soluble lead concentrations described above, arsenic was detected in both soil samples analyzed at concentrations of 0.72J* and 20 mg/Kg. The March 2008 DTSC publication Determination of a Southern California Regional Background Arsenic Concentration in Soil (DTSC, 2008) establishes a regional background concentration for arsenic within Southern California including Los Angeles County using naturally occurring and anthropogenic concentrations of arsenic and concludes that the upper-bound background concentration for arsenic within Los Angeles County is 12 mg/Kg. Although one soil sample exceeded the background concentration, arsenic concentrations are not considered a concern because the average of the two soil samples is below the 12 mg/Kg background concentration and total lead concentrations are the driver for potential soil handling in the shallow soils where the 20 mg/kg was encountered.

pH

Ten percent of the soil samples (three) were analyzed for pH. The pH analytical results ranged from 7.2 (1139-102-1.0) to 7.9 (1139-101-0.0 and 1139-102-0.0) and are provided in Table 1.

VOCs

Soil samples collected at depths of 5 feet below grade and greater were analyzed for VOCs. VOCs were detected in three of the seven soil samples collected (1139-101-10.0, 1139-101-15.0 and 1139-102-10.0). The VOCs and maximum reported concentrations in these soil samples were: 1,2,4-trimethylbenzene (21 micrograms per kilogram [µg/Kg]); 1,3,5-trimethlybenzene (7.7 µg/Kg); 2-chlorotoluene (3.2J µg/Kg); 4-isopropyltoluene (1.3J µg/Kg); benzene (42 µg/Kg); ethylbenzene (32 µg/Kg); isopropylbenzene (10 µg/Kg); naphthalene (0.95 µg/Kg); n-propylbenzene (10 µg/Kg); sec-butylbenzene (1.5J µg/Kg); tert-butanol (200 µg/Kg); toluene (20 µg/Kg); m,p-xylenes (18 µg/Kg); o-xylenes (1.6J µg/Kg); and total xylenes (19 µg/Kg). These VOCs are consistent with a release of petroleum hydrocarbon constituents. VOCs were not detected in soil samples collected from a depth of 5 feet bgs at 1139-101 and 1139-102. A summary of the VOC results are provided in Table 2.

Based on visual observations made during hand augering, soils between depths of 8.5 and 15.5 feet bgs at 1139-101 were described as having a strong to moderate petroleum hydrocarbon odors. PID readings from hand auger soil samples retained from depths of approximately 9 and 12.5 feet at this location were 490 and 5.6 parts per million, respectively. The visual observations and PID readings are in relatively good agreement with the VOCs detected in the soil samples from 1139-101; however, the lateral extent and deeper vertical extent of soils containing VOCs was not defined with the data collected during this investigation.

TPH

Soil samples collected at depths equal to and greater than 5 feet below grade were analyzed for TPH. TPH in the C4 to C8 range was detected in 5 of the soil samples (1139-101-10.0, 1139-101-15.0, 1139-102-10.0, 1139-104-5.0, 1139-104-10.0) at a maximum reported concentration of 2.1 mg/Kg. TPH in the C9 to C32 range was not detected in any of the soil samples. A summary of the TPH results are provided in Table 3.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC procedures were performed in accordance with the Task Order. Field QA/QC procedures included analyses of equipment rinsate, field, trip, and source water blank samples as described in Section 3.2.3. In addition, the laboratory data were reviewed, qualified, and validated as described below in Section 6.0.

Two rinsate (equipment blank) samples, field blank sample (1139-100-FB-1) and the source water blank samples had reported estimated lead concentrations above the method detection limit (MDL) and below the PQL. VOCs including bromodichloromethane, chloroform, and

chloromethane were detected in the source water and in one field blank sample (1139-100-FB-1) at concentration between the MDL and PQL (Table 6).

6.0 DATA VALIDATION

Soil samples were successfully obtained in accordance with the Task Order. The laboratory reported the requested analyses and the data reports were complete. All associated analytical holding times were met by the laboratories for the samples tested. The field and laboratory quality control results were reviewed by AMEC.

Data validation procedures are based on the principles of the U.S. EPA National Functional Guidelines (U.S. EPA 2008, 2010) and were designed to ensure completeness and adequacy of the data set. For some analytical results, quality control and/or quality assurance criteria were not met and U.S. EPA data qualifiers were included to the reported data to indicate limitations and/or bias in the data. The definitions for the data qualifiers or data validation flags used during validation are provided in the data tables and are consistent with those defined in U.S. EPA National Functional Guidelines (U.S. EPA 2008, 2010). Data validation flags indicate results that are considered estimated due to analytical bias.

Data qualified as estimated are affected by special circumstances, and are likely to be quantitatively biased to some degree. Such data provide only an approximate measure of the respective analyte concentration(s). Data qualifiers have been appended to the respective data and are reflected in the data summary tables. The data, as qualified, are acceptable and can be used for decision-making purposes; however, the limitations identified by the applied qualifiers should be considered when using the data. For a more detailed discussion on data quality, refer to the Data Validation Report provided in Appendix C.

7.0 DISCUSSION

Soil samples were collected from four boring locations located within the Project area and analyzed in accordance with the analytical criteria specified in the Task Order. Elevated concentrations of total lead were reported in soil samples collected from ground surface to depths of approximately one foot bgs at three of the four soil boring locations completed during this investigation. Soil samples collected from depths of approximately two feet and deeper at each soil boring location reported concentrations that were below the 50 mg/Kg soil screening criteria for lead.

VOCs consistent with petroleum hydrocarbons were reported in soil samples collected from depths of 10 and 15 feet bs at 1139-101 and 10 feet bgs at 1139-102. Based on field observations, the soils between a depth of approximately 8.5 feet and 15 feet bgs at 1139-101 were described as having a moderate to strong petroleum hydrocarbon odor. The lateral

extent and deeper vertical extent of soils containing VOCs was not defined with the data collected during this investigation.

Based on the analytical results, the total lead concentrations in shallow soils and VOCs in deeper soils will require further evaluation by Caltrans and its contractors to determine potential reuse and/or disposal options for shallow soils containing lead, to develop appropriate health and safety measures, and to support development of soil management protocols for soil spoils that may be generated during the planned Temple Avenue Bridge repair.

8.0 LIMITATIONS

This report has been prepared exclusively for Caltrans. The information obtained is only relevant as of the date of the latest site visit and is only valid as of the date of the report and will require an update to reflect additional information obtained.

The disposition and handling of the soil are governed by California regulations. Characterization of the soil in the study areas for either California or Federal waste criteria was beyond the scope of work in this task order.

9.0 REFERENCES

California Department of Transportation (Caltrans), 2011, Contract 07A2730 Task Order No. 17 – Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead (ADL) Site Investigation, PM 3.4/4.5, EA 07-278301, May 21.

California Department of Water Resources (CDWR), 1961, Bulletin No. 104, Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A, Groundwater Geology, June.

Miller Brooks Environmental, Inc. (Miller Brooks), 2005, First Quarter 2005 Groundwater Monitoring and Sampling Report, Total Equipment Rental, 2800 East Spring Street, Long Beach, California, LARWQCB Case No.908061189, April 14.

United State Geological Survey Topographic Map, 1981a, 7.5-minute series, Long Beach, California Quadrangle.

TABLES

TABLE 1

SOIL ANALYTICAL RESULTS - LEAD and pH

Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Boring ID	Sample ID	Depth (ft)[1]	Sample Date	Total Lead[2] (mg/Kg)	WET-Citric Acid Lead[3] (mg/L)	WET-DI Lead[4] (mg/L)	TCLP Lead[5] (mg/L)	pH[6]
1139-101	1139-101-0.0	0	6/2/2011	1100 J*	29	<0.25	0.51	7.9
	1139-101-1.0	1	6/2/2011	62 J*	1.6		<0.25	
	1139-101-2.0	2	6/2/2011	24 J*				
	1139-101-3.0	3	6/2/2011	17 J*				
	1139-101-5.0	5	6/2/2011	9.9 J*				
	1139-101-7.5	7.5	6/2/2011	6.2 J*				
	1139-101-10.0	10	6/2/2011	5.9 J*				
1139-102	1139-102-0.0	0	6/2/2011	74 J*	2.6		<0.25	7.9
	1139-102-1.0	1	6/2/2011	21 J*				
	1139-102-2.0	2	6/2/2011	29 J*				
	1139-102-3.0	3	6/2/2011	22 J*				
	1139-102-5.0	5	6/2/2011	42 J*				
	1139-102-7.5	7.5	6/2/2011	14 J*				
	1139-102-10.0	10	6/2/2011	26 J*				
1139-103	1139-103-0.0	0	6/2/2011	60 J*	3.1			
	1139-103-1.0	1	6/2/2011	52 J*	1.9			7.2
	1139-103-2.0	2	6/2/2011	28 J*				
	1139-103-3.0	3	6/2/2011	9.8 J*				

TABLE 1

SOIL ANALYTICAL RESULTS - LEAD and pH

Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Boring ID	Sample ID	Depth (ft)[1]	Sample Date	Total Lead[2] (mg/Kg)	WET-Citric Acid Lead[3] (mg/L)	WET-DI Lead[4] (mg/L)	TCLP Lead[5] (mg/L)	pH[6]
1139-104	1139-104-0.0	0	6/2/2011	13 J*				7.5
	1139-104-1.0	1	6/2/2011	5.3 J*				
	1139-104-2.0	2	6/2/2011	10				
	1139-104-5.0	5	6/2/2011	5.0 U*				
	1139-102-7.5	7.5	6/2/2011	5.0 U*				
	1139-102-10.0	10	6/2/2011	11				

Notes

1. Samples collected using a hand auger or a drive sampler; sample depth in feet (ft) below ground surface.
2. Samples analyzed in accordance with U.S. Environmental Protection Agency (EPA) Method 6010B; concentrations in milligrams per kilogram (mg/Kg).
3. Samples analyzed in accordance with EPA Method 7420 -- Extractable lead using the Waste Extraction Test (WET) with citric acid as the extractant; concentrations in milligrams per liter (mg/L).
4. Samples analyzed in accordance with EPA Method 7420 -- Extractable lead using the WET procedure with deionized water as the extractant (WET-DI); concentrations in mg/L.
5. Samples analyzed in accordance with EPA Method 1311/7420 -- Leachable lead analyzed by the Toxicity Characteristic Leaching Procedure (TCLP); concentrations in mg/L.
6. Samples analyzed in accordance with EPA Method 9045C.

Abbreviations

J* = The analyte is qualified as estimated as a result of the data validation process conducted by AMEC.
U* = The analyte was positively identified but was not detected at a concentration greater than or equal to the PQL.

TABLE 2

SOIL ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS[1]
Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Results reported in micrograms per kilogram (µg/Kg)

Boring ID	Sample Date	Sample ID	Sample Depth (feet bgs)	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Chlorotoluene	4-Isopropyltoluene	Benzene	Ethylbenzene	Isopropylbenzene	Naphthalene	n-Propylbenzene	sec-Butylbenzene	Tert-Butanol	Toluene	m,p-Xylene	o-Xylene	Total Xylenes	Other VOCs[2]
1139-101	6/2/2011	1139-101-5.0	5.0	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<91	<4.6	<9.1	<4.6	<14	--
	6/2/2011	1139-101-10.0	10.0	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	**7.7**	<5.3	**0.90**	<5.3	**200**	<5.3	<11	<5.3	<16	--
	6/2/2011	1139-101-15.0	15.0	<4.0	<4.0	<4.0	<4.0	**42**	**0.92 J**	<4.0	<4.0	<4.0	<4.0	**21**	**20**	**1.7 J**	**0.80 J**	<12	--
1139-102	6/2/2011	1139-102-5.0	5.0	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<140	<7.1	<14	<7.1	<21	--
	6/2/2011	1139-102-10.0	10.0	**21**	**7.7**	**3.2 J**	**1.3 J**	**3.6 J**	**32**	**10**	**0.95 J**	**10**	**1.5 J**	**200**	<5.4	**18**	**1.6 J**	**19**	--
1139-104	6/2/2011	1139-104-5.0	5.0	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<92	<4.6	<9.2	<4.6	<14	--
	6/2/2011	1139-104-10.0	10.0	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<100	<5.1	<10	<5.1	<15	--

Notes
1. Samples analyzed by United States Environmental Protection Agency (U.S. EPA) Method 8260B for VOCs.
2. Other VOCs = Remaining VOCs analyzed by EPA Method 8260B; refer to laboratory reports in Appendix D for list of analytes and individual method detection limits (MDLs) and practical quantitation limits (PQLs).

Detections are shown in **BOLD**.

Abbreviations
bgs = below ground surface.
ND = not detected.
VOCs = volatile organic compounds
J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
"<" = value less than the practical quantitation limit shown.
"--" = not published or not applicable.

TABLE 3

SOIL ANALYTICAL RESULTS - TPH[1] (Carbon Chain Speciation)
Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Results reported in milligrams per kilogram (mg/Kg)

Boring ID	Sample Date	Sample ID	Sample Depth (feet bgs)	C4-C8	C9-C32 [2]
1139-101	6/2/2011	1139-101-5.0	5.0	<1.0	<3.0
	6/2/2011	1139-101-10.0	10.0	**0.23 J***	<3.0
	6/2/2011	1139-101-15.0	15.0	**0.97 J***	<3.0
1139-102	6/2/2011	1139-102-5.0	5.0	<1.2	<3.0
	6/2/2011	1139-102-10.0	10.0	**2.1 J***	<3.0
1139-104	6/2/2011	1139-104-5.0	5.0	**0.12 J***	<3.0
	6/2/2011	1139-104-10.0	10.0	**0.14 J***	<3.0

Notes
1. Samples analyzed using United States Environmental Protection Agency (U.S. EPA) Method 8015B for carbon chain speciation.
2. Carbon chain speciation results were non detect for the following ranges (C9-C10, C11-C12, C13-C14, C15-C16, C17-C18, C19-C20, C21-C22, C23-C24, C25-C26, C27-C28, C29-C30, and C31-C32).

Detections are shown in **BOLD**.

Abbreviations
bgs = below ground surface.
J* = The analyte is qualified as estimated as a result of the data validation process conducted by AMEC.
TPH = total petroleum hydrocarbons.
"<" = value less than the practical quantitation limit (PQL) shown.

TABLE 4

SOIL ANALYTICAL RESULTS -TITLE 22 METALS (excluding lead)[1]
Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Results in milligrams per kilogram (mg/Kg)

Boring I.D.	Sample Date	Sample I.D.	Sample Depth (feet bgs)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
1139-101	6/2/2011	1139-101-0.0	0	1.8J	0.72J*	200	<1.0	1.4	30	11	47	0.098J	0.97J	28	<1.0	<1.0	<1.0	39	330
1139-102	6/2/2011	1139-102-0.0	0	2.0 U*	20	210	<1.0	0.86J	29	15	50	0.056J	<1.0	26	<1.0	<1.0	<1.0	55	92

Notes:
1. All samples analyzed using United States Environmental Protection Agency (U.S. EPA) Method 6010B for each constituent except mercury (EPA Method 7471A).

Abbreviations:
bgs = below ground surface.
J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J* = The analyte is qualified as estimated as a result of the data validation process conducted by AMEC.
U* = The analyte was detected in the method blank and in the primary sample between the MDL and PQL. The results for antimony were therefore reported as the PQL and qualified with a U* flag.
"--" = not applicable.
"<" = value less than the practical quantitation limit (PQL) shown.

TABLE 5

BORING GPS COORDINATES [1]

Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

Unique Identification	Boring Identification	Latitude	Longitude	Northing	Easting
1139	1139-101	33.809770	-118.158796	1753189.31586	6513429.71289
1139	1139-102	33.809728	-118.158795	1753174.03047	6513429.99254
1139	1139-103	33.809686	-118.158796	1753158.74603	6513429.66460
1139	1139-104	33.810318	-118.158797	1753388.74804	6513429.72416

Note

1. Survey coordinates using North American Datum (NAD) 83, California State Plane Zone 5 Coordinate System (feet). GPS coordinates were not measured or verified by a Professional Licensed Surveyor, and are excluded from the professional certification of this report.

TABLE 6

QUALITY ASSURANCE / QUALITY CONTROL SAMPLE RESULTS
Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Investigation, PM 3.4/4.5
Caltrans Contract 07A2730, Task Order 17
Long Beach, California

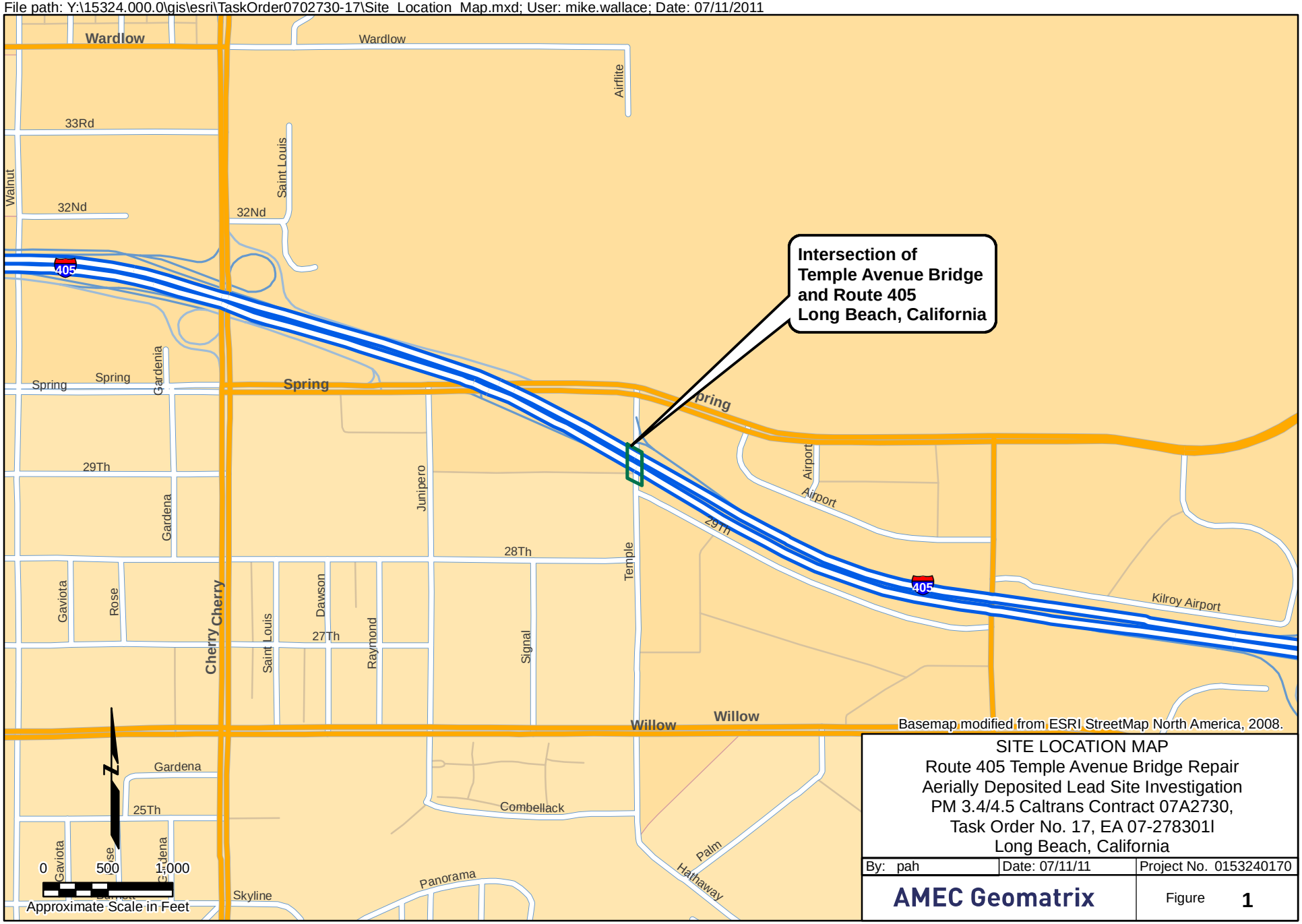
Sample Date	Sample Name [1]	Associated Borehole Locations	Matrix	VOCs[2]	TPH Carbon Chain Speciation[3]	Lead[4]
6/2/2011	1139-100-TBW-060211	1139-101, 1139-102, 1139-103, 1139-104	Water	ND	NA	NA
6/2/2011	1139-100-SW-060211	1139-101, 1139-102, 1139-103, 1139-104	Water	Bromodichloromethane - 0.21 Chloroform - 0.55 Chloromethane - 0.25	ND	0.25 U*
6/2/2011	1139-100-FB-060211-1	For VOCs and TPH (1139-101, 1139-102, 1139-104) For lead (1139-101, 1139-102, 1139-103, 1139-104)	Water	Bromodichloromethane - 0.21 Chloroform - 0.56 Chloromethane - 0.32	ND	0.25 U*
6/2/2011	1139-100-EB-060211-1	For VOCs and TPH (1139-101, 1139-102, 1139-104) For lead (1139-101, 1139-102, 1139-103, 1139-104)	Water	ND	ND	0.25 U*
6/2/2011	1139-100-EB-060211-2	For lead (1139-104)	Water	NA	NA	0.25 U*
6/2/2011	1139-100-FB-060211-2	For lead (1139-104)	Water	NA	NA	ND

Notes
1. Sample name abbreviations: EB = equipment blank, Source = source water blank, TBW = trip blank, FB = field blank.
2. Samples analyzed by United States Environmental Protection Agency (U.S. EPA) Method 8260B for VOCs; concentrations in micrograms per kilogram (µg/Kg). .
3. Samples analyzed using U.S. EPA Method 8015B for TPH carbon chain speciation.
4. Samples analyzed in accordance with U.S. EPA Method 6010B; concentrations in milligrams per kilogram (mg/Kg).

Abbreviations
ND = not detected.
NA = not analyzed.
U* = The analyte was detected in the method blank and in the primary samples between the MDL and PQL.
The results were therefore reported as the PQL and qualified with a U* flag.
VOCs = volatile organic compounds.
TPH = total petroleum hydrocarbons.
mg/L = milligrams per liter.

FIGURES

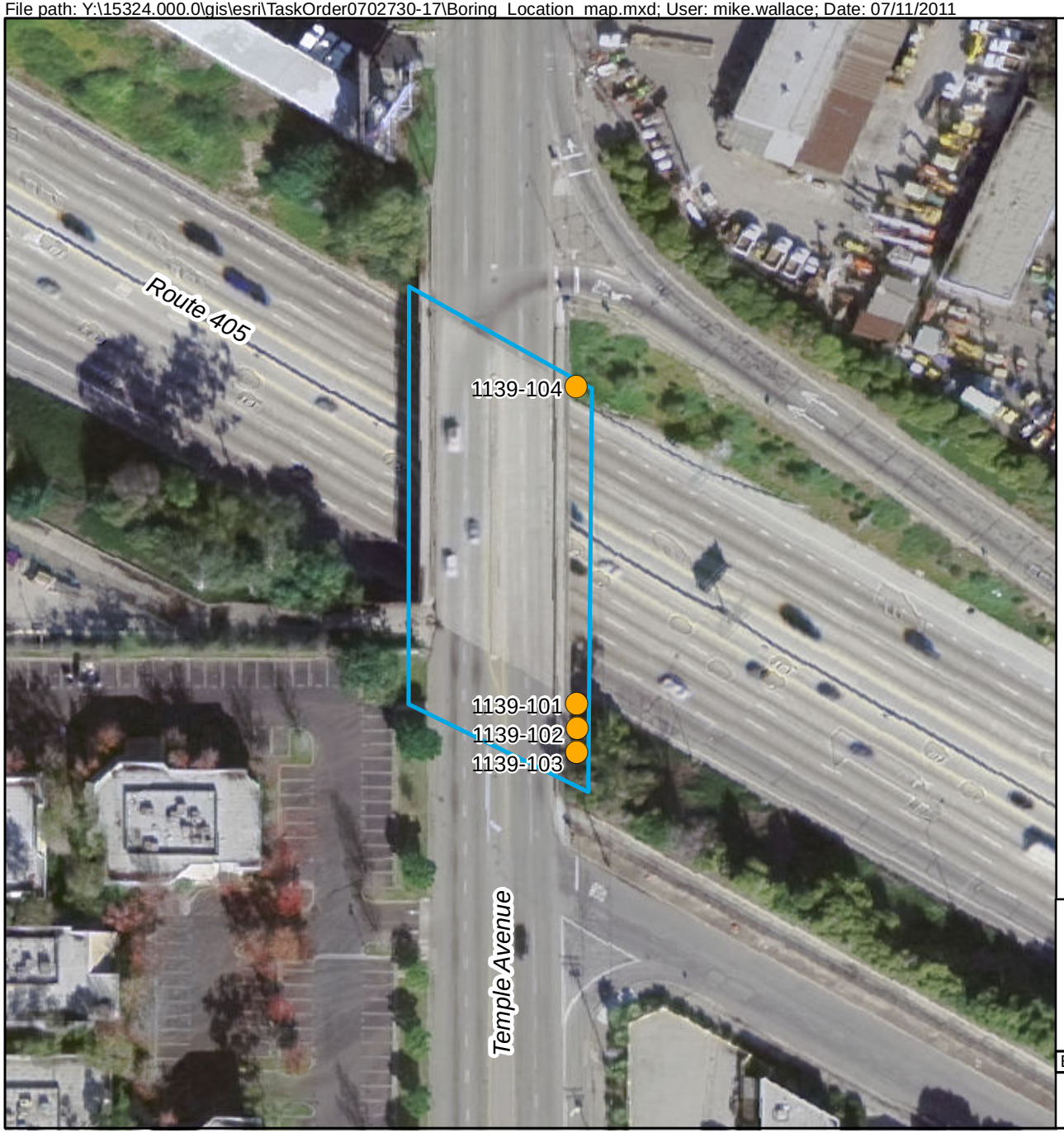
File path: Y:\15324.000.0\gis\esri\TaskOrder0702730-17\Site_Location_Map.mxd; User: mike.wallace; Date: 07/11/2011



SITE LOCATION MAP
Route 405 Temple Avenue Bridge Repair
Aerially Deposited Lead Site Investigation
PM 3.4/4.5 Caltrans Contract 07A2730,
Task Order No. 17, EA 07-278301l
Long Beach, California

By: pah	Date: 07/11/11	Project No. 0153240170
AMEC Geomatrix	Figure	1

File path: Y:\15324.000.0\gis\esri\TaskOrder0702730-17\Boring_Location_map.mxd; User: mike.wallace; Date: 07/11/2011



Explanation

1139-104 Soil sample location

Approximate area of investigation

N

0 50 100

Approximate Scale in Feet

Basemap modified from Cal-Atlas Geospatial Clearinghouse, 2004.

BORING LOCATION MAP
Route 405 Temple Avenue Bridge Repair
Aerially Deposited Lead Site Investigation
PM 3.4/4.5 Caltrans Contract 07A2730,
Task Order No. 17, EA 07-278301l
Long Beach, California

By: pah	Date: 07/11/2011	Project No. 0153240170
AMEC Geomatrix		Figure 2

APPENDIX A

Health and Safety Plan and Sign-in-Sheet

ENVIRONMENTAL SITE HEALTH & SAFETY PLAN

Aerially Deposited Lead Site Investigation

Interstate Route 405 Temple Avenue Bridge Repair

PM 3.4/4.5

EA No. 278301

Task Order No. 17

Prepared for:

California Department of Transportation (District 7)
Division of Planning
Office of Environmental Engineering and Corridor Studies
100 South Main Street, 12-297, MS-16
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June 1, 2011
Project No. 0153240170

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Figure 2 – Hospital Location Map

APPENDIXES

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SITE HEALTH AND SAFETY PLAN

1.0 PURPOSE

This site Health and Safety Plan outlines the health and safety procedures that shall be followed during field work conducted at the site. The observance and practice of the procedures in this plan are mandatory for all AMEC Geomatrix, Inc. (AMEC), employees at the site. All subcontractors shall be made aware of the requirements of this plan; however, subcontractors are responsible for the health and safety of their own employees and for following all applicable federal, state, and local regulations.

This plan has been reviewed by the Project Manager, Corporate Health and Safety Officer, and Project Health and Safety Officer. Prior to entering the site, AMEC personnel shall read this plan and be familiar with health and safety procedures required when working on site. A copy of the plan shall be available on site for inspection and review.

For individuals with sensory disabilities, this document is available in alternate formats. Please call or write to Penny Nakashima, Department of Transportation, District 7, Division of Planning, Office of Environmental Engineering and Corridor Studies, 100 South Main Street, 12-297, MS-16, Los Angeles, California 90012, (213) 897-0936 [voice], or use the California Relay Service TTY number 1-800-735-2929.

2.0 ADMINISTRATIVE INFORMATION

Project Name: Interstate Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Site Investigation, PM 3.4/4.5.

Project Start Date: June 1, 2011 Project Number: 0153240170

Project Address: Intersection of Temple Avenue and Interstate Route 405, Long Beach, California

Client: California Department of Transportation, District 7

Client Contact: Penny Nakashima

Telephone No.: 213-897-7695 (Work)

Project Manager: Duane Paul

Telephone No.: 949-642-0245 (Work) 949-637-6369 (Mobile)

Corporate Health & Safety Officer: Donald Kubik

Telephone No.: 510-663-4115 (Work) 510-368-6433 (Mobile)

Project Health & Safety Officer: Vincent Robino

Telephone No.: 949-574-7638 (Work) 949-274-6516 (Mobile)

Site Health & Safety Officer: Thet Naing

Telephone No.: 949-574-7631 (Work) 949-279-5847 (Mobile)

3.0 PROJECT DESCRIPTION

3.1 SITE HISTORY

The existing Temple Avenue Bridge, constructed in 1964, is a continuous two span, nine cell reinforced concrete box girder structure with closed end cantilever abutments and column/pier bent supported spread footings. Damage to the bridge was observed in the form of acute delamination and spalling of concrete in the soffit of cells #8 and #9 for the entire length of the bridge, in three bearings in abutment #3, and deep corrosion on the majority of the reinforcement bars located in the bottom of cells #8 and #9.

The California Department of Transportation (Caltrans) has proposed demolition of cells #8 and #9, removal of the concrete barrier, chainlink railing and concrete sidewalk, and reconstruction of the bridge cells as PC/PS post-tensioned bulb-T girder with a Type 26 Modified concrete barrier and chainlink railing, and replacement of the median barrier.

3.2 SITE PHYSICAL DESCRIPTION

The project site is located at the intersection of Interstate Route 405 and the Temple Avenue Bridge. Work will be focused on abutments and shoulders of northbound and southbound Interstate Route 405 in Long Beach, California. A site location map is provided as Figure 1.

3.3 TYPE OF FIELD WORK

The purpose of this Project is to conduct an aerially deposited lead (ADL) Site Investigation (SI) at the proposed bridge foundation footprint within the State right-of-way. This SI will investigate for concentrations of aerially deposited lead (ADL), Title 22 Metals, and other commonly found contaminants in the unpaved soil adjacent to the existing edge of travel ways that may exceed acceptable regulated levels. Lead in excess of California hazardous waste criteria is found in soil next to older and/or heavily traveled highways in California primarily due to historical leaded gasoline use. The result of this site investigation will assist in the development of an appropriate health and safety plan/Lead Compliance Plan and training program for the field staff as required per Title 8 of the California Code of Regulations (8CCR).

AMEC will conduct the soil sampling, GPS surveying, and obtain the validated analytical results. The analytical results from the soil samples will allow Caltrans to conduct regression, statistical evaluation, and soil classification based on the applicability of the Department of Toxic Substances Control (DTSC) Lead Variance on the reuse of ADL-impacted soil on-site and also to determine the proper management of excess ADL soil in accordance with the Health and Safety Code disposal requirement.

3.4 SCOPE OF FIELD ACTIVITIES

Field tasks and hazards associated with each field task are provided below in Tables 6.0 and 8.0:

1. Traffic Control – work will be conducted along Interstate Route 405 freeway shoulder and generally will require shoulder closures during ADL sampling. Traffic volume along Interstate Route 405 generally is high in both directions within the limits of the project area and therefore pose significant traffic hazards. Field personnel are required to wear orange safety vests at all times during the field activities along with their proper personal protective equipment (PPE). Extra care will be taken while entering and exiting the work area from Interstate Route 405.
2. Surveying – surveying will be conducted at the project site at all ADL sampling locations. Traffic volume along Interstate Route 405 generally is high in both directions within the limits of the project area and therefore pose significant traffic hazards. Field personnel are required to wear orange safety vests at all times during the field activities along with their proper PPE. Extra care will be taken while entering and exiting the work area from Interstate Route 405.
3. Hand Auger to Collect Soil Samples - work will be conducted along the freeway shoulder and abutments adjacent to Interstate Route 405. Traffic volume along Interstate Route 405 generally is high in both directions within the limits of the project area and therefore pose significant traffic hazards. Field personnel are required to wear orange safety vests at all times during the field activities along with wearing their proper PPE. Extra care will be taken while entering and exiting the work area from Interstate Route 710. Ground surface at the sampling locations may not be level and can contribute to trips/slips/and falls. All field personnel should be cautious of where they step to help reduce trips/slips/and falls.
4. Decontamination – drilling and sampling equipment will be washed and rinsed prior to first use and in between sampling intervals. Decontamination procedures will occur at each of the sampling locations. Physical hazards associated with this field task include trips/slips/and falls along with vehicular and truck traffic. Field personnel are required to wear orange safety vests at all times during the field activities along with wearing their proper PPE.
5. Onsite Waste Disposal – investigation derived waste such as gloves, pails, etc. will be disposed of according to Local and State regulations. Decontamination wash water and soil cuttings generated during field sampling activities will be disposed of onsite at each sampling location. Traffic volume generally is high in both directions along Interstate Route 405 and specifically within the limits of the project area and therefore poses significant traffic hazards. Proper PPE is required for each field personnel while handling and disposing of IDW.

4.0 GENERAL SAFETY PROCEDURES

Health and safety procedures that shall be followed for this project are included in this section

4.1 SAFETY POLICY AND RULES

AMEC considers effective safety, health and environmental management to be of prime importance to its business and is committed to continuous improvement in performance in all of these areas.

AMEC will:

- Employ both the leadership and management structure required to deliver this Policy and ensure a complete, unbroken chain of responsibility and accountability for health, safety and the environment.
- Comply with all relevant legislative requirements and AMEC policy pertaining to safety, health and the environment as its minimum standard.
- Pursue high standards of safety, health and environmental management as an integral part of efficient management ensure that all business decisions take proper account of safety, health and environmental implications.
- Develop, implement, maintain and monitor a safety, health and environmental management system consistent with the AMEC Framework.
- Develop procedures that, in particular, provide for:
- Systems of work that minimize risks to safety, health and the environment;
- Workforce engagement and consultation;
- Suitable arrangements for the selection, use, handling, storage and transport of articles and substances;
- Adequate information, instruction, training and supervision to enable work to be carried out safely and without risk to the environment by persons with the necessary competence;
- Safe premises and work places, including access to and egress from them;
- Safe and health working environments with adequate hygiene facilities;
- Designs which fully consider their safety, health and environmental impact in construction, operation, maintenance, decommissioning and disposal;
- Engagement of and consultation with, the supply chain;
- Minimization of polluting emissions to air, land or water;
- Efficient use of natural resources;
- Control of dust, noise, odor, vibration, traffic movement or other nuisance or environmental effects which may harm or cause offence to the local community or environment;
- Waste minimization and management of waste disposal including recycling where appropriate;
- Organizational learning with regards to safety, health and environmental matters;
- Competent safety and occupational health and environmental advice.

- Set and monitor, clear safety, health and environmental performance indicators that encompass both leading and lagging measures, including as a minimum:
- Accident and frequency rates;
- Attainment of annual safety, health and environmental objectives.
- Review and, if necessary, revise this policy on an annual basis.

The AMEC President has overall responsibility for implementing this policy and ensuring compliance with all local legislation. It is the responsibility of all employees to implement this policy together by discharging their collective and individual responsibilities, as set out in the AMEC Framework.

This signature endorses HSE Policies included in all volumes of AMEC Health, Safety, and Environment (HSE) Manual.

AMEC Six Safety Essentials

The Six Safety Essentials are designed to support the safe execution of work in all our operating locations with the development of a "common set of behaviours" that we can all share. AMEC, in our goal to be recognized as a world-class leader in HSE safety must strive to ensure our daily overall consistency of HSE standards, leadership and performance.

ALWAYS TAKE CARE

Be observant, take your time and think safety first. Nothing we do is so important that we cannot take time to do it safely.

FOLLOW THE RULES
Safety procedures are designed to stop you from getting hurt. Ignoring them is unacceptable. If a procedure is unclear or unworkable, then you must inform your supervisor.

DO A RISK ASSESSMENT
Before starting work, a risk assessment is required for identifying potential hazards and selected control measures must be in place. If you're unsure ask your supervisor. Risk assessments associated with routine tasks should be re-examined regularly.

YOU MUST INTERVENE
If you believe your safety, or the safety of others, is being compromised, you have a right and obligation to intervene to stop and correct the work. You have our support to exercise this right without any repercussions.

MANAGE ANY CHANGE
If there is a change or deviation to the planned activity you must stop the job and re-evaluate the risk assessment and the precautions taken.

WEAR THE CORRECT PPE
You must ensure that when you undertake any work, you wear the full PPE correctly as identified in the risk assessment for that specific task.

AMEC Global Safety Rules

The AMEC Safety rules are similar to and replacing our *Ten Safety Topics to Remember*. The AMEC Safety Rules are a key element in achieving our *Beyond Zero* safety vision and provide practices for our critical tasks which will help keep us all safe at work.

The Safety Rules provide global standards to ensure we work safely. The following key controls are fixed in each rule:

- Before starting work a risk assessment must be completed, and communicated to all persons

involved

- All personnel must be trained and competent for their role
- PPE must be worn, as specified in the risk assessment
- If anything changes, we stop, review and reassess the risks
- Whatever we do, we always take the time to do it safely

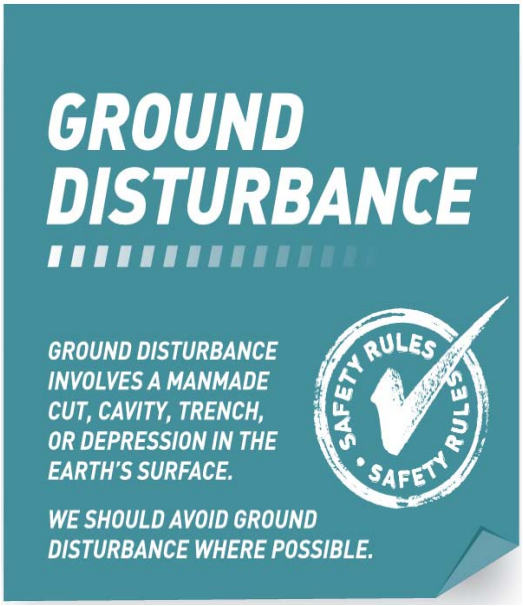
These task-based Safety Rules define expected behaviors within AMEC and are underpinned by AMEC's Safety Essentials. We ask everyone to read our Safety Rules, immerse themselves in their content, and effectively practice these rules at all times.

Rule No. 1 Permit to Work

When a permit is required, we will:

- Make sure we comply with the permit conditions.
- Ensure only permit-trained persons compile and approve permits.
- Satisfy ourselves that all hazards have been identified and risks removed.
- Satisfy ourselves that all controls are in place, including isolations. Isolation integrity must be verified.
- Consider interactions with other permits, or simultaneous operations, cross referencing these on the permit.
- Complete a toolbox talk at the worksite, involving all members of the team.
- Ensure we have read and fully understood the requirements of the permit before signing it.
- When work is complete or suspended, ensure that the work site is left in a safe condition.

Rule No. 2 Ground Disturbance



- Ensure that all underground hazards, i.e. pipelines, electric cables, etc., have been identified, located and if necessary, isolated.
- Ensure that all ground disturbance is safely designed, including any temporary structures.
- Ensure you have a safe means of entry into and exit out of the excavation, and arrangements to avoid unauthorized entry.
- Ensure a suitable rescue plan is in place and communicated to the full work party.
- Adopt the confined space arrangements if the excavation meets the confined space definition.
- Adopt safe digging practices around suspected live services.
- Control ground movement and prevent collapse by appropriate means.
- Ensure spoil placement distances and heavy equipment operations are maintained as appropriate.
- Continuously monitor ground and environmental conditions.

Rule No. 3 Driving

If we need to drive at work, we will:

- Plan our journey in advance.
- Ensure the vehicle is safe to use and fit for purpose.
- Ensure we are fit, authorized and competent to drive at work.
- Only carry goods that the vehicle is licensed to carry.
- Ensure the vehicle is safely loaded and within load/passenger limits.
- Comply with rules and legislation, ensuring as a minimum that we:
    - Wear a seatbelt
    - Obey the speed limit
    - Don't use mobile phones
    - Avoid distractions (e.g. eating, drinking)
- Ensure our driver complies with these rules.

- Report any incidents which occur while driving vehicles at work.
- Minimize risks associated with reversing vehicles.
- Deploy spotters where there is significant risk associated with vehicle movement.

Rule No. 4 Confined Spaces

When undertaking work in confined spaces we:

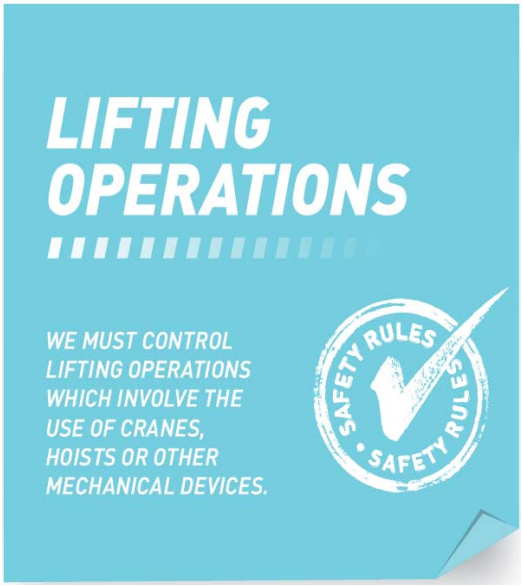
- Ensure all isolations are in place.
- Test the atmosphere prior to and during confined space entry, using calibrated equipment.
- Ensure all persons entering the confined space are fit to do so.
- Ensure all team members are briefed on the arrangements for safe entry.
- Have controlled access arrangements.
- Have a competent confined space entry supervisor and standby person in place preventing unauthorized entry.
- Ensure that proper communications are established and tested.
- Have an appropriate rescue plan in place, with sufficient rescue equipment available.

Rule No. 5 Working at Height

Where this is not possible we will:

- Assess the risk and select appropriate controls from, in order of priority:
  - 1. fixed platform (scaffolding).
  - 2. mobile access platforms.
  - 3. fall prevention systems.
  - 4. personal fall arrest systems.
  - 5. use of nets or airbags.
- If using fall arrest systems, you must:
  - Select and use a proper anchor point, preferable overhead.
  - **Use a full body harness with double lanyards to ensure 100% tie-off.**
  - Use shock absorbing lanyards to limit fall distance.
  - Ensure arrangements are in place for rescue.
  - Ensure your equipment is adequate, inspected and certified for use.
- Take into account weather and environmental conditions.
- Use dropped object protection.
- Consider the risks involved when working on stairs or fragile surfaces.

Rule No. 6 Lifting Operations



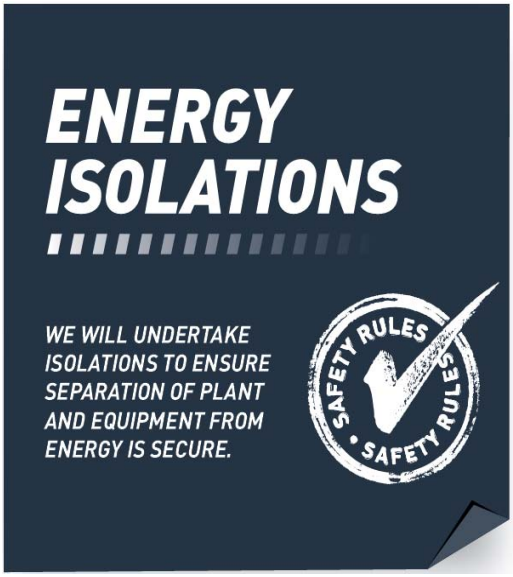
Before undertaking lifting operations, we will:

- Ensure a lifting plan, appropriate for the complexity of risk is prepared, and approved by an authorized person.
- Ensure weather conditions and light conditions are suitable to undertake the lift safely.
- Ensure ground conditions are assessed and suitable.
- Check load does not exceed the dynamic and/or static capacities of the lifting equipment.
- Assess and mitigate the risk of dropped objects.
- Ensure lifting equipment is certified for use and pre-use checks are completed.
- Agree signaling, signage and

communication for any lift.

- Use appropriate barrier management, including signs, to prevent unauthorized entry.

Rule No. 7 Energy Isolations (Lockout/Tagout)



Any isolation of energy systems (mechanical, electrical, process, hydraulic and others) will only proceed when:

- The method of isolation and discharge of stored energy are agreed by an authorized person.
- Any stored energy is discharged.
- A system of locks and tags is utilized at isolation points.
- A test is conducted to ensure the isolation is effective.
- Isolation effectiveness is periodically monitored.

Rule No. 8 Pressure Testing

Where we cannot avoid pressure testing, we will utilize the safest method and ensure that:

- An approved work method and plan is available, including arrangements for designing exclusion zones by an authorized person.
- Calibrated pressure test equipment and fittings are used, supported by appropriate certification documentation.
- The location and segregation of all monitoring and recording equipment is defined.
- No attempt is made to enter the test area during pressurization.
- Test completion is recorded on test certificates.
- Care is taken to ensure that no trapped inventory or pressure at check or isolation valve locations.
- No work will be carried out on pressurized systems

Rule No. 9 Plant and Equipment

When using plant and equipment we:

- Ensure plant has unique identification number.
- Conduct pre-use checks and report quarantine and defective plant and equipment.
- Ensure that equipment is used only for the purpose it was designed for – and within the manufacturer's or supplier's operating instructions.
- Ensure that any changes to plant and equipment are carried out through approved procedures.
- Ensure that adequate inspection and maintenance routines are implemented.
- Do not modify or improvise tools and equipment.

Rule No. 10 Housekeeping

We will ensure that we:

- Keep our work area clear from debris and waste.
- Keep access ways clear and free from obstructions.
- Route cables and hoses away from walkways.
- Designate pedestrian and vehicle routes and keep to them.
- Store materials and equipment properly – and avoid storing items on elevated surfaces where possible.
- Store flammable materials in controlled areas, away from sources of ignition.
- Clean up spills immediately.
- Inspect our workspace regularly and report defects.
- Observe signs and barriers and local house rules.
- Always leave all worksites tidy, clean and safe.

General Project Safety Rules

The following general rules have been developed to minimize workplace injuries and illnesses:

1. No employee shall report to work or be permitted to work while he/she is in any way unfit to perform his/her duties in a safe and efficient manner. Employees are not to report to work under the influence of alcohol, illegal drugs, or drugs for which the employees do not have a lawful prescription. Employees are not to consume alcohol, illegal drugs, or drugs for which they do not have a lawful prescription during the regular work hours.
2. All injuries and accidents (even near misses) must be reported to your supervisor immediately.
3. Immediately report all unsafe or unhealthful conditions in the workplace, including defective tools or other equipment to your supervisor.
4. Take all reasonable precautions to ensure your own safety and the safety of fellow workers during the course of employment.
5. All threats, intimidation, harassment, or acts of violence shall be reported to your supervisor; Human Resources; or the Safety, Health, and Environment Coordinator (HSE Coordinator).
6. No person shall engage in any improper activity or behavior that might create or constitute a hazard to him/herself or any other worker. For the purposes of this rule, improper activities include horseplay, fighting, practical jokes, unnecessary running or jumping, or similar conduct.
7. All employees must follow established safe job procedures. If unsure how to perform any assigned task or operate any equipment, ask your supervisor before proceeding.
8. Do not remove guards from machines.
9. PPE must be worn or used in any area where it is required.
10. Disposal of hazardous materials and wastes must be in accordance with applicable environmental regulations. If there is any doubt about proper disposal, discuss this with your supervisor.
11. Report all spills of hazardous wastes or materials to your supervisor. Consult the material safety data sheet for appropriate cleanup procedures.

12. Use only the proper tool for the job. Do not use defective tools or equipment. If the proper tool is not available, ask for help from your supervisor before doing the job.
13. When required to clean, repair, or adjust machinery, the machinery shall be shut off and locked out both mechanically and/or electrically to prevent operation of the equipment.
14. Get help in lifting any item that is so bulky, awkward, or heavy that you feel you cannot lift it safely.
15. If a repetitive task causes you discomfort, or you feel it is unsafe or unhealthy, report it to your supervisor immediately.
16. Employees must conduct themselves in a safe manner to prevent injury to themselves and others and to minimize damage to AMEC property. Each employee is responsible for the care and safe operation of AMEC equipment.
17. Obey all safety warning signs and signals. Do not remove any safety warning signs or signals until the danger is eliminated.
18. Maintain good housekeeping in your work area.
19. Employees are responsible for safe use of any vehicles, machines, and equipment that they may operate, and for the quality of the work they produce.
20. Wear seat belts at all times when in vehicles used for company business. This includes drivers and passengers in rental cars, personal vehicles used for business activities, and company-provided vehicles.
21. Do not engage in any activities that interfere with your ability to operate a vehicle safely.

4.2 STOP WORK AUTHORITY

Anyone and everyone working on the project have the **responsibility** and **authority** to stop any work that does not comply with a safe work environment. There will be no repercussions to the employee for stopping any unsafe behavior.

4.3 JOB SAFETY ANALYSIS

In addition to performing and holding a “tailgate” health and safety meeting, AMEC will complete a job safety analysis (JSA) for each task to be completed. The JSA is a tool used to carefully study and record each step of a job or task, to identify existing or potential hazards (safety,

health, environmental, work quality), and to determine the best procedures to follow to perform the job properly.

Each major task must have a JSA and the work must be performed as required by the JSA.

JSAs will be modified in the field using pen and ink edits to the Health and Safety Plan (HASP) as site conditions change.

Post-job reviews of the JSAs will be completed by the Site Safety Officer, Project Manager, and the Project Health and Safety Officer.

JSAs must be reviewed daily during the tailgate safety briefings.

JSAs are included in Appendix A.

4.4 PERMIT TO WORK

Each days work will be authorized by the AMEC field supervisor. Field forms are included in Appendix B.

4.5 COMMUNICATIONS

Based on the scope of work, it is anticipated that only one subcontractor (traffic control) will be on site at any time. If two or more subcontractors need to be on site, they will be required to attend a joint Tailgate Safety Meeting where topics to be discussed include: planned work, designated work zones for each subcontractor, coordination of work, permit procedures, hazards of the work being done, and emergency procedures. AMEC's site supervisor will coordinate the work between subcontractors.

5.0 PRIMARY RESPONSIBILITIES

Below are responsibilities for each of the project health and safety representatives:

5.1 PROJECT MANAGER

The Project Manager (PM) shall:

1. direct all AMEC personnel involved in investigative, monitoring, and remedial activities at the site and vicinity;
2. make the Project Health and Safety Officer aware of all pertinent project developments and plans;
3. make available the resources that are necessary for a safe working environment; and

4. maintain communications with the client, as necessary.

5.2 PROJECT HEALTH AND SAFETY OFFICER

The Project Health and Safety Officer (PHSO) shall:

1. direct all health and safety aspects of investigative, monitoring, and remedial activities conducted by AMEC personnel at the site and vicinity;

2. ensure that all AMEC personnel have received required training, are aware of the potential hazards associated with site operations, have been instructed in the work practices necessary for personal health and safety, and are familiar with the site Health and Safety Plan's procedures for all scheduled activities and for dealing with emergencies;

3. direct required exposure monitoring to assess site health and safety conditions;

4. prepare any accident/incident reports;

5. modify the site Health and Safety Plan as required based on accidents/incidents and findings regarding personnel exposures and work practices; and

6. report all accidents/incidents and findings regarding personnel exposure and work practices to the Project Manager.

5.3 SITE SAFETY OFFICER

The Site Safety Officer (SSO) shall:

1. ensure that appropriate personal protective equipment is available for AMEC site personnel and enforce proper utilization of personal protective equipment by all on-site AMEC personnel;

2. with guidance from the PHSO, observe subcontractor's procedures with respect to health and safety. If the SSO believes that a subcontractor's personnel are or may be exposed to an immediate health hazard, the SSO shall suspend the subcontractor's site work. If the subcontractor's personnel do not have required protective equipment, the SSO shall consult with the PM or PHSO before proceeding with the work;

3. implement the site Health and Safety Plan and report any observed deviations from site conditions anticipated in the plan;

4. conduct site safety briefings as needed;

5. calibrate monitoring equipment daily and properly record and file results;

6. under direction of the PHSO perform required exposure monitoring;

7. maintain monitoring equipment or arrange maintenance as necessary;

8. assume other duties as directed by the PM or PHSO; and

9. report observed accidents/incidents or inadequate work practices to the PHSO and the PM.

5.4 PROJECT PERSONNEL

Project personnel involved in on-site investigations and operations shall:

1. take reasonable precautions to prevent injury to themselves and to their fellow employees;

2. perform only those tasks that they can do safely and immediately report accidents and/or unsafe conditions to the SSO or PHSO;

3. follow the procedures set forth in the site Health and Safety Plan and report to the SSO or PHSO any observed deviations from the procedures described in the plan on the part of AMEC or subcontractor personnel; and

4. inform the PM and PHSO of any physical conditions that might affect their ability to perform the planned field tasks.

5.5 TRAINING REQUIREMENTS

All project personnel must comply with Occupational Safety and Health Administration (OSHA) regulations specified in 29 CFR 1910.120. These include completion of a 40-hour health and safety training course, an annual 8-hour refresher training, and participation in AMEC's medical surveillance program and respiratory protection program.

Additional site-specific training that covers on-site hazards, personal protection requirements, decontamination procedures, and emergency response information as outlined in this site Health and Safety Plan will be given by the PHSO or SSO before beginning on-site work. Site-specific training briefings will be documented on a "Project Health and Safety Field Meeting Form" provided at the end of this plan. We do not anticipate that field staff will be occupationally exposed to blood or potentially infectious materials during the course of this project.

5.6 MEDICAL SURVEILLANCE

All AMEC project site personnel shall participate in the AMEC medical surveillance program, which includes annual audiometric and physical examinations for employees involved in hazardous waste or materials projects. It requires that all such personnel have medical clearance before being issued a respirator and participating in field activities. Frequency of medical examinations which complies with 29 CFR § 1910.120(f3):

1. prior to performing field work;
2. at least once every 12 months;
3. at termination of employment;
4. upon occurrence of possible overexposure;

5. more frequently if deemed necessary by a physician.

6.0 HAZARD ASSESSMENT

An assessment of the potential hazards that may be encountered during field activities at the site are designated by field task in Table 6.0 and are discussed below.

6.1 POTENTIAL CHEMICAL HAZARDS AT SITE

Although the potential contaminants and concentrations are unknown, lead in excess of California hazardous waste criteria is potentially found in soil next to older and/or heavily traveled highways in California primarily due to historical leaded gasoline use. The potential chemical hazards at the site are included on a table provided on the following table.

Listed below are the analytical methods that will be used to analyze collected soil samples for the project:

- Total lead, Total Threshold Limit Concentration (TTLC), using EPA Method 6010;
- Soluble lead, Soluble Threshold Limit Concentration (STLC) using Waste Extraction Test method (WET-Citric Acid);
- Soluble lead, STLC using deionized water (WET-DI);
- Soluble lead, Toxicity Characteristic Leach Procedures (TCLP), using EPA Method 1311;
- pH using EPA Method 9045,
- Title 22 metals using EPA Method 6010B/7400;
- Total Petroleum Hydrocarbon (TPH) carbon chain speciation using EPA Method 8015B (for samples collected at 5 feet and 10 feet below ground surface only); and
- Volatile Organic Compounds using EPA Method 8260B (for samples collected at 5 feet and 10 feet below ground surface only).

The table on the following page provides a summary of the potential chemicals that may be present at the site in which a site worker may be exposed to during sampling, decontamination, and disposing of accumulated wastes. The table includes occupational exposure limits, potential exposure pathways, and possible health effects. A chemical information sheet for each of the chemicals listed in the table is included in Appendix C.

Hazardous Substances Known or Suspect at Site:

CAS	CHEMICAL	EXPOSURE LIMITS		LEL %	IP eV	KNOWN or EXPECTED CONCENTRATIONS	HEALTH HAZARDS
		OSHA	ACGIH				
Varies	Antimony (mg/m3)	0.5/I50	0.5			Low	RISE; Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly
Varies	Arsenic -- organic (mg/m3)*	0.2				Low	RISE; In animals: irritation skin, possible dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor, convulsions; possible gastrointestinal tract, reproductive effects; possible liver damage
7727-43-7	Barium sulfate (mg/m3)	10(5 respirable)	10			Low	RISE; Eye, nose, and upper respiratory irritation; pneumoconiosis
71-43-2	Benzene (ppm)	1/S5/I500	0.5/S2.5	1.2	9.24	Unknown	RISE; Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
7440-41-7	Beryllium (mg/m3)	0.0002/C0.025/I4	0.002/0.01			Low	RSE; Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]
75-27-4	Bromodichloromethane (ppm)	none	none			Unknown	RISE; Eye and skin irritation, Irritating to mucous membranes & upper respiratory tract
7440	Cadmium	0.005/	0.002			Low	RI; Pulmonary edema,

-43-9	(mg/m3)	I9					dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen
67-66-3	Chloroform (Trichloromethane) (ppm)	C50/I500	10		11.42	Unknown	RISE; Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]
7440-47-3	Chromium metal & insoluble salts (mg/m3)	0.5/I250	0.5			Low	RISE; Irritation eyes, skin; lung fibrosis (histologic)
7440-48-4	Cobalt (dust or fume) (mg/m3)	0.02/I20	0.02			Low	RISE; Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; respiratory hypersensitivity, asthma
7440-50-8	Copper (Salts, Dusts and Mists) (mg/m3)	1/I100	1			Low	RISE; Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]
68476-34-6	Diesel Fuel No. 2 (mg/m3)	none	100	~0.9		Unknown	RISE; SKIN; Irritation
100-41-4	Ethyl benzene (ppm)	100/S125/I800	100/S125	0.8	8.76	Unknown	RISE; Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma
8006-61-9	Gasoline (ppm)	none	300/S500	1.4		Unknown	RISE; Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech,

							confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]
7439-92-1	Lead (inorganic) (mg/m3)	0.05/I 100	0.05			Up to and potentially exceeding 1000 ppm	RISE; Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension
7439-97-6	Mercury (inorganic) (mg/m3)	0.025/ C0.1/I 10	0.025			Low	RISE; SKIN; Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
1634-04-4	Methyl tert-butyl ether (ppm)	40	50	1.6		Unknown	RISE; Drowsiness, dizziness, headache, weakness, unconsciousness, abdominal pain, nausea, vomiting, dry skin, redness
7439-98-7	Molybdenum - insoluble as total dust (mg/m3)	10(3 respirable)/I 5,000	10 (3 respirable)			Low	RISE; Irritation eyes, nose, throat; anorexia, diarrhea, weight loss; listlessness; liver, kidney damage
7440-02-0	Nickel (metal) (mg/m3)	1/I10	1.5			Low	RISE; Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]
7782-49-2	Selenium compounds (mg/m3)	0.2/I1	0.2			Low	RISE; Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance;

							dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage
7440-22-4	Silver, metal and soluble compounds (mg/m3)	0.01/I10	0.1metal/0.01 soluble			Low	RISE; Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance
75-65-0	tert-butyl alcohol (ppm)	100/S150/I1,600	100	2.4	9.7	Unknown	RISE; Irritation eyes, skin, nose, throat; drowsiness, narcosis
varies	Thallium - soluble compounds (mg/m3)	0.1/I15	0.1			Low	RISE; SKIN, Nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs
108-88-3	Toluene (ppm)	50/S150/C500/I500	50 ppm	1.1	8.82	Unknown	RISE; Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage
1314-62-1	Vanadium (respirable dust) (mg/m3)	0.05/I35	0.05			Low	RISE; Irritation eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheezing, bronchitis, dyspnea (breathing difficulty)
1330-20-7	Xylenes (Dimethylbenzene) (total) (ppm)	100/S150/C300/I900	100/S150	0.9	8.56	Unknown	RISE; Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

1314-13-2	Zinc (zinc oxide -- total dust) (mg/m3)	10 (5 respirable)	2/S10			Low	I; Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function

Exposure Limits –If not specified, exposure limit is the PEL or the TLV-TWA, Exposure limit preceded by a "S" is a Short Term Exposure Limit, by a "C" is the Ceiling Limit, and by an I is the NIOSH IDLH.
CAS – Chemical Abstracts Number
LEL – Lower Explosive Limit in percent
IP – Ionization Potential in eV
Health Hazards: Letters in italics represent exposure routes: R – Respiratory; I- Ingestion; S-Skin Absorption; & E – Eye Absorption
SKIN – Chemical represents a significant skin absorption hazard.

Air monitoring requirements and action levels related to potential chemical hazards at the site are discussed in Section 6.0.

TABLE 6.0
ANTICIPATED HAZARDS

TASK	HAZARDS															
		PHYSICAL														
	Chemical	Trip/Slip/Fall	Heavy Equipment	Underground Utilities	Overhead Power Lines	Noise	Heat Stress	Cold Stress	Sunburn	Drilling (hand auger)	Trench/Excavation	Confined Space	Traffic	Biological	Explosive	General Safety
1. Traffic Control		X	X			X	X	X	X				X			X
2. Surveying		X				X	X	X	X				X	X		X
3. Soil Sampling	X	X	X	X		X	X	X	X	X			X	X		X
4. Decontamination	X	X	X			X	X	X	X	X			X	X		X
5. Onsite Waste Disposal	X	X				X	X	X	X				X	X		X

6.2 POTENTIAL PHYSICAL HAZARDS AT SITE

Potential physical hazards, as those listed in Table 6.0, are discussed below.

6.2.1 Underground Utility Hazards

An underground utility check shall be performed prior to initiating any subsurface investigation or work. The check will include:

__X__ USA Note: USA must be notified at least 2 working days before any subsurface work begins. Record confirmation number in project field notes.

_____ Private Locator: _____

_____ Plans Check. Facility Contact: _____

Geophysical Survey.

Additional Information: _____

_____

_____

6.2.2 Overhead Power Lines

Whenever possible, avoid working under overhead high voltage lines. The following are minimum clearances for overhead high voltage lines.

Normal Voltage (phase to phase)				Minimum Required Clearance (feet)
more than	750	-	50,000	10
more than	50,000	-	75,000	11
more than	75,000	-	125,000	13
more than	125,000	-	175,000	15
more than	250,000	-	379,000	21
more than	370,000	-	550,000	27
more than	550,000	-	1,000,000	42

(Reference: CCR Title 8, Section 2946, Table II)

6.2.3 Noise Hazards

Wear hearing protection when working near large heavy equipment, such as drill rigs or earth movers, or in other noisy conditions. As a general rule, hearing protection should be worn when two people standing within 2 feet of each other cannot communicate at normal conversational voice levels.

6.2.4 Heat Stress Hazards

Heat stress is a major hazard, especially for workers wearing protective clothing. To avoid heat stress, drink plenty of fluids and take periodic work breaks.

The signs, symptoms, and treatment of heat stress include:

- Heat rash, which may result from exposure to heat or humid air.
- Heat cramps, which are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms and pain in the hands, feet, and abdomen. Persons experiencing these symptoms should rest in a cooler area, drink cool (not cold) liquids and gently massage cramped muscles.
- Heat exhaustion, which occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; and fainting. Persons experiencing these symptoms should lie down in a cooler area, drink cool liquids with electrolytes (Gatorade, etc.), remove any protective clothing, and cool body with wet compresses at forehead, back and neck, and/or armpits.
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma.

Ambient temperatures at the Site are expected to range from 70°F to greater than 90ºF. When temperature exceeds 70ºF, frequent breaks will be taken in shaded areas. Cool water or electrolyte replenishment solution will be available on site. Sufficient amounts of drink should be taken frequently to replace fluid loss. Coveralls will be unzipped or removed during breaks. If protective clothing must be worn, the suggested guidelines for ambient temperature and maximum work periods from the *IOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* are:

Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[a]		
Adjusted Temperature[b]	Normal work Ensemble[c]	Impermeable Ensemble[d]
90 ºF (32.2 ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90.0 ºF(30.8 - 32.2 C)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 ºF(28.1 - 30.8 ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 ºF(25.3 - 28.1 ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 ºF(22.5 - 25.3 ºC)	After each 150 minutes of work	After each 120 minutes of work

Notes:
[a]For work levels of 250 kilocalories/hour.
[b]Calculate the adjusted air temperature (ta adj) from the measured air temperature (ta) by using this equation: ta adj ºF=ta ºF + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 % sunshine = no cloud cover and a sharp distinct shadow; 0 percent sunshine = no shadows).

[c]A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
[d]Impermeable Ensemble includes Tyvek and Saranex coveralls and rubber boots.

Pulse rates and oral temperatures may be monitored as early as possible in the rest period. If the pulse rate exceeds 100 beats per minute or temperature exceeds 99ºF at the beginning of the rest period, the work cycle will shorten by one-third.

6.2.5 Cold Stress Hazards

Exposure to cold can cause the body's internal temperature to drop to a dangerously low level. This is called hypothermia. Exposure to temperatures below freezing can cause frostbite of hands, feet, and face.

Symptoms of hypothermia include:

- vague, slow, slurred speech
- forgetfulness, memory lapses
- inability to use hands
- frequent stumbling
- drowsiness.

To prevent hypothermia, stay dry and avoid exposure. Wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypro-pylene). Keep hands and feet well protected at all times.

6.2.6 Sunburn Hazards

Skin exposure to ultraviolet radiation can result in sunburn. Use long-sleeved shirts, hats, and sunscreen to protect against sunburn.

6.2.7 Drilling Hazards

Drilling hazards include noise, heavy equipment operation, rotative/moving parts, and trip/fall hazards. Non-drilling personnel should stay away from the area around the borehole during drilling. Hard hats and safety glasses shall be worn by all personnel within 30 feet of the raised mast of an operating drill rig. All personnel will be instructed as to the location of the "kill switch" on the drill rig.

6.2.8 Trench/Excavation Hazards

OSHA requires that in all excavations, workers exposed to potential cave-ins must be protected by shoring, sloping, or benching the sides of the excavation, or placing a shield between the side of the excavation and the work area. Any excavation 4 feet deep or deeper must have adequate means of access/egress and must be tested by a competent person for oxygen deficiency or hazardous atmosphere before anyone enters. Entry into excavations/trenches 5 feet deep or deeper requires an OSHA permit and compliance with OSHA regulations for trenching and excavation.

During the work for this project, no one will enter trenches/excavations deeper than 4 feet. If soil is not inherently stable at this depth, appropriate protective measures (sloping, shoring, etc.) will be used. Care will be taken when sampling the excavation area from above to be sure the ground is stable and not undercut.

NOTE: If entry into trenches/excavations greater than 4 feet deep is required, contact PHSO prior to entry.

6.2.9 Confined Space

A confined space is any space a person can bodily enter that has limited egress and is not designed for continuous human occupancy. Confined spaces can pose many potential hazards including hazardous atmosphere, poor natural ventilation, engulfment, entrapment, and restricted entry for rescue purposes. All confined spaces must be considered immediately dangerous to life or health unless proven otherwise.

If entry into a confined space is required, the PHSO must be consulted and a confined space entry plan prepared and followed prior to anyone entering the space.

6.2.10 Heavy Equipment

Personnel working on site in the vicinity of operating equipment should maintain safe distances from the equipment to avoid contact with moving equipment parts such as backhoe/excavator arms and buckets (be aware of swing radius), tires, tracks, etc. Be sure heavy equipment operators can see you or know where you are.

6.2.11 Traffic Hazards

The field activities will be conducted at the intersection of Temple Avenue Bridge and Interstate Route 405 including off-ramps and on-ramps. Traffic control will be provided by American Barricade of Long Beach, California. Traffic control is required and may involve shoulder closures which include the use of an impact attenuator vehicle(s), arrow board(s), placement (and removal) of signs and cones, as needed.

6.2.12 Biohazards

There is a potential for various fauna such as insects, spiders, and ticks to be encountered at the site. Care should be taken to avoid contact.

6.3 GENERAL HAZARDS

In working with or around any hazardous or potentially hazardous substances or situations, site personnel should plan all activities before starting any task. Site personnel shall identify health and safety hazards involved with the work planned and consult with the PHSO or SSO as to how the task can be performed in the safest manner, if he/she has any uncertainties.

Common safety hazards include trip/fall hazards and those associated with working around heavy equipment. All field personnel will adhere to the following general safety rules.

1. Wear protective equipment and clothing provided, when required.

2. Wear a hard hat and safety glasses in all construction areas and during drilling activities.

3. Wear sturdy work boots or shoes at the site. Steel-toed boots are required during drilling activities.

4. Do not eat, drink, or use tobacco in restricted work areas.

5. Prevent splashing of materials containing chemicals.

6. Prevent back injury by never lifting or carrying a load that is heavier than you can comfortably handle. When lifting heavy objects, bend the knees and use the leg muscles.

7. Keep all heat sources away from combustible liquids, gases, or any flammable materials. When working in areas where combustible gases are present, use only intrinsically safe (non-sparking) equipment.

8. Field personnel shall be familiar with the physical characteristics of investigations, including:

   - wind direction in relation to restricted work areas
   - accessibility of other personnel, equipment, and vehicles
   - areas of known or suspected chemicals in soil and groundwater
   - site access
   - nearest water sources
   - location of communication devices.

9. Personnel and equipment in restricted work areas should be limited to the number necessary to perform the task at hand.

10. All wastes generated during investigative activities at the site shall be disposed of as directed by the PM.

11. Inspect power cords for damage such as cuts and frays. Suspend cords only with nylon rope or plastic ties.

12. When in doubt of your safety, it is better to overprotect.

13. Practice defensive driving.

14. If site activities include the use of a drill rig, all on-site personnel should know the location of the “kill switch.”

15. A first-aid kit and a type ABC fire extinguisher shall be kept at the site and/or in a field vehicle when performing field work.

7.0 MONITORING PROCEDURES

7.1 TEMPERATURE MONITORING

Temperature monitoring during ADL sampling activities is discussed in Section 6.2.4 (Heat Stress Hazards).

7.2 NOISE MONITORING

Noise monitoring is not required during ADL sampling activities; however, hearing protection is required for field personnel during drilling activities as discussed in Section 6.2.3 (Noise Hazards).

7.3 AIR MONITORING

The following air monitoring equipment will be used.

_X_ Photoionization Detector (PID) [with a 10.6 eV lamp]
____ Flame Ionization Detector (FID)
____ Draeger Pump and Tubes (specify tubes)
____ Combustible Gas Meter (CGM)
____ Oxygen Meter (O2)
____ Dust (Particle) Meter
____ Other (specify)

The type and frequency of air monitoring for each work task is specified below. Air monitoring instruments will be calibrated and maintained according to manufacturer's specifications. Calibration information and air monitoring results will be recorded in project field notes.

7.3.1 ACTION LEVELS

Section 6.1 provided information regarding the known or expected chemicals of concern at the site as well as information regarding these chemicals. The below action levels, based on this data, will be used to determine when the upgrading of personal protective equipment, specifically respiratory protections.

Respirators shall be worn when air monitoring indicates that concentrations exceed the following action levels:

Wear half-face respirator supplied with organic vapor (OV) cartridges if PID reads greater than 5 ppm (sustained reading in the breathing zone for greater than 30 seconds)

Stop work if PID reads greater than 25 ppm (sustained reading in the breathing zone for greater than 30 seconds)

An explosion hazard shall be assumed to exist where air concentrations of the following chemicals exceed their respective lower explosion levels (LELs).

State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) information for the site:

(Applicable warning is checked)

☒ WARNING: This area contains a chemical known to the State of California to cause cancer.

☒ WARNING: This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Additional information may be obtained from Donald Kubik Jr. at (510) 663-4100

8.0 PERSONAL PROTECTIVE EQUIPMENT

All required PPE is modified Level D equipment. The following personal protective equipment (PPE) will be used as specified below:

PPE Required	Task 1	Task 2	Task 3	Task 4	Task 5
Describe Task	Traffic Control	Surveying	Soil Sampling	Decontamin-ation	Onsite Waste Disposal
Steel-Toed Boots (Rubber)					
Steel-Toed Boots (Leather)	X	X	X	X	X
Hard Hat	X	X	X	X	X
Safety Glasses/Goggles	X	X	X	X	X
Ear Plugs			X	X	X
Gloves (specify type):	Nitrile				
• Inner and Outer					
• Inner Only		X	X	X	X
Tyvek Coverall		AV	AV	AV	AV
Saranex Coverall					
Half-Face Respirator					
Full-Face Respirator					
Respirator Cartridge (specify type):					
Orange Vests	X	X	X	X	X
Fire Extinguisher (each field vehicle)	X	X	X	X	X
Cellular Telephones (each field personnel)	X	X	X	X	X
First Aid Kit (each field vehicle)	X	X	X	X	X
Other (specify)					

Key:

X = PPE Required
Av = Have available at work site
Glove Types = Nitrile, Vinyl, Neoprene, Butyl
Other – specify

Cartridge Types = Organic Vapor (OV)
HEPA Filter (HEPA)
Combination OV and HEPA (Comb.)

9.0 SITE CONTROL

The purpose of site control is to minimize the potential exposure to site hazards, to prevent vandalism at the site, and to provide adequate facilities for workers. Work area controls and decontamination areas will be provided to limit the potential for chemical exposure associated with site activities.

9.1 WORK AREA

An exclusion zone will be set up immediately surrounding the site work areas. Only authorized personnel shall be permitted access to the exclusion zone. If practical, the exclusion zone will be cordoned with barriers, cones, or fencing to limit unauthorized access. No eating, drinking, or smoking are allowed in the exclusion zone.

9.2 DECONTAMINATION AREAS

Equipment and personnel decontamination areas will be set up adjacent to the work exclusion zones. All equipment and tools used during work activities shall be decontaminated in the designated decontamination area. Decontamination procedures are described in Section 10.0 of this plan.

9.3 COMMUNICATIONS

A field representative should contact the project manager or office at least once a day while in the field. The closest telephone is located: with the Site Safety Officer.

9.4 DAILY FIELD LOG

- Date
- Location and scope of work
- Ambient weather parameters
- Visitor information, if any
- Other comments or information relevant to project

10.0 DECONTAMINATION

10.1 PERSONNEL DECONTAMINATION PROCEDURES

Remove disposable gloves and clothing and place in plastic bags. Wash hands and face before eating, drinking, or smoking and at the end of the work day.

10.2 DECONTAMINATION PROCEDURES FOR EQUIPMENT/SAMPLING GEAR

Re-usable soil sampling equipment will be decontaminated prior to collection of each sample by scrubbing using Alconox or equivalent (a laboratory-grade detergent) and distilled water, followed by double rinsing with distilled water.

10.3 STORAGE OF INVESTIGATION-DERIVED MATERIALS

Investigation-derived materials (PPE/expendables) will be disposed of as municipal waste.

Soil cuttings and decontamination water generated during soil sampling activities will be disposed of on-site. Measures shall be taken to prevent any liquids from entering the roadway, storm drains, or run-off from State right of way. AMEC anticipates the following IDW streams;

- Soil cuttings generated during sampling activities; and
- Decontamination water

11.0 EMERGENCY RESPONSE

In the event of an accident or emergency condition, the procedures specified below shall be followed.

11.1 NON-EMERGENCY INCIDENTS

Steps 1 & 2 must be completed – before seeking medical attention other then the local first aid

1. Report the situation to your immediate supervisor AND safety coordinator (all incidents with the clear starting event should be reported within 1 hour of occurrence)

2. Call WorkCare 24/7 Hotline: (800) 455-6155

3. WorkCare will assess the situation telephonically and determine whether the incident requires medical attention. During this process, the WorkCare will perform the following duties:

   - Explain the process to the caller
   - Determine the nature of the concern
   - Provide appropriate medical advice to the caller
   - Determine appropriate path forward with the caller
   - Maintain appropriate medical confidentiality
   - Help caller to execute path forward, including referral to the appropriate local medical facility
   - Send an email notification to the corporate safety contact

4. Within 2 Hours of the incident inform verbally (direct contact is required) contact Don Kubik - (510) 663-4100 (office); (510) 368-6433 (cell) – H&S Manager, AMEC - Oakland, CA

5. Project Manager to complete the initial Incident Report within 24 hours and forward it to the Corporate Health and Safety Officer

6. Corporate HR to complete Worker's Compensation Insurance notifications

7. Corporate Health and Safety Officer to conduct further incident investigation and communicate as needed

Note: These procedures are only for AMEC employees.

11.2 MEDICAL EMERGENCIES

In the event of a medical emergency, the following procedures should be used.

1. Remove injured or exposed person(s) from immediate danger if possible.
2. Perform emergency eyewash and shower if necessary.
3. Evacuate other on-site personnel to a safe place in an upwind direction until it is safe for work to resume.

4. If serious injury or life-threatening condition exists, call
    1. 911 - Paramedics, fire department, police
       Hospital emergency room
   ii. Clearly describe location, injury and conditions to dispatcher/hospital. Designate a person to direct emergency equipment to the injured person(s).
5. Provide first aid if necessary. Remove contaminated clothing only if this can be done without endangering the injured person.
6. Call the project manager and/or project health and safety officer.
7. Immediately implement steps to prevent recurrence of the accident
8. Once medical attention is sought and provided, the supervisor must contact WorkCare 24/7 Hotline: (800) 455-6155
9. WorkCare will be responsible for performing the following duties:
   - Contact the treating physician
   - Inform the physician of the injury/illness
   - Request to be consulted on treatment
   - Determine appropriateness of treatment
   - Request copies of all medical records from clinic
   - Remind the treating physician of the care management philosophy
   - Send an email update to the Corporate Safety contact
10. IMMEDIATELY after contacting WorkCare inform verbally (direct contact is required) contact Don Kubik - (510) 663-4100 (office); (510) 368-6433 (cell) - H&S Manager, AMEC - Oakland, CA
11. Notify the Site Health & Safety Officer and Safety Committee worker representative (if applicable) to complete initial investigation with the Supervisor
12. Site Health & Safety Officer to complete the initial Incident Report within 24 hours
13. Corporate HR to complete Worker's Compensation Insurance notifications
14. Corporate Health & Safety Officer to conduct further incident notifications, investigation and develop internal communications

A map showing the nearest hospital location along with driving directions from the project Site is attached to this plan (Figure 2).

Hospital St. Mary Medical Center
Address 1050 Linden Avenue
Long Beach, California 90813
Telephone (562) 491-9000 (general)

Driving directions to St. Mary Medical Center are provided below:

1. Head south on North Temple Avenue toward East 28th Street.
2. Take the 2nd right onto East Willow Street.
3. Turn left onto Atlantic Avenue.
4. Turn right onto East 11th Street.
5. Take the 1st left onto Linden Avenue.

6. Hospital will be on the left.

Telephone number of nearest Poison Control Center: 1-800-222-1222

11.3 ACCIDENTAL RELEASE OF HAZARDOUS MATERIALS OR WASTES

1. Evacuate all on-site personnel to a safe place in an upwind direction until the PM or PHSO determines that it is safe for work to resume.
2. Immediately instruct a designated person to contact the PM or PHSO.
3. Contain spill, if it is possible and it can be done safely.
4. Initiate cleanup.

11.4 GENERAL EMERGENCIES

In the case of fire, flood, explosion, or other hazard, work shall be halted and the local police/ fire department shall be notified by calling 911. All on-site personnel will be immediately evacuated to a safe place.

APPROVALS

Duane D. Paul — 5/26/11

Project Manager — Date
Duane Paul

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE INCORPORATED
CERTIFICATION NUMBER 8721 CP
EXPIRES 6-1-2014
PENNSYLVANIA - 1960
DONALD ANTHONY KUBIK JR., CIH

5/26/11

Corporate Health & Safety Officer — Date
Donald Kubik

5/26/11

Project Health & Safety Officer — Date
Vincent P. Robino

ESE PROJECT HEALTH AND SAFETY FIELD MEETING FORM

Date:_____ Time: _____ Project No.:0153240170

Project Name: Interstate Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Site Investigation, PM 3.4/4.5.

Location:_____

Meeting Conducted by: _____

Topics Discussed:
Physical Hazards: _____
Chemical Hazards: _____

State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) information for the site:
(Applicable warning is checked)

☒ WARNING: This area contains a chemical known to the State of California to cause cancer.

☒ WARNING: This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Personal Protection: _____

Decontamination: _____

Special Site Considerations: _____

_____

Emergency Information:_____

Hospital Location:_____

Attendees

Name/Company (printed)	Signature

Meeting Conducted by: _____

Signature

FIGURES

Explanation

Site boundary

Note:

All locations are approximate.

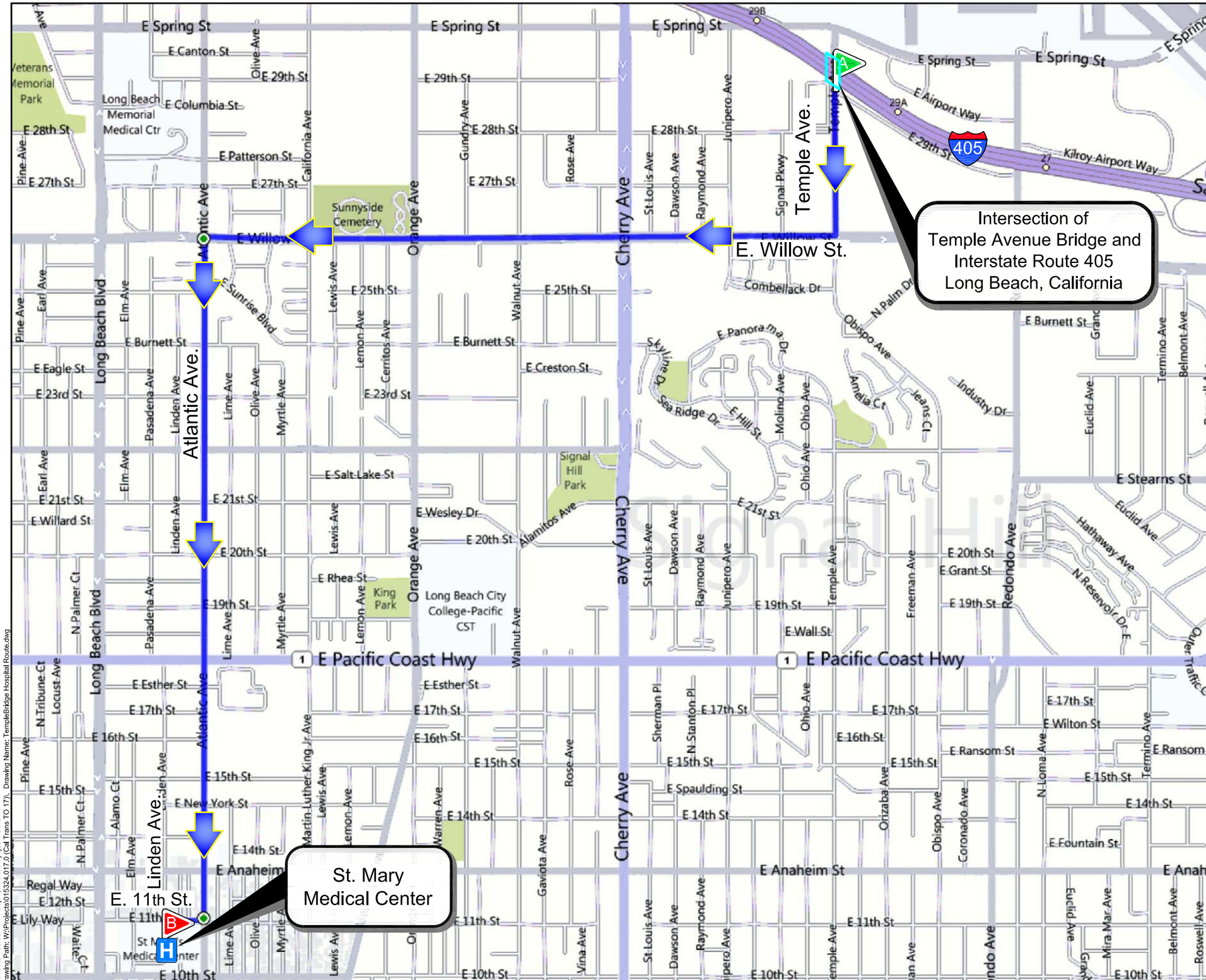
Approximate scale in feet
0 400 800
0 120 240
Approximate scale in meters

Basemap modified from Bing Maps (Microsoft Corporation®, 2011, and NAVTEQ®, 2010).

SITE LOCATION MAP
Aerially Deposited Lead Site Investigation
Temple Avenue Bridge
Intersection of Temple Avenue Bridge and
Interstate Route 405
Long Beach, California

By: jrw	Date: 5/25/11	Project No. 153240170
AMEC Geomatrix	Figure	1

Plot Date: 05/25/11 - 1:42pm, Plotted by: joanna.worker
Drawing Path: W:\Projects\015324.017.0 (Cal Trans TO 17)\, Drawing Name: TempleBridge Site Loc Map.dwg



Directions to Hospital From Site

1. Head south on North Temple Avenue toward East 28th Street, (0.3 mile).
2. Take the 2nd right onto E. Willow Street (1.5 mile).
3. Turn left onto Atlantic Avenue (1.6 mile).
4. Turn right onto E. 11th Street. (<0.1 mile).
5. Take the 1st left onto Linden Avenue (<0.1 mile).
6. Hospital will be located on the left.

St. Mary Medical Center
1050 Linden Avenue
Long Beach, California 90813
(562) 491-9000

Explanation

Site boundary

Note:

All locations are approximate.

N

Approximate scale in feet
0 600 1,200
0 180 360
Approximate scale in meters

Basemap modified from Bing Maps (Microsoft Corporation®, 2011, and NAVTEQ®, 2010).

HOSPITAL LOCATION MAP
Aerially Deposited Lead Site Investigation
Temple Avenue Bridge
Intersection of Temple Avenue Bridge and
Interstate Route 405
Long Beach, California

By: jrw	Date: 5/25/11	Project No. 153240170
AMEC Geomatrix	Figure	2

Plot Date: 05/25/11 - 1:39pm, Plotted by: joanna.worker
Drawing Path: W:\Projects\015324.017.0 (Cal Trans TO 17)\, Drawing Name: TempleBridge Hospital Route.dwg

APPENDIX A

Job Safety Analysis Documents

JOB SAFETY ANALYSIS

JSA #

Project Name:	Task Order 17	Project No:	0153240170	Date:	
Task:	Hand Augering	Task Location:			
Completed by:	AMEC	Reviewed by:	AMEC		
Notes:					

Task	Hazard	Risk Control Method
Mobilization To Site	Driving accidents	Vehicle to be fit for purpose and well maintained.
		Loads to be secure and not to exceed vehicle specifications or legal limits.
		Driver to be licensed, trained and medically fit
		Driver to be rested and alert
		No cell phone use unless pulled over to side of road.
		PLAN YOUR ROUTE AHEAD OF TIME
		Driver must not be under the influence of alcohol, drugs or medication that impairs ability to drive vehicle.
Set Up Work Site	Auto / public traffic	Notify attendant or site manager / owner of work activities and location.
		Work location to be barricaded off; vehicle and pedestrian traffic management plan as required
		High visible clothing, steel cap boots, long sleeves/pants/ hard hat / safety glasses to be worn at all times while in operational areas
		Inspect area around vehicle prior to putting vehicle in motion and use spotter
	Uneven or unstable ground	Visually examine site prior to entry.
	UV exposure	Wear correct PPE (neck to toe clothing & sun block)
	Underground services	Underground services to be located prior to breaking ground by qualified service locator
Boring (Hand Augering)	Hand Injuries	Use proper tools for assembling and dissembling the hand auger
		Use appropriate lubricant between auger rods
		Wear leather gloves use boring.
		Hold handles properly
		Watch out for pinch points when handling and assembling auger
	Head injuries	Lay down hand auger or secure when leaning against and object.
		Don't place auger against a surface on which it can roll
		Wear hard hat
	Back injuries	Lift objects properly (bending knees)
		When rotating the auger do not over exert
		If obstruction is encountered, try to remove obstruction
		Use care when moving spoils.
		If boring require too much force, use mechanical device for borings
	Sharp objects	Keep hands away from blades of auger

APPENDIX B

ESE Project Health and Safety Meeting Form

ESE PROJECT HEALTH AND SAFETY FIELD MEETING FORM

Date: _____ Time: _____ Project No.: _____

Project Name: Interstate Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Site Investigation, PM 3.4/4.5.

Location: _____

Meeting Conducted by: _____

Topics Discussed:
Physical Hazards: _____
Chemical Hazards: _____

State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) information for the site:
(Applicable warning is checked)

☒ WARNING: This area contains a chemical known to the State of California to cause cancer.

☒ WARNING: This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Personal Protection: _____

Decontamination: _____

Special Site Considerations: _____

_____

Emergency Information: _____

Hospital Location: _____

Attendees

Name/Company (printed)	Signature

Meeting Conducted by: _____

Signature

_____

APPENDIX C

Chemical Information Sheets

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September 2005

NIOSH Publication Number 2005-149

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Enter search terms separated by spaces.

Antimony

Synonyms & Trade Names Antimony metal, Antimony powder, Stibium		
CAS No. 7440-36-0	**RTECS No.** CC4025000	**DOT ID & Guide** 1549 157 (inorganic compounds, n.o.s.) 2871 170 (powder) 3141 157 (inorganic liquid compounds, n.o.s.)
Formula Sb	**Conversion**	**IDLH** 50 mg/m3 (as Sb) See: 7440360
Exposure Limits **NIOSH REL** *: TWA 0.5 mg/m3 [*Note: The REL also applies to other antimony compounds (as Sb).] **OSHA PEL** *: TWA 0.5 mg/m3 [*Note: The PEL also applies to other antimony compounds (as Sb).]		**Measurement Methods** **NIOSH** 7301 , 7303 , P&CAM261 (II-4); **OSHA** ID121 , ID125G , ID206 See: NMAM or OSHA Methods
Physical Description Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder.		

MW: 121.8	**BP:** 2975°F	MLT: 1166° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 6.69	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame.

Incompatibilities & Reactivities Strong oxidizers, acids, halogenated acids [Note: Stibine is formed when antimony is exposed to nascent (freshly formed) hydrogen.]

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly

Target Organs Eyes, skin, respiratory system, cardiovascular system

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 5 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 25 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0775

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

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September 2005

NIOSH Publication Number 2005-149

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Arsenic (organic compounds, as As)

Synonyms & Trade Names Synonyms vary depending upon the specific organic arsenic compound.

CAS No.	RTECS No.	DOT ID & Guide
	Conversion	IDLH N.D. See: IDLH INDEX

Exposure Limits

NIOSH REL : none
OSHA PEL : TWA 0.5 mg/m3

Measurement Methods
NIOSH 5022
See: NMAM or OSHA Methods

Physical Description Appearance and odor vary depending upon the specific organic arsenic compound.

Properties vary depending upon the specific organic arsenic compound.

Incompatibilities & Reactivities Varies

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation skin, possible dermatitis; resp distress; diarrhea; kidney damage; muscle tremor, convulsions; possible gastrointestinal tract, reproductive effects; possible liver damage

Target Organs Skin, respiratory system, kidneys, central nervous system, liver, gastrointestinal tract, reproductive system

Personal Protection/Sanitation (See protection codes)
Recommendations regarding personal protective clothing vary depending upon the specific compound.
Recommendations regarding eye protection vary depending upon the specific compound.

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately

Recommendations regarding washing the skin vary depending upon the specific compound. Recommendations regarding the removal of personal protective clothing that becomes wet or contaminated vary depending upon the specific compound. Recommendations regarding the daily changing of personal protective clothing vary depending upon the specific compound. Recommendations regarding the need for eyewash or quick drench facilities vary depending upon the specific compound.	**Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

Not available.

Important additional information about respirator selection

See also: INTRODUCTION

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

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ELECTRONIC SPACE PRODUCTS INTERNATIONAL

1050 Benson Way, Ashland, OR 97520
Toll Free (800) 638-2581 * Fax (541) 488-8313
E-Mail: sales@espimetals.com

MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Barium
Common Name: Barium
Formula: Ba
CAS #: 7440-39-3

II HAZARDOUS INGREDIENTS

Hazardous Component	%	OSHA/PEL	ACGIH/TLV
Barium	0-100	0.5 mg/m^3	0.5 mg/m^3

III PHYSICAL DATA

Boiling Point: 1640 ^oC
Vapor Density (Air=1): NA
Vapor Pressure: Not Measurable (mm Hg @ 25 ^oC)
Appearance and Odor: Silver white metal, odorless
Melting Point: 725 ^oC
Solubility in H_2O: Insoluble, reacts with water
Specific Gravity: 3.600
% Volatiles: 0

NOTE: The physical data presented above are typical values and should not be construed as a specification.

IV FIRE AND EXPLOSION HAZARDS DATA

Flash Point (Method used): N/A
Explosive Limits: **Lower**: N/E **Upper**: N/E
Autoignition Temperature: N/E

Extinguishing Media: Dry chemical powder-Chemical/Dolomite(Powdered Limestone. DO NOT USE WATER, CARBON DIOXIDE, OR HALOCARBON EXTINGUISHERS! FLAMMABLE SOLID!!
Special Fire Fighting Procedures: Wear a self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes. Flammable solid.

Unusual Fire and Explosion Hazards: Material readily reacts with water generating flammable and/or explosive hydrogen gas. Do not expose to air and fire. Emits toxic fumes under fire conditions. Isolate with dolomite and allow to burn. Large Fires: Contain and Smother with dolomite.

Caution! Fire may reignite after having been extinguished. Blend with large excess of dolomite.

V HEALTH HAZARD INFORMATION

Effects of Exposure:

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Barium poisoning is virtually unknown in industry, although the potential exists when the soluble forms are used. When ingested or given orally, the soluble ionized barium compounds exert a profound effect on all muscles and especially smooth muscles, markedly increasing their contractility. The heart rate is slowed and may stop in systole. Other effects are increased intestinal peristalsis, vascular construction, bladder contraction, and increased voluntary muscle tension.
Acute Effects:

Inhalation: Can cause irritation to the nose, throat, and upper respiratory tract.
Ingestion: Causes severe irritation of the mouth, throat, and esophagus.
Skin: Contact with skin can cause mild to moderate irritation. Contact with skin can lead to the development of a hypersensitivity (ie. allergic) in susceptible individuals.
Eye: Can cause mild to moderate irritation to the ocular tissues.

Chronic Effects: Severe irritation or burns.

Primary Routes of Exposure: Eye, skin, and inhalation.
Target Organs: Depending on the route, frequency, and duration of exposure, toxicity may occur in the following organs and/or systems: Respiratory System, Eye, Skin, Immune System (Allergic Reactions), Central Nervous System, and Heart.

Medical Conditions Generally Aggravated by Exposure: Respiratory system, skin, immune system and/or specific chemical allergies, central nervous system, and the heart.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. If symptoms develop, seek immediate medical attention. If not breathing, give artificial respiration.
INGESTION: Call a poison control center, emergency room, or physician. Unless advised otherwise, induce vomiting after giving 1-2 glasses of milk or water. If a soluble barium compound has been swallowed, get medical attention. Never induce vomiting or give anything by mouth to an unconscious person. Loosen tight fitting clothing, clear the airway, and keep the person warm.
SKIN: Immediately remove and isolate contaminated clothing. Carefully brush material off skin and wash area with soap and water. Seek medical attention if irritation develops.
EYE: Contamination of the eyes should be treated by immediate and prolonged irrigation with copious amounts of water. Lift upper and lower eye lids frequently. Get prompt medical attention.

NOTE TO PHYSICIAN: Treatment should be directed at preventing absorption, administering to the symptoms as they occur, and providing supportive therapy.

VI REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Do not allow water to enter container because of violent reaction. Avoid friction, heat, sparks, and flame.
Incompatibility (Materials to Avoid): Oxidizing agents, oxygen, acids, halocarbons, carbon dioxide.

Hazardous Decomposition Products: Toxic fumes.
Hazardous Polymerization: Will not occur

VII SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area and provide ventilation. Shovel spilled product and place in a closed container for further handling and disposal. Do not flush to sewer, stream, or other bodies of water unless authorized to do so by appropriate government official. Small quantities of barium metal may be dissolved in large quantities of water. Soda ash is added and the solution then neutralized with HCL.

Waste Disposal Method: Material in the elemental state should be recovered for reuse or recycling. Observe all federal, state & local laws.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: Avoid breathing dust. Wear a NIOSH/MSHA approved dust respirator.
Ventilation: Provide adequate ventilation. Handle only in protective argon or helium atmosphere or under oil.

Protective Gloves: Leather-palmed, heat resistant gloves.
Eye Protection: Chemical splash goggles and a full face shield. An eye wash facility should be readily available.

Other Protective Clothing or Equipment: The use of fire resistant outer clothing is advisable.

IX SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Barium metal should be stored in tightly-closed containers under argon or helium atmosphere or a paraffin oil blanket. When handling, wear non-sparking shoes and flame resistant clothing. Avoid friction, heat, sparks, and flame. Use only non-sparking tools and utensils. Ground all equipment, vessels, tables, and other metallic objects that may come into contact with the product.

Other Precautions: Can autoignite in air. Extremely sensitive to shock, heat, friction and static electricity. Rubber gloves, rubber protective clothing and apron, goggles and gas filter mask should be worn when working in a barium storage area.

Empty Container Precautions: This container is hazardous when empty. Do not use heat, sparks, open flame, torches, or cigarettes on or near empty container. Empty containers can retain product residues. Do not reuse empty container for food, clothing, or other products for human or animal consumption or where skin contact may occur.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Do not use tobacco or food in work area. Wash thoroughly after handling, especially before eating, drinking, smoking, or using restroom facilities. Contaminated clothing and shoes should be thoroughly cleaned before reuse. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

DOT Shipping Name: Barium
DOT Label: Dangerous when wet
DOT Identification No.: UN 1400

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

Issued by: S. Dierks
Dated: March 1994

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Benzene

Synonyms & Trade Names Benzol, Phenyl hydride

CAS No. 71-43-2	**RTECS No.** CY1400000	**DOT ID & Guide** 1114 130
Formula C_6H_6	**Conversion** 1 ppm = 3.19 mg/m3	**IDLH** Ca [500 ppm] See: 71432

Exposure Limits **NIOSH REL** : Ca TWA 0.1 ppm ST 1 ppm See Appendix A **OSHA PEL** : [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F	**Measurement Methods** **NIOSH** 1500 , 1501 , 3700 , 3800 ; **OSHA** 12 , 1005 See: NMAM or OSHA Methods

Physical Description Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]

MW: 78.1	**BP:** 176°F	**FRZ:** 42°F	**Sol:** 0.07%	**VP:** 75 mmHg	**IP:** 9.24 eV
Sp.Gr: 0.88	**Fl.P:** 12°F	**UEL:** 7.8%	**LEL:** 1.2%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers, many fluorides & perchlorates, nitric acid

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow

Cancer Site [leukemia]

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated	**First Aid** (See procedures) **Eye:** Irrigate immediately **Skin:** Soap wash immediately **Breathing:** Respiratory

Remove: When wet (flammable) **Change:** No recommendation **Provide:** Eyewash, Quick drench	support **Swallow:** Medical attention immediately

Respirator Recommendations

(See Appendix E)

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0015 See MEDICAL TESTS: 0022

Page last reviewed: April 4, 2011
Page last updated: November 18, 2010
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

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Beryllium & beryllium compounds (as Be)

Synonyms & Trade Names Beryllium metal: Beryllium
Other synonyms vary depending upon the specific beryllium compound.

CAS No. 7440-41-7 (metal)	**RTECS No.** DS1750000 (metal)	**DOT ID & Guide** 1566 154 (compounds) 1567 134 (powder)
Formula Be (metal)	**Conversion**	**IDLH** Ca [4 mg/m3 (as Be)] See: 7440417
Exposure Limits **NIOSH REL** : Ca C 0.0005 mg/m3 See Appendix A **OSHA PEL** : TWA 0.002 mg/m3 C 0.005 mg/m3 (30 minutes), with a maximum peak of 0.025 mg/m3		**Measurement Methods** **NIOSH** 7102 , 7300 , 7301 , 7303 , 9102 ; **OSHA** ID125G , ID206 See: NMAM or OSHA Methods

Physical Description Metal: A hard, brittle, gray-white solid.

MW: 9.0	**BP:** 4532°F	MLT: 2349°F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 1.85 (metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of a powder or dust.

Incompatibilities & Reactivities Acids, caustics, chlorinated hydrocarbons, oxidizers, molten lithium

Exposure Routes inhalation, skin and/or eye contact

Symptoms Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency;

irritation eyes; dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [lung cancer]

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash

First Aid (See procedures)
Eye: Irrigate immediately

Breathing: Fresh air

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

Page last reviewed: February 3, 2009
Page last updated: February 3, 2009
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IPCS INCHEM Home

BROMODICHLOROMETHANE	ICSC: 0393

Date of Peer Review: April 2006

Dichlorobromomethane
Methane, bromodichloro-

CAS #	**75-27-4**	**$CHBrCl_2$**	
RTECS #	**PA5310000**	**Molecular mass: 163.8**	
UN #			
EC/EINECS #	**200-856-7**		

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			

EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation	See Notes.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest.
Skin		Protective gloves.	Rinse and then wash skin with water and soap.
Eyes		Safety spectacles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
	GHS Classification Warning Harmful if swallowed Suspected of causing cancer May causes damage to liver and kidneys through prolonged or repeated exposure if swallowed
EMERGENCY RESPONSE	**STORAGE**

	Separated from strong oxidants, strong bases and magnesium. Ventilation along the floor.

IPCS
International

Programme
on
Chemical
Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the Commission of the European Communities © IPCS, CEC 2005

SEE IMPORTANT INFORMATION ON BACK

BROMODICHLOROMETHANE	**ICSC: 0393**

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive gases, including hydrogen bromide and hydrogen chloride. Reacts with strong bases, strong oxidants and magnesium

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established. MAK not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20℃.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the kidneys and liver, by ingestion , resulting in impaired functions. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 90℃
Melting point: -57℃
Density: 1.9 g/cm³
Solubility in water, g/100 ml at 20℃: 0.45 (poor)
Vapour pressure, kPa at 20℃: 6.6
Relative vapour density (air = 1): 5.6

Relative density of the vapour/air-mixture at 20℃ (air = 1): 1.3
Octanol/water partition coefficient as log Pow: 2

ENVIRONMENTAL DATA

NOTES

Halon 1021 is a trade name. Bromodichloromethane can be found in chlorinated water. Health effects of exposure to the substance have not been investigated adequately other than by ingestion. Card has been partially updated in August 2007: see GHS classification.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the CEC nor the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information

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See Also:
- Toxicological Abbreviations
- Bromodichloromethane (IARC Summary & Evaluation, Volume 52, 1991)
- Bromodichloromethane (IARC Summary & Evaluation, Volume 71, 1999)

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Cadmium dust (as Cd)

Synonyms & Trade Names Cadmium metal: Cadmium
Other synonyms vary depending upon the specific cadmium compound.

CAS No. 7440-43-9 (metal)	**RTECS No.** EU9800000 (metal)	**DOT ID & Guide** 2570 154 (cadmium compound)
Formula Cd (metal)	**Conversion**	**IDLH** Ca [9 mg/m3 (as Cd)] See: 7440439

Exposure Limits **NIOSH REL** *: Ca See Appendix A [*Note: The REL applies to all Cadmium compounds (as Cd).] **OSHA PEL** *: [1910.1027] TWA 0.005 mg/m3 [*Note: The PEL applies to all Cadmium compounds (as Cd).]	**Measurement Methods** **NIOSH** 7048 , 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G , ID189 , ID206 See: NMAM or OSHA Methods

Physical Description Metal: Silver-white, blue-tinged lustrous, odorless solid.

MW: 112.4	**BP:** 1409°F	MLT: 610° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 8.65 (metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Solid in bulk form, but will burn in powder form.

Incompatibilities & Reactivities Strong oxidizers; elemental sulfur, selenium & tellurium

Exposure Routes inhalation, ingestion

Symptoms pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal

(occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]

Target Organs respiratory system, kidneys, prostate, blood

Cancer Site [prostatic & lung cancer]

Personal Protection/Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: Daily
Remove: No recommendation
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
(See Appendix E)

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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Chloroform

Synonyms & Trade Names Methane trichloride, Trichloromethane

CAS No. 67-66-3	**RTECS No.** FS9100000	**DOT ID & Guide** 1888 151
Formula $CHCl_3$	**Conversion** 1 ppm = 4.88 mg/m3	**IDLH** Ca [500 ppm] See: 67663

Exposure Limits **NIOSH REL** : Ca ST 2 ppm (9.78 mg/m3) [60-minute] See Appendix A **OSHA PEL** †: C 50 ppm (240 mg/m3)	**Measurement Methods** **NIOSH** 1003 See: NMAM or OSHA Methods

Physical Description Colorless liquid with a pleasant odor.

MW: 119.4	**BP:** 143°F	**FRZ:** -82°F	Sol(77°F): 0.5%	**VP:** 160 mmHg	**IP:** 11.42 eV
Sp.Gr: 1.48	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Liquid

Incompatibilities & Reactivities Strong caustics; chemically-active metals such as aluminum or magnesium powder, sodium & potassium; strong oxidizers [Note: When heated to decomposition, forms phosgene gas.]

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]

Target Organs Liver, kidneys, heart, eyes, skin, central nervous system

Cancer Site [in animals: liver & kidney cancer]

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated	**First Aid** (See procedures) **Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory

Remove: When wet or contaminated **Change:** No recommendation **Provide:** Eyewash, Quick drench	support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0027 See MEDICAL TESTS: 0047

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Chromium metal

Synonyms & Trade Names Chrome, Chromium		
CAS No. 7440-47-3	**RTECS No.** GB4200000	**DOT ID & Guide**
Formula Cr	**Conversion**	**IDLH** 250 mg/m3 (as Cr) See: 7440473
Exposure Limits **NIOSH REL** : TWA 0.5 mg/m3 See Appendix C **OSHA PEL** *: TWA 1 mg/m3 See Appendix C [*Note: The PEL also applies to insoluble chromium salts.]		**Measurement Methods** **NIOSH** 7024 , 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G See: NMAM or OSHA Methods

Physical Description Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.

MW: 52.0	**BP:** 4788°F	MLT: 3452° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 7.14	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame.

Incompatibilities & Reactivities Strong oxidizers (such as hydrogen peroxide), alkalis

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; lung fibrosis (histologic)

Target Organs Eyes, skin, respiratory system

Personal Protection/Sanitation (See protection codes)
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

Up to 2.5 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.*

Up to 5 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 12.5 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 25 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0029

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Cobalt metal dust and fume (as Co)

Synonyms & Trade Names Cobalt metal dust, Cobalt metal fume		
CAS No. 7440-48-4	**RTECS No.** GF8750000	**DOT ID & Guide**
Formula Co	**Conversion**	**IDLH** 20 mg/m3 (as Co) See: 7440484
Exposure Limits **NIOSH REL** : TWA 0.05 mg/m3 **OSHA PEL** †: TWA 0.1 mg/m3		**Measurement Methods** **NIOSH** 7027 , 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G , ID213 See: NMAM or OSHA Methods
Physical Description Odorless, silver-gray to black solid.		

MW: 58.9	**BP:** 5612°F	MLT: 2719°F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 8.92	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures.

Incompatibilities & Reactivities Strong oxidizers, ammonium nitrate

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma

Target Organs Skin, respiratory system

Personal Protection/Sanitation (See protection codes)	**First Aid** (See procedures)

Skin: Prevent skin contact **Eyes:** No recommendation **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** Daily	**Eye:** Irrigate immediately **Skin:** Soap wash **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

Up to 0.25 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.

Up to 0.5 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 2.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 20 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0782 See MEDICAL TESTS: 0055

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Copper (dusts and mists, as Cu)

Synonyms & Trade Names Copper metal dusts, Copper metal fumes		
CAS No. 7440-50-8	**RTECS No.** GL5325000	**DOT ID & Guide**
Formula Cu	**Conversion**	**IDLH** 100 mg/m3 (as Cu) See: 7440508
Exposure Limits **NIOSH REL** *: TWA 1 mg/m3 [*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.] **OSHA PEL** *: TWA 1 mg/m3 [*Note: The PEL also applies to other copper compounds (as Cu) except copper fume.]		**Measurement Methods** **NIOSH** 7029 , 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G See: NMAM or OSHA Methods
Physical Description Reddish, lustrous, malleable, odorless solid.		

MW: 63.5	**BP:** 4703°F	MLT: 1981° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 8.94	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid in bulk form, but powdered form may ignite.

Incompatibilities & Reactivities Oxidizers, alkalis, sodium azide, acetylene

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; in animals: lung, liver, kidney damage; anemia

Target Organs Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease)

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 5 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.*

Up to 10 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 50 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0240 See MEDICAL TESTS: 0057

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International Chemical Safety Cards

DIESEL FUEL No. 2

ICSC: 1561

Fuels, Diesel, No. 2
Diesel oil No. 2
Gasoil - unspecified

ICSC # 1561
CAS # 68476-34-6
RTECS # LS9142500
UN # 1202
EC # 649-227-00-2
October 26, 2004 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Water spray, alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 52°C explosive vapour/air mixtures may be formed.	Above 52°C use a closed system, ventilation, and explosion-proof electrical equipment.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
•INHALATION	Dizziness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove	Well closed.	Note: H Xn symbol R: 40

to safe place. Personal protection: filter respirator for organic gases and vapours.		S: 2-36/37 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1561

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DIESEL FUEL No. 2

ICSC: 1561

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** BROWN SLIGHTLY VISCOUS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA; (skin); A3; (ACGIH 2004).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol. **INHALATION RISK:** A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes , the skin and the respiratory tract . The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin.
PHYSICAL PROPERTIES	Boiling point: 282-338°C Melting point: -30 - -18°C Density: 0.87 - 0.95 g/cm³ Solubility in water, g/100 ml at 20°C: 0.0005 Flash point: 52°C c.c.	Auto-ignition temperature: 254-285°C Explosive limits, vol% in air: 0.6 - 6.5 Octanol/water partition coefficient as log Pow: > 3.3
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms.	

N O T E S

Additives to Diesel fuel in winter may change physical and toxicological properties of the substance. This card does not address Diesel exhaust.

Transport Emergency Card: TEC (R)-30S1202

NFPA Code: H0; F2; R0;

ADDITIONAL INFORMATION

ICSC: 1561 **DIESEL FUEL No. 2**

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Ethyl benzene

Synonyms & Trade Names Ethylbenzol, Phenylethane

CAS No. 100-41-4	**RTECS No.** DA0700000	**DOT ID & Guide** 1175 130
Formula $CH_3CH_2C_6H_5$	**Conversion** 1 ppm = 4.34 mg/m3	**IDLH** 800 ppm [10%LEL] See: 100414

Exposure Limits

NIOSH REL : TWA 100 ppm (435 mg/m3) ST 125 ppm (545 mg/m3)
OSHA PEL †: TWA 100 ppm (435 mg/m3)

Measurement Methods
NIOSH 1501 ;
OSHA 7 , 1002
See: NMAM or OSHA Methods

Physical Description Colorless liquid with an aromatic odor.

MW: 106.2	**BP:** 277°F	**FRZ:** -139°F	**Sol:** 0.01%	**VP:** 7 mmHg	**IP:** 8.76 eV
Sp.Gr: 0.87	**Fl.P:** 55°F	**UEL:** 6.7%	**LEL:** 0.8%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
NIOSH/OSHA

Up to 800 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0268 See MEDICAL TESTS: 0098

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Gasoline

Synonyms & Trade Names Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins, and aromatics).]

CAS No. 8006-61-9	**RTECS No.** LX3300000	**DOT ID & Guide** 1203 128
	Conversion 1 ppm = 4.5 mg/m3 (approx)	**IDLH** Ca [N.D.] See: IDLH INDEX

Exposure Limits **NIOSH REL** : Ca See Appendix A **OSHA PEL** †: none	**Measurement Methods** **OSHA** PV2028 See: NMAM or OSHA Methods

Physical Description Clear liquid with a characteristic odor.

MW: 110 (approx)	**BP:** 102°F	**FRZ:** ?	**Sol:** Insoluble	**VP:** 38-300 mmHg	**IP:** ?
Sp.Gr(60°F): 0.72-0.76	**Fl.P:** -45°F	**UEL:** 7.6%	**LEL:** 1.4%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers such as peroxides, nitric acid & perchlorates

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney cancer]

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact	**First Aid** (See procedures)

Eyes: Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet (flammable) **Change:** No recommendation **Provide:** Eyewash, Quick drench	**Eye:** Irrigate immediately **Skin:** Soap flush immediately **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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Lead

Synonyms & Trade Names Lead metal, Plumbum		
CAS No. 7439-92-1	**RTECS No.** OF7525000	**DOT ID & Guide**
Formula Pb	**Conversion**	**IDLH** 100 mg/m3 (as Pb) See: 7439921
Exposure Limits **NIOSH REL** *: TWA (8-hour) 0.050 mg/m3 See Appendix C [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.] **OSHA PEL** *: [1910.1025] TWA 0.050 mg/m3 See Appendix C [*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]		**Measurement Methods** **NIOSH** 7082 , 7105 , 7300 , 7301 , 7303 , 7700 , 7701 , 7702 , 9100 , 9102 , 9105 ; **OSHA** ID121 , ID125G , ID206 See: NMAM or OSHA Methods

Physical Description A heavy, ductile, soft, gray solid.					
MW: 207.2	**BP:** 3164°F	MLT: 621° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 11.34	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid in bulk form.

Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
(See Appendix E)
NIOSH/OSHA

Up to 0.5 mg/m3:
(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.
Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 2.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Up to 100 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0052 See MEDICAL TESTS: 0127

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Mercury compounds [except (organo) alkyls] (as Hg)

Synonyms & Trade Names Mercury metal: Colloidal mercury, Metallic mercury, Quicksilver
Synonyms of "other" Hg compounds vary depending upon the specific compound.

CAS No. 7439-97-6 (metal)	**RTECS No.** OV4550000 (metal)	**DOT ID & Guide** 2809 172 (metal)
Formula Hg (metal)	**Conversion**	**IDLH** 10 mg/m3 (as Hg) See: 7439976

Exposure Limits **NIOSH REL** : Hg Vapor: TWA 0.05 mg/m3 [skin] Other: C 0.1 mg/m3 [skin] **OSHA PEL** †: TWA 0.1 mg/m3	**Measurement Methods** **NIOSH** 6009 ; **OSHA** ID140 See: NMAM or OSHA Methods

Physical Description Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]

MW: 200.6	**BP:** 674°F	**FRZ:** -38°F	**Sol:** Insoluble	**VP:** 0.0012 mmHg	**IP:** ?
Sp.Gr: 13.6 (metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Liquid

Incompatibilities & Reactivities Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss;

proteinuria

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly

Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

Mercury vapor:

NIOSH

Up to 0.5 mg/m^3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)

Up to 2.5 mg/m^3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge (s) providing protection against the compound of concern(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
Any appropriate escape-type, self-contained breathing apparatus

Other mercury compounds: NIOSH/OSHA

Up to 1 mg/m^3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m^3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)

Up to 5 mg/m^3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge (s) providing protection against the compound of concern(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m^3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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International Chemical Safety Cards

METHYL TERT-BUTYL ETHER

ICSC: 1164

tert-Butyl methyl ether
MTBE
Methyl-1,1-dimethylethyl ether
2-Methoxy-2-methyl propane
$(CH_3)_3COCH_3$ / $C_5H_{12}O$
Molecular mass: 88.2

ICSC # 1164
CAS # 1634-04-4
RTECS # KN5250000
UN # 2398
EC # 603-181-00-X
November 04, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidants.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
•INHALATION	Drowsiness. Dizziness. Headache. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce

			vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants, strong acids.	F symbol Xi symbol R: 11-38 S: 2-9-16-24 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1164

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

METHYL TERT-BUTYL ETHER

ICSC: 1164

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** The vapour is heavier than air and may travel along the ground; distant ignition possible. **CHEMICAL DANGERS:** Reacts violently with strong oxidants causing fire hazard. The substance decomposes on contact with acids. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 50 ppm as TWA; A3; (ACGIH 2004). MAK: 50 ppm, 180 mg/m³; Peak limitation category: I(1.5); Carcinogen category: 3B; Pregnancy risk group: C; (DFG 2004).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation and by ingestion. **INHALATION RISK:** A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure far above the OEL could cause lowering of consciousness. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 55°C Melting point: -109°C Relative density (water = 1): 0.7 Solubility in water, g/100 ml at 20°C: 4.2	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.5 Flash point: -28°C c.c.

	Vapour pressure, kPa at 20°C: 27 Relative vapour density (air = 1): 3.0	Auto-ignition temperature: 375°C Explosive limits, vol% in air: 1.6-15.1 Octanol/water partition coefficient as log Pow: 1.06
ENVIRONMENTAL DATA	It is strongly advised not to let the chemical enter into the environment because it persists in the environment.	

N O T E S

Much less likely to form peroxides than other ethers. Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.

Transport Emergency Card: TEC (R)-30GF1-I+II

ADDITIONAL INFORMATION

ICSC: 1164 **METHYL TERT-BUTYL ETHER**

(C) IPCS, CEC, 1994

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Molybdenum (soluble compounds, as Mo)

Synonyms & Trade Names Synonyms vary depending upon the specific soluble molybdenum compound.

CAS No.	RTECS No.	DOT ID & Guide
	Conversion	IDLH 1000 mg/m3 (as Mo) See: moly-mo

Exposure Limits	Measurement Methods
NIOSH REL : See Appendix D OSHA PEL : TWA 5 mg/m3	**NIOSH** 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G See: NMAM or OSHA Methods

Physical Description Appearance and odor vary depending upon the specific soluble molybdenum compound.

Properties vary depending upon the specific soluble molybdenum compound.

Incompatibilities & Reactivities Varies

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, nose, throat; anorexia; incoordination; dyspnea (breathing difficulty); anemia

Target Organs Eyes, respiratory system, kidneys, blood

Personal Protection/Sanitation	First Aid
(See protection codes) **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated	(See procedures) **Eye:** Irrigate immediately **Skin:** Water flush **Breathing:** Respiratory

Remove: When wet or contaminated **Change:** No recommendation	support **Swallow:** Medical attention immediately

Respirator Recommendations

OSHA

Up to 25 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.*

Up to 50 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 125 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 250 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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Nickel metal and other compounds (as Ni)

Synonyms & Trade Names **Nickel metal:** Elemental nickel, Nickel catalyst
Synonyms of other nickel compounds vary depending upon the specific compound.

CAS No. 7440-02-0 (Metal)	**RTECS No.** QR5950000 (Metal)	**DOT ID & Guide**
Formula Ni (Metal)	**Conversion**	**IDLH** Ca [10 mg/m3 (as Ni)] See: 7440020
Exposure Limits **NIOSH REL** *: Ca TWA 0.015 mg/m3 See Appendix A [*Note: The REL does not apply to Nickel carbonyl.] **OSHA PEL** *†: TWA 1 mg/m3 [*Note: The PEL does not apply to Nickel carbonyl.]		**Measurement Methods** **NIOSH** 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 , ID125G See: NMAM or OSHA Methods

Physical Description Metal: Lustrous, silvery, odorless solid.

MW: 58.7	**BP:** 5139°F	MLT: 2831° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 8.90 (Metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.

Incompatibilities & Reactivities Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational

carcinogen]

Target Organs Nasal cavities, lungs, skin

Cancer Site [lung and nasal cancer]

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated/Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures)

Skin: Water flush immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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Selenium

Synonyms & Trade Names Elemental selenium, Selenium alloy		
CAS No. 7782-49-2	**RTECS No.** VS7700000	**DOT ID & Guide** 2658 152 (powder)
Formula Se	**Conversion**	**IDLH** 1 mg/m3 (as Se) See: 7782492
Exposure Limits **NIOSH REL** *: TWA 0.2 mg/m3 [*Note: The REL also applies to other selenium compounds (as Se) except Selenium hexafluoride.] **OSHA PEL** *: TWA 0.2 mg/m3 [*Note: The PEL also applies to other selenium compounds (as Se) except Selenium hexafluoride.]		**Measurement Methods** **NIOSH** 7300 , 7301 , 7303 , 9102 , S190 (II-7); **OSHA** ID121 See: NMAM or OSHA Methods
Physical Description Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.]		

MW: 79.0	**BP:** 1265°F	MLT: 392°F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 4.28	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Combustible Solid

Incompatibilities & Reactivities Acids, strong oxidizers, chromium trioxide, potassium bromate, cadmium

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal

disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage

Target Organs Eyes, skin, respiratory system, liver, kidneys, blood, spleen

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 1 mg/m^3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.*
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0072

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Silver (metal dust and soluble compounds, as Ag)

Synonyms & Trade Names **Silver metal:** Argentum
Synonyms of soluble silver compounds such as Silver nitrate ($AgNO_3$) vary depending upon the specific compound.

CAS No. 7440-22-4 (metal)	**RTECS No.** VW3500000 (metal)	**DOT ID & Guide**
Formula Ag (metal)	**Conversion**	**IDLH** 10 mg/m3 (as Ag) See: 7440224
Exposure Limits **NIOSH REL** : TWA 0.01 mg/m3 **OSHA PEL** : TWA 0.01 mg/m3		**Measurement Methods** **NIOSH** 7300 , 7301 , 9102 ; **OSHA** ID121 See: NMAM or OSHA Methods

Physical Description Metal: White, lustrous solid.

MW: 107.9	**BP:** 3632°F	MLT: 1761° F	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 10.49 (metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Solid, but flammable in form of dust or powder.

Incompatibilities & Reactivities Acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethyleneimine, oxalic acid, tartaric acid

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance

Target Organs Nasal septum, skin, eyes

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated ($AgNO_3$)
Change: Daily
Provide: Eyewash

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Water flush
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 0.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode£
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.£

Up to 0.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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tert-Butyl alcohol

Synonyms & Trade Names 2-Methyl-2-propanol, Trimethyl carbinol

CAS No. 75-65-0	**RTECS No.** EO1925000	**DOT ID & Guide** 1120 129
Formula $(CH_3)_3COH$	**Conversion** 1 ppm = 3.03 mg/m3	**IDLH** 1600 ppm See: 75650

Exposure Limits **NIOSH REL** : TWA 100 ppm (300 mg/m3) ST 150 ppm (450 mg/m3) **OSHA PEL** †: TWA 100 ppm (300 mg/m3)	**Measurement Methods** **NIOSH** 1400 ; **OSHA** 7 See: NMAM or OSHA Methods

Physical Description Colorless solid or liquid (above 77°F) with a camphor-like odor. [Note: Often used in aqueous solutions.]

MW: 74.1	**BP:** 180°F	**FRZ:** 78°F	**Sol:** Miscible	VP(77°F): 42 mmHg	**IP:** 9.70 eV
Sp.Gr: 0.79 (Solid)	**Fl.P:** 52°F	**UEL:** 8.0%	**LEL:** 2.4%		

Combustible Solid Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong mineral acids, strong hydrochloric acid, oxidizers

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; drowsiness, narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

Personal Protection/Sanitation (See protection codes) **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated	**First Aid** (See procedures) **Eye:** Irrigate immediately **Skin:** Water flush

Remove: When wet (flammable) **Change:** No recommendation	promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 1600 ppm:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode£
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)£
(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0114

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Thallium (soluble compounds, as Tl)

Synonyms & Trade Names Synonyms vary depending upon the specific soluble thallium compound.

CAS No.	RTECS No.	DOT ID & Guide 1707 151 (compounds, n.o.s.)
	Conversion	IDLH 15 mg/m3 (as Tl) See: thallium

Exposure Limits	Measurement Methods
NIOSH REL : TWA 0.1 mg/m3 [skin] OSHA PEL : TWA 0.1 mg/m3 [skin]	**NIOSH** 7300 , 7301 , 7303 , 9102 ; **OSHA** ID121 See: NMAM or OSHA Methods

Physical Description Appearance and odor vary depending upon the specific soluble thallium compound.

Properties vary depending upon the specific soluble thallium compound.

Incompatibilities & Reactivities Varies

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs

Target Organs Eyes, respiratory system, central nervous system, liver, kidneys, gastrointestinal tract, body hair

Personal Protection/Sanitation	First Aid
(See protection codes) **Skin:** Prevent skin contact	(See procedures) **Eye:** Irrigate immediately

Eyes: Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** Daily	**Skin:** Water flush promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 0.5 mg/m3:
(APF = 5) Any quarter-mask respirator.
Click here for information on selection of N, R, or P filters.

Up to 1 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 15 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION

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Toluene

Synonyms & Trade Names Methyl benzene, Methyl benzol, Phenyl methane, Toluol		
CAS No. 108-88-3	**RTECS No.** XS5250000	**DOT ID & Guide** 1294 130
Formula $C_6H_5CH_3$	**Conversion** 1 ppm = 3.77 mg/m	**IDLH** 500 ppm See: 108883
Exposure Limits **NIOSH REL** : TWA 100 ppm (375 mg/m) ST 150 ppm (560 mg/m) **OSHA PEL** †: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)		**Measurement Methods** **NIOSH** 1500 , 1501 , 3800 , 4000 ; **OSHA** 111 See: NMAM or OSHA Methods
Physical Description Colorless liquid with a sweet, pungent, benzene-like odor.		

MW: 92.1	**BP:** 232°F	**FRZ:** -139°F	Sol(74°F): 0.07%	**VP:** 21 mmHg	**IP:** 8.82 eV
Sp.Gr: 0.87	**Fl.P:** 40°F	**UEL:** 7.1%	**LEL:** 1.1%		

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities Strong oxidizers

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Personal Protection/Sanitation (See protection codes)	First Aid (See procedures)
Skin: Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contaminated **Remove:** When wet (flammable) **Change:** No recommendation	**Eye:** Irrigate immediately **Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

NIOSH

Up to 500 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0078 See MEDICAL TESTS: 0232

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Vanadium dust

Synonyms & Trade Names Divanadium pentoxide dust, Vanadic anhydride dust, Vanadium oxide dust, Vanadium pentaoxide dust
Other synonyms vary depending upon the specific vanadium compound.

CAS No. 1314-62-1	**RTECS No.** YW2450000	**DOT ID & Guide** 2862 151
Formula V_2O_5	**Conversion**	**IDLH** 35 mg/m3 (as V) See: vandust

Exposure Limits **NIOSH REL** *: C 0.05 mg V/m3 [15-minute] [*Note: The REL applies to all vanadium compounds except Vanadium metal and Vanadium carbide (see Ferrovanadium dust).] **OSHA PEL** †: C 0.5 mg V_2O_5/m3 (resp)	**Measurement Methods** **NIOSH** 7300 , 7301 , 7303 , 7504 , 9102 ; **OSHA** ID185 See: NMAM or OSHA Methods

Physical Description Yellow-orange powder or dark-gray, odorless flakes dispersed in air.

MW: 181.9	**BP:** 3182°F (Decomposes)	MLT: 1274° F	**Sol:** 0.8%	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 3.36	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Noncombustible Solid, but may increase intensity of fire when in contact with combustible materials.

Incompatibilities & Reactivities Lithium, chlorine trifluoride

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheezing, bronchitis, dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
NIOSH (as V)

Up to 0.5 mg/m3:
(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.
Click here for information on selection of N, R, or P filters.*
(APF = 10) Any supplied-air respirator*

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.*

Up to 2.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 35 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See MEDICAL TESTS: 0240

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o-Xylene

Synonyms & Trade Names 1,2-Dimethylbenzene; ortho-Xylene; o-Xylol		
CAS No. 95-47-6	**RTECS No.** ZE2450000	**DOT ID & Guide** 1307 130
Formula $C_6H_4(CH_3)_2$	**Conversion** 1 ppm = 4.34 mg/m	**IDLH** 900 ppm See: 95476
Exposure Limits **NIOSH REL** : TWA 100 ppm (435 mg/m) ST 150 ppm (655 mg/m) **OSHA PEL** †: TWA 100 ppm (435 mg/m)		**Measurement Methods** **NIOSH** 1501 , 3800 ; **OSHA** 1002 See: NMAM or OSHA Methods

Physical Description Colorless liquid with an aromatic odor.					
MW: 106.2	**BP:** 292°F	**FRZ:** -13°F	**Sol:** 0.02%	**VP:** 7 mmHg	**IP:** 8.56 eV
Sp.Gr: 0.88	**Fl.P:** 90°F	**UEL:** 6.7%	**LEL:** 0.9%		

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities Strong oxidizers, strong acids

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal

tract, blood, liver, kidneys

Personal Protection/Sanitation (See protection codes)
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH/OSHA

Up to 900 ppm:
(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*
(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

See also: INTRODUCTION See ICSC CARD: 0084

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www.numinor.com

MATERIAL SAFETY DATA SHEET (MSDS)
ZINC POWDER

SECTION 1 - PRODUCER & SUPPLIERS DETAILS

Manufacturer & Supplier: NUMINOR CHEMICAL INDUSTRIES LTD.

Address: P. O. BOX 92,
MAALOT 24952,
ISRAEL.

Tel: + 972-4-9978220
Fax: + 972-4-9976062
E-Mail: zinc@numinor.com
Web Site: www.numinor.com

SECTION 2 - CHEMICAL NAME & INFORMATION ON INGREDIENTS

Chemical Name: Zinc Powder, Zinc Dust (CAS : 7440 -66-6) (EINECS: 231-175-3)
Hazard Symbol:

F Highly Flammable

R-Phrases: R15- Contact with water liberates highly flammable gases.
R17- Spontaneously flammable in air.
Formula: Zn and ZnO
Synonyms: Zinc Dust, Zinc Powder, Zinc Blue Powder
% Range: 92-98.0%

SECTION 3 - PHYSICAL & CHEMICAL CHARACTERISTICS

Physical State: Solid
Melting Point: 419.5°C
Boiling Point: 908°C
Specific Gravity: 7.14 g/cm^3
Solubility in water: Low.
Molecular Wt. 65.38
Appearance & Odour: Silver/grey powder, odourless.

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SECTION 4 - HAZARDS IDENTIFICATION

Physical / chemical hazards : Appearance: slightly gray solid. **Danger**! Water-Reactive. May ignite or explode on contact with moist air. Reacts violently and/or explosively with water, steam or moisture. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. *Target Organs:* Kidneys

Adverse human health effects

- Inhalation : Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

- Skin contact : Skin contact may cause irritation.

- Eye contact : Excessive dust exposure may cause eye irritation.

- Ingestion : Health hazard if ingested and can cause abdominal pain, nausea, diarrhea, cramps, and damage to gastrointestinal tract.

-Chronic : Repeated inhalation may cause chronic bronchitis.

SECTION 5 – FIRE, FIGHTING & EXPLOSION DATA

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Water Reactive. Material will react with water and may release a flammable and/or toxic gas. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. May ignite or explode on contact with steam or moist air.

Flammability: Flammable

Flash point: Not Available

Extinguishing media: Use dry sand or earth to smother fire. DO NOT USE WATER! Do NOT get water inside containers. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out.

Protection of fire-fighters: Use breathing apparatus (self-contained breathing apparatus with full face shield). Wear suitable protective clothing.

Emergency Code: **4Y**

NFPA Rating: Health: 2, Flammability: 1, Instability: 1, Special Hazard: ~~W~~

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SECTION 6 - STABILITY & REACTIVITY DATA

Stability: Stable in dry air.
Combines vigorously or explosively with water.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat, strong oxidants, exposure to moist air or water, mechanical shock.

Incompatibilities: Halogenated agents, strong oxidizing agents, alkali hydroxides, chlorinated solvents, strong acids, strong bases.

Hazardous combustion or Decomposition Products: Irritating and toxic fumes and gases, toxic fumes of zinc oxide.

SECTION 7 – Toxicological Information

Acute effects:

- Inhalation: n/a

- Dermal: Moderate irritation to rabbits,mice and guinea pigs with 1% solution applied for 5 days.

- Ingestion: 50 mg/3 times per day caused gastrointestinal problems.

Eyes irritation (rabbit): 420 ug – moderate irritation.

Chronic toxicity: n/a

Sensitization: Contact with skin causes irritation.

Carcinogenicity: NTP: No IARC: No Z List: No OHA Reg: No

Mutagenicity: In vitro and in vivo test of short-term genotoxicity : no evidence of genotoxicity.

Reproductive toxicity: No experimental or epidemiological evidence of reproduction toxicity.

SECTION 8 - FIRST AID MEASURES

First aid

- Skin contact: Rinse immediately with plenty of soap and water. Remove contaminated clothing and seek medical attention if irritation develops.

- Inhalation: Remove victim from exposure to fresh air.
If feeling unwell, immediately seek medical attention.

- Eye contact: Rinse immediately with clean water for at least 15 minutes occasionally lifting the upper and lower eyelids. Seek medical attention.

- Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Protection of rescue personnel: Avoid all unnecessary exposure. Use appropriate protection.
(see Section 9).

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SECTION 9 - PERSONAL PROTECTION & EXPOSURE CONTROLS

- Respiratory protection: A respiratory protection program that meets European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use. Follow the respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

- Hand protection: Appropriate gloves to prevent skin exposure.

- Skin protection: Appropriate work clothes to prevent skin exposure..

- Eye protection: Chemical goggles or safety glasses.

- Engineering measures: Use explosion-proof ventilation equipment. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits..

SECTION 10 - ACCIDENTAL RELEASE MEASURES & SPILL LEAK PROCEDURES

Personal precautions: Wear suitable gloves and eye/face protection as indicated in Section 8. Avoid dust creation.

Environmental precautions: Do not let product enter drains, sewage system, ground water.

Methods for cleaning up: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Do not expose spill to water.

SECTION 11 - HANDLING AND STORAGE

Handling & storing: Good housekeeping - store in a cool dry place - keep containers tightly shut. Keep away from water. Avoid making dust. Wash thoroughly after handling. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

Packing Materials: Use only UN approved types of packaging. Water tight.

SECTION 12 - ECOLOGICAL INFORMATION

No information available

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Comply with local regulations for disposal. Zinc should be recovered for recycling.

Waste of residues: This material and its container must be disposed of as hazardous waste. Because of possible pollution, remove as industrial waste or hazardous waste.
Avoid release to the environment. Refer to special instructions/safety data sheets.

Contaminated packaging: Keep waste packaging separate.

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SECTION 14 - TRANSPORT INFORMATION

Hazard Labels:

4.3

Emergency Code:	**4Y**
Hazard Symbol	F
UN - No:	UN 1436
ADR/IMO-IMDG:	4.3,4.2
Shipping Name:	UN 1436 Solid, Dangerous when Wet, Spontaneously Combustible
Packaging Group:	II
EMS Code:	F-G, S-O

SECTION 15 - REGULATORY INFORMATION

Symbol:

F Highly Flammable

R Phrase(s): R10– Flammable.
R15- Contactwith water liberates extremely flammable gas.
R17- Spontaneously flammable in air.

S Phrase(s): S7/8 - Keep container tightly closed and dry..
S43- In case of fire, use dry powder.NEVER USE WATER.

SECTION 16 - OTHER INFORMATION

Date of Issue:	Dec. 2000
Last update:	February 2010
MSDS prepared by:	AVK

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amec

ESE PROJECT HEALTH AND SAFETY FIELD MEETING FORM

Date: 6/2/11 Time: 0805 Project No.: 0153240170

Project Name: Interstate Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Site Investigation, PM 3.4/4.5.

Location: I-405 / Temple Ave Overcrossing

Meeting Conducted by: V. Robino

Topics Discussed:
Physical Hazards: Trips / Slips / Falls, free way traffic, insects/biological, sun
Chemical Hazards: Metals, VOCs, TPH

State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) information for the site:
(Applicable warning is checked)

☒ WARNING: This area contains a chemical known to the State of California to cause cancer.

☒ WARNING: This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Personal Protection: Hard hat, Safety vest, Safety glasses, Steel-toed boots, nitrile & work gloves

Decontamination: Alconox wash & rinse

Special Site Considerations:

Emergency Information: 911

Hospital Location: ST Mary Medical Center
1050 Linden Ave.
Long Beach, CA 90813

Attendees

Name/Company (printed)	Signature
Penny Nakashima / Caltrans	
Eric Guittinan / AMEC	
ART DOMINGUEZ	C.M.S.

Meeting Conducted by: V. Robino

Signature

APPENDIX B

Soil Boring Logs and Daily Field Record

PROJECT: CALTRANS - TASK ORDER 17 Route 405, Temple Ave. Bridge Repair, ADL Site Investigation		**Log of Boring No. 1139-101**	
BORING LOCATION: Closest to Route 405 on southbound side		ELEVATION AND DATUM: Lat: 33.809770, Long: -118.158796	
DRILLING CONTRACTOR: AMEC Geomatrix, Inc.		DATE STARTED: 6/2/11	DATE FINISHED: 6/2/11
DRILLING METHOD: Hand Auger		TOTAL DEPTH (ft.): 15.5	MEASURING POINT:
DRILLING EQUIPMENT: Hand Auger		DEPTH TO WATER: FIRST NA; COMPL. NA; 24 HRS. NA	
SAMPLING METHOD: Hand Auger, Slide Hammer		LOGGED BY: V. Robino	
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: D. Paul	REG. NO. CHG 414

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter. Surface Elevation: Lat: 33.809770, Long: -118.158796	PID READING (ppm)	REMARKS
	1139-101-0.0	■		CLAYEY SAND (SC): dark gray (10YR 4/1), ~60% fine to medium sand, ~40% medium plasticity fines		PID = MiniRAE 3000 photoionization detector calibrated with 100 ppm isobutylene standard
1	1139-101-1.0	■		SANDY LEAN CLAY (CL): light brownish gray (10YR 6/2), moist, ~60% fines, ~40% fine to medium sand, medium plasticity, slow dilatancy, low to medium toughness		PID readings are headspace from soil in resealable plastic bags
2	1139-101-2.0	■				
3	1139-101-3.0	■		LEAN CLAY with SAND (CL): light brownish gray (10YR 6/2), moist, ~85% fines, ~15% fine to trace medium sand, medium plasticity, no dilatancy, low to medium toughness, high dry strength		Hand augered from 0.0 to 3.5' bgs
4				LEAN CLAY (CL): mottled brown (10YR 4/3), with very pale brown (10YR 8/2), moist, ~95% fines, ~5% fine sand, medium plasticity, no dilatancy, medium to high toughness, high dry strength, trace brick fragment		Soil samples from 0.0' to 3.5' bgs collected using hand auger.
5	1139-101-5.0	■				Deeper soil samples collected using slide hammer with 2" diameter stainless steel sleeve
6						
7				POORLY GRADED SAND (SP): dark grayish brown (2.5Y 4/2), moist, ~95% fine sand, ~5% fines		
8	1139-101-7.5	■		SILT (ML): very dark greenish gray (5BG 3/1), moist, ~100% fines, low plasticity, rapid dilatancy, high to low toughness, low dry strength		
9				POORLY GRADED SAND with SILT (SP-SM): very dark greenish gray (5BG 3/1), moist, ~90% fine sand, ~10% low plasticity fines. Strong petroleum odor at 8.5'	490	
10	1139-101-10.0	■		CLAYEY SAND (SC): very dark greenish gray (5BG 3/1), moist, (increase in moisture content), ~75% fine to medium sand, ~25% medium plasticity fines, moderate hydrocarbon odor @10.5' wet		
11						
12				LEAN CLAY (CL): olive gray (5Y 4/2), moist, ~95% fines, ~5% fine sand, medium plasticity, no dilatancy, low toughness, high dry strength, moderate hydrocarbon odor	5.6	
13						
14						

RMRK3

PROJECT: CALTRANS - TASK ORDER 17
Route 405, Temple Ave. Bridge Repair, ADL Site Investigation

Log of Boring No. 1139-101 (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ 6 inches	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	PID READING (ppm)	REMARKS
				CLAYEY SAND (SC): very dark greeish gray (5Y 4/2), moist, 60% fine to medium sand, ~40% medium plasticity fines, faint to moderate hydrocarbon odor		
15	1139 -101 -15.5	■				
16				Bottom of boring at 15.5' bgs		Boring destroyed by backfilling with cuttings
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						

RMRK3

PROJECT: CALTRANS - TASK ORDER 17 Route 405, Temple Ave. Bridge Repair, ADL Site Investigation		**Log of Boring No. 1139-102**	
BORING LOCATION: Mid-slope boring on southbound side of Route 405		ELEVATION AND DATUM: Lat: 33.809728, Long: -118.158795	
DRILLING CONTRACTOR: AMEC Geomatrix, Inc.		DATE STARTED: 6/2/11	DATE FINISHED: 6/2/11
DRILLING METHOD: Hand Auger		TOTAL DEPTH (ft.): 10.5	MEASURING POINT:
DRILLING EQUIPMENT: Hand Auger		DEPTH TO WATER: FIRST NA; COMPL. NA; 24 HRS. NA	
SAMPLING METHOD: Hand Auger, Slide Hammer		LOGGED BY: V. Robino	
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: D. Paul	REG. NO. CHG 414

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter. Surface Elevation: Lat: 33.809728, Long: -118.158795	PID READING (ppm)	REMARKS
	1139-102-0.0	■		SANDY LEAN CLAY (CL): light brownish gray (10YR 6/2), moist, ~60% fines, ~40% fine to medium sand, trace coarse sand, medium plasticity, no dilatancy, low toughness, high dry strength, roots ~1/8"		PID = MiniRAE 3000 photoionization detector calibrated with 100 ppm isobutylene standard
1	1139-102-1.0	■		LEAN CLAY with SAND (CL): light brownish gray (10YR 6/2), moist, ~85% fines, ~15% fine to medium sand, medium plasticity, no dilatancy, medium toughness, high dry strength		PID readings are headspace from soil in resealable plastic bags
2	1139-102-2.0	■		LEAN CLAY (CL): olive (5Y 4/3), moist, ~95% fines, ~5% fine sand, medium to high plasticity, no dilatancy, medium to high toughness, high dry strength		Hand augered from 0.0 to 3.5' bgs
3	1139-102-3.0	■				
4						
5	1139-102-5.0	■		mottled olive (5Y 4/3) and pale yellow (5Y 8/2)		Soil samples from 0.0' to 3.5' bgs collected using hand auger.
6						Deeper soil samples collected using slide hammer with 2" diameter stainless steel sleeve
7						
8	1139-102-7.5	■		olive (5Y 4/3)		
9						
10	1139-102-10.0	■		Bottom of boring at 10.5'		Boring destroyed by backfilled with cuttings
11						
12						
13						
14						

RMRK3

PROJECT: CALTRANS - TASK ORDER 17 Route 405, Temple Ave. Bridge Repair, ADL Site Investigation	**Log of Boring No. 1139-103**
BORING LOCATION: Up-slope boring on southbound side of route 405	ELEVATION AND DATUM: Lat: 33.809686, Long: -118.158796
DRILLING CONTRACTOR: AMEC Geomatrix, Inc.	DATE STARTED: 6/2/11 / DATE FINISHED: 6/2/11
DRILLING METHOD: Hand Auger	TOTAL DEPTH (ft.): 4.5 / MEASURING POINT:
DRILLING EQUIPMENT: Hand Auger	DEPTH TO WATER: FIRST NA / COMPL. NA / 24 HRS. NA
SAMPLING METHOD: Hand Auger, Slide Hammer	LOGGED BY: V. Robino
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: D. Paul / REG. NO. CHG 414

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter. Surface Elevation: Lat: 33.809686, Long: -118.158796	PID READING (ppm)	REMARKS
	1139-103 0.0	■		CLAYEY SAND (SC): light brownish gray (2.5Y 6/2), moist, ~85 fine to medium sand, ~15% low to medium plasticity fines		PID = MiniRAE 3000 photoionization detector calibrated with 100 ppm isobutylene standard
1	1139-103 1.0	■				PID readings are headspace from soil in resealable plastic bags
2	1139-103 2.0	■				Hand augered from 0.0 to 4.5' bgs
3	1139-103 3.0	■				Soil samples from 0.0' to 3.5' bgs collected using hand auger.
4				Bottom of boring at 4.5' bgs.		Boring destroyed by backfilled with cuttings
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

RMRK3

PROJECT: CALTRANS - TASK ORDER 17 Route 405, Temple Ave. Bridge Repair, ADL Site Investigation		**Log of Boring No. 1139-104**
BORING LOCATION: Northbound side of Route 405		ELEVATION AND DATUM: Lat: 33.810318, Long: -118.158797
DRILLING CONTRACTOR: AMEC Geomatrix, Inc.		DATE STARTED: 6/2/11 / DATE FINISHED: 6/2/11
DRILLING METHOD: Hand Auger		TOTAL DEPTH (ft.): 10.5 / MEASURING POINT:
DRILLING EQUIPMENT: Hand Auger		DEPTH TO WATER: FIRST NA / COMPL. NA / 24 HRS. NA
SAMPLING METHOD: Hand Auger, Slide Hammer		LOGGED BY: V. Robino
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: D. Paul / REG. NO. CHG 414

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	DESCRIPTION NAME (USCS): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter. Surface Elevation: Lat: 33.810318, Long: -118.158797	PID READING (ppm)	REMARKS
	1139-104-0.0	■		SILTY SAND (SM): olive (5Y 5/3), moist, ~80% fine to medium sand, ~20% low plasticity fines, roots		PID = MiniRAE 3000 photoionization detector calibrated with 100 ppm isobutylene standard
1	1139-104-1.0	■				PID readings are headspace from soil in resealable plastic bags
2	1139-104-2.0	■				Hand augered from 0.0 to 3.5' bgs
3						
4						Soil samples from 0.0' to 2.5' bgs collected using hand auger.
				LEAN CLAY with SAND (CL): olive (5Y 5/3), moist, ~85% fines, ~15% fine to medium sand, medium plasticity, no dilatancy, medium toughness, high dry strength		
5	1139-104-5.0	■				Deeper soil samples collected using slide hammer with 2" diameter stainless steel sleeve
6						
				CLAYEY SAND (SC): olive (5/3), moist, ~60% fine to medium sand, 40% medium plasticity fines, high dry strength		
7						
8	1139-104-7.5	■				
9						
				SANDY LEAN CLAY (CL): olive (5Y 5/3), moist, ~60% fines, ~40% fine to medium sand, medium plasticity, rapid dilatancy, high dry strength		
10	1139-104-10.0	■		LEAN CLAY (CL): olive (5Y 5/3), moist, ~95% fine, ~5% fine sand, medium plasticity, no dilatancy, medium toughness, high dry strength		Boring destroyed by backfilling with cuttings
11				Bottom of boring at 10.5' bgs.		
12						
13						
14						

RMRK3

DAILY FIELD RECORD

AMEC Geomatrix

Project and Task Number: 0153240170	Date: 6/7/2011
Project Name: Route 405 Temple Ave Bridge Repair	Field Activity: 8 hand augered borings @ temple + 405
Location: Temple + 405 Freeway	Weather: ~~clear~~ clear. Sunny hot.

PERSONNEL: Name	Company	Time In	Time Out
Eric Guittinan	AMEC Geomatrix, Inc	730	2000
Vinnie Robino	AMEC Geomatrix, Inc.	730	2000
Penny Nakaghima, ART	Caltrans	750	1900

PERSONAL SAFETY CHECKLIST

✓	Steel-toed Boots	✓	Hard Hat		Tyvek Coveralls
✓	Rubber Gloves	✓	Safety Goggles		1/2-Face Respirator

DRUM I.D.	DESCRIPTION OF CONTENTS AND QUANTITY	LOCATION
	No Drums generated - cutting & Decon water disposed of in the state R.O.W as instructed by/specified in task order.	

TIME	DESCRIPTION OF WORK PERFORMED
730	Arrived at ATL (Vinnie R. + Eric G.)
750	Arrived on-site at Temple + 405. Caltrans (Penny and ~~Mark~~ Art and grounds crew) onsite
805	Conduct HASP Meeting w/ caltrans + AMEC
815	Art says that the southbound onramp + auxillary lane will be closed at nine.
840	Northbound borings staked + snow fence set up
900	Southbound lanes closed
955	Source, trip, + temperature blanks collected. Snow fence on southbound side set up.
1140	D. Paul onsite. Boring 1139-101 & 1139-102 augered/sampled to 4.5 feet bgs. Currently at 1139-103 @ 0-5 ft. bgs. Duane delivered slide hammer, extension rods, drive sampler and sleeves/caps.
~1200	D. Paul offsite.
1300	Crew encountered petroleum odors (strong) at ~8.5' bgs in 1139-101 Penny returned from restroom break. She instructed crew to continue hand augering/sampling as deep as possible. AMEC PM notified

DAILY FIELD RECORD (continued)

AMEC Geomatrix

Project and Task Number: 0153240170 | Date: 6/2/11

TIME	DESCRIPTION OF WORK PERFORMED
~~1415~~ 1415	Completed boring 1139-101. Total Depth = 15.5 ft.
	samples for VOCs + TPH collected at Caltrans request at 15.5
	moving to boring 102.
1432	Continue setup at 1139-102.
1545	Completed boring 1139-102. Total depth = 10.5 ft
	setting up at boring 1139-103
1550	Boring 1139-103 is already complete. Total depth 4.5 ft.
1600	Packing up and moving northbound side. Equipment
	blank taken
1615	Taking GPS coordinates from top of bridge to
	get satellite readings. N 75° E
	~~55~~ 1139-103 3.5 ft away bearing ~~N 45° E~~ ~~N 80° E~~
	1139-102 6.5 ft bearing N 75° E
	1139-~~103~~ 104 9.5 ft bearing N 75° E
1700	Set up at 1139-104, the closest boring to the
	northbound 405.
1810	Finished boring 1139-104. total depth 10.5 feet.
1835	1139-104 coordinates taken from temple ave bridge
	9.0 ft away from location bearing N 75° E
1850	Photographs taken equipment packed up. Heading
	to ATL to relinquish samples. Penny offsite.
1949	Samples relinquished to ATL
2000	Vinnie + Eric head home.

VR 6/02/11

APPENDIX C

Data Validation Report and Laboratory Analytical Reports

APPENDIX C

DATA VALIDATION REPORT

Interstate 405 Temple Avenue Bridge Repair, PM 3.4/4.5
Aerially Deposited Lead Site Investigation
Caltrans Contract 07A2730, Task Order No. 17
Long Beach, California

INTRODUCTION

This report summarizes the findings of the data validation for results obtained from laboratory analysis of soil samples collected by AMEC Geomatrix, Inc. (AMEC), on behalf of California Department of Transportation. Soil samples were collected to evaluate for the presence of constituents of concern (COCs) for the Interstate 405 Temple Avenue Bridge Repair located in Long Beach, California. Soil samples were submitted to Advanced Technology Laboratories of Signal Hill, California (ATL), for laboratory analysis; a State of California laboratory certified by the National Environmental Laboratory Accreditation Program.

Field quality assurance/quality control (QA/QC) samples for soil samples collected within the investigation area consisted of trip blanks, equipment blanks, field blanks, and one source water blank. Laboratory QA/QC samples consisted of method blanks, matrix spike/matrix spike duplicate (MS/MSD) recoveries, laboratory control samples (LCSs), and laboratory duplicate samples.

Based on the data quality evaluation of the soil matrix samples, the data can be considered acceptable for decision-making purposes.

1.0 SOIL SAMPLES

The field QC samples were submitted to the laboratory for analyses along with the soil samples collected in the investigation area. Data verification was performed in accordance with the U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (U.S. EPA National Functional Guidelines [U.S. EPA, 2008; U.S. EPA, 2010]). Data quality evaluation for the soil samples analyzed is described below. Soil samples were collected from four locations at depths ranging from approximately 0.0 to 15.0 feet below ground surface (bgs).

1.1 DATA COMPLETENESS

A total of 24 soil samples and six field QC samples were submitted to ATL for analysis. Results for all samples were reported by ATL and therefore met the goal of 90% completeness.
The samples listed on the chain-of-custody were analyzed and reported by ATL.

1.2 SAMPLE HOLD TIMES AND SAMPLE PRESERVATION

All samples submitted to the laboratory for analysis were properly preserved according to guidelines established by the methods for the requested laboratory analyses. Recommended hold times were achieved for all analyses performed.

Soil samples were collected at a depth of approximately 0.0 to 15.0 feet bgs and using a hand auger or a slide hammer lined with a new stainless steel sleeve.

Soil samples collected for volatile organic compounds (VOCs) and total petroleum hydrocarbon (TPH) carbon chain speciation in the gasoline range (C4 to C8) analyses were field preserved onsite using U.S. EPA Method 5035 before submittal to the laboratory. Soil samples collected for VOCs and TPH analyses were collected from the stainless steel sleeves using lab-supplied Terracore samplers to collect three 5-gram aliquots of soil. Each aliquot of soil was extruded from the Terracore sampler into a pre-labeled 40 milliliter (mL) volatile organic analysis (VOA) vial containing a pre-measured quantity of a preservative. One VOA vial contained 10 mL of methanol preservative and the other two VOA vials each contained 5 mL of sodium bisulfate preservative. After a 5-gram aliquot of soil was extruded into each VOA vial, the vial was immediately capped and placed in an ice-chilled shipping container.

For the remainder of the required analyses, AMEC provided the laboratory with the soil samples in stainless steel sleeves capped with Teflon® sheeting and plastic end caps or in 4-ounce (oz) glass jars for each soil sample interval.

1.3 FIELD QA/QC SAMPLES

Trip Blank Sample

A trip blank is used to detect potential VOC contamination during sample shipping and handling. The trip blank was prepared by the laboratory and transported to the sampling site, accompanying the respective sampling containers during field activities, and returned to the laboratory with the respective samples. One trip blank accompanied the cooler containing samples collected for VOC analyses. One trip blank was collected over one day of drilling.
The trip blank sample results were reported below the method detection limits (MDLs).
The investigation met the frequency of collection requirements as specified in the Contract and Task Order.

Equipment Blank Samples

Equipment blank samples are used to evaluate potential residual contamination on sampling equipment that was reused. Two equipment blank samples were collected over the one day of drilling and soil sampling. The investigation met the frequency of collection requirements as specified in the Task Order. All analytes were reported below the MDL in the equipment blanks. Therefore, data qualification was not necessary.

Field Blank Samples

Field blank samples are used to evaluate contaminants that may be introduced during sample collection. Two field blank samples were collected over one day of drilling and soil sampling. The investigation met the frequency of collection requirements as specified in the Task Order. All analytes were reported below the MDL in the field blanks with the exception of the following:

- Laboratory Work Order #118185 (Field Blank Sample ID: 1139-100-FB-060211-1) – bromodichloromethane and chloromethane were detected between the MDL and the practical quantitation limits (PQLs). The analyte was not detected in any primary field samples; therefore data qualification was not necessary.

- Laboratory Work Order # 118185 (Field Blank Sample ID: 1139-100-FB-060211-1) – chloroform was detected above the PQL. The analyte was not detected in primary field samples; therefore data qualification was not necessary.

Source Water Sample

One source water sample was collected to evaluate the quality of the water used during decontamination and blank sample preparation (i.e., equipment rinsate blanks and field blanks) and to confirm that the source water was not a source of contamination. The source water sample was collected at a frequency of one for each source of water used for preparation of equipment rinsate blanks and used during decontamination and field blanks. The source water sample was analyzed for VOCs using U.S. EPA Method 8260B and TPH carbon chain speciation (C4-C8 and individual speciation [C9-C32]) using U.S. EPA Method 8015B, and lead using EPA Method 6010B. VOCs and TPH were not detected at concentrations above their respective MDLs, with exception of the following:

- Laboratory Work Order # 118185 (Source Water Sample ID: 1139-100-SW-060211) – bromodichloromethane and chloromethane were detected between the MDL and the practical quantitation limits (PQLs). The analyte was not detected in any equipment rinsate blanks and primary field samples; therefore data qualification was not necessary.

- Laboratory Work Order # 118185 (Source Water Sample ID: 1139-100-SW-060211) – chloroform was detected above the PQL. The analyte was not detected in any equipment rinsate blanks and primary field samples; therefore data qualification was not necessary.

1.4 LABORATORY QA/QC SAMPLES

Method Blank Samples

The laboratory also analyzed method blanks to provide an additional measure of internal quality control. Method blank results for all analytes were less than the reported PQLs, however some were detected above the MDL. Qualification of affected sample results is further described below:

- Laboratory Work Order # 118185 (sample batch I.D. # 73029) – lead was detected between the MDL and the PQL. Lead was detected in associated samples between the MDL and PQL. The results for lead were therefore reported as the PQL and qualified with a U* flag (the analyte was positively identified, but was not detected at a concentration greater than or equal to the PQL).

- Laboratory Work Order # 118186 (sample batch I.D. # 73410) – lead was detected between the MDL and PQL. Lead was detected in associated samples above the PQL. Professional judgment was used and data qualification for the analytes was not necessary.

- Laboratory Work Order # 118186 (sample batch I.D. # 73411) – lead was detected between the MDL and PQL. Lead was detected in associated samples between the MDL and PQL. The results for lead were therefore reported as the PQL and qualified with a U* flag.

- Laboratory Work Order # 118186 Addendum (sample batch I.D. # 73626) – barium and zinc were detected between the MDLs and PQLs. Barium and zinc in associated samples were detected significantly above the PQL; therefore, data qualification for the analytes was not necessary.

- Laboratory Work Order # 118186 Addendum (sample batch I.D. # 73627) – antimony and zinc were detected between the MDLs and PQLs. Antimony in associated samples was detected between the MDL and PQL. The results for antimony were therefore reported as the PQL and qualified with a U* flag. Zinc in associated samples was detected significantly above the PQL; therefore, data qualification for zinc was not necessary.

The investigation met the frequency of collection requirements established by the Task Order.

Laboratory Control Samples

LCSs are analyzed as a measure of data accuracy. The laboratory analyzed LCSs and met the frequency requirements for LCS analyses established by U.S. EPA National Functional Guidelines. Internal laboratory QA/QC data associated with these analyses met laboratory acceptance criteria, including percent recoveries (%Rs).

Laboratory Duplicate Samples

Laboratory duplicate samples are analyzed as a measure of data precision. The laboratory analyzed laboratory duplicate samples and met the frequency requirements of one in ten samples as specified in the Task Order. Internal laboratory QA/QC data associated with these analyses met laboratory acceptance criteria, including relative percent differences (RPDs), with the following exceptions:

- Laboratory Work Order # 118186 (sample duplicate for 1139-103-1.0) – RPD for lead was outside the acceptable recovery limits of 20%; however, the laboratory control sample (LCS) results validated the analytical batch. Lead in associated samples were qualified with a J* flag to indicate estimated results.

- Laboratory Work Order # 118186 Addendum (sample duplicate for 1139-101-0.0) –RPD for arsenic was outside the acceptable recovery limits of 20%; however, the LCS results validated the analytical batch. Arsenic in the associated sample was qualified with a J* flag to indicate estimated results.

Matrix Spike/Matrix Spike Duplicate Samples and Surrogate Recoveries

The laboratory also analyzed MS/MSD samples to assess data accuracy. The purpose of spiked samples is to evaluate the effect of the matrix on a method's recovery efficiency (percent recovery). A sample prepared by adding a known concentration of a target analyte to an aliquot of a specific homogenized environmental sample for which an independent estimate of the target analyte concentration is available. The matrix spike is accompanied by an independent analysis of the unspiked aliquot of the environmental sample. Only MS/MSD samples collected on site are considered appropriate for assessing matrix conditions. Only data that were qualified based on matrix interference from the site are discussed further.

The purpose of MSD sample is to evaluate the precision of the intra-laboratory analytical process for specific analytes in a sample matrix. The duplicate sample is prepared simultaneously as a split with the MS sample, and each is spiked with identical, known concentrations of targeted analyte(s). The precision is measured by the RPD between

the spiked results. The %Rs and RPDs of target analytes were within the laboratory determined control limits with the exception of the following:

- Laboratory Work Order # 118185 (sample batch I.D. # E11VS213) – %R for the surrogate bromofluorobenzene was reported at 163.7% which is outside the upper recovery limit of 161% and was attributed by the laboratory as being due matrix interference. Detected results in associated samples were qualified with a J* flag to indicate estimated results.

1.5 SUMMARY OF QUALIFIED DATA

All other quality assurance data met the acceptance criteria for soil samples. Except for the QA/QC issues discussed above, the results of field and laboratory QC indicate that the sampling and analysis were performed consistent with the analytical methods. Overall, the results of the QA/QC review indicate that the test results are valid and usable. The following table summarizes the sample data warranting qualification based on the data review elements discussed above.

Sample ID	Compound	Laboratory Work Order Number	Analytical Method	Qualified Result		Units
1139-100-SW-050211	Lead	118185	U.S. EPA Method 3010A	0.25	U*	mg/kg
1139-100-FB-060211-1	Lead	118185	U.S. EPA Method 3010A	0.25	U*	mg/kg
1139-100-EB-060211-1	Lead	118185	U.S. EPA Method 3010A	0.25	U*	mg/kg
1139-100-EB-060211-2	Lead	118185	U.S. EPA Method 3010A	0.25	U*	mg/kg
1139-101-10.0	TPH (C4-C8)	118185	U.S. EPA Method 8015B	0.23	J*	mg/kg
1139-101-15.0	TPH (C4-C8)	118185	U.S. EPA Method 8015B	0.97	J*	mg/kg
1139-102-10.0	TPH (C4-C8)	118185	U.S. EPA Method 8015B	2.1	J*	mg/kg
1139-104-5.0	TPH (C4-C8)	118185	U.S. EPA Method 8015B	0.12	J*	mg/kg
1139-104-10.0	TPH (C4-C8)	118185	U.S. EPA Method 8015B	0.14	J*	mg/kg
1139-101-0.0	Lead	118186	U.S. EPA Method 6010B	1100	J*	mg/kg
1139-101-1.0	Lead	118186	U.S. EPA Method 6010B	62	J*	mg/kg
1139-101-2.0	Lead	118186	U.S. EPA Method 6010B	24	J*	mg/kg
1139-101-3.0	Lead	118186	U.S. EPA Method 6010B	17	J*	mg/kg
1139-102-0.0	Lead	118186	U.S. EPA Method 6010B	74	J*	mg/kg
1139-102-1.0	Lead	118186	U.S. EPA Method 6010B	21	J*	mg/kg
1139-102-2.0	Lead	118186	U.S. EPA Method 6010B	29	J*	mg/kg
1139-102-3.0	Lead	118186	U.S. EPA Method 6010B	22	J*	mg/kg
1139-103-0.0	Lead	118186	U.S. EPA Method 6010B	60	J*	mg/kg
1139-103-1.0	Lead	118186	U.S. EPA Method 6010B	52	J*	mg/kg
1139-103-2.0	Lead	118186	U.S. EPA Method 6010B	28	J*	mg/kg
1139-103-3.0	Lead	118186	U.S. EPA Method 6010B	9.8	J*	mg/kg
1139-101-5.0	Lead	118186	U.S. EPA Method 6010B	9.9	J*	mg/kg
1139-101-7.5	Lead	118186	U.S. EPA Method 6010B	6.2	J*	mg/kg
1139-101-10.0	Lead	118186	U.S. EPA Method 6010B	5.9	J*	mg/kg
1139-102-5.0	Lead	118186	U.S. EPA Method 6010B	42	J*	mg/kg
1139-102-7.5	Lead	118186	U.S. EPA Method 6010B	14	J*	mg/kg
1139-102-10.0	Lead	118186	U.S. EPA Method 6010B	26	J*	mg/kg
1139-104-0.0	Lead	118186	U.S. EPA Method 6010B	13	J*	mg/kg
1139-104-1.0	Lead	118186	U.S. EPA Method 6010B	5.3	J*	mg/kg
1139-103-1.0	Lead	118186	U.S. EPA Method 6010B	52	J*	mg/kg
1139-104-5.0	Lead	118186	U.S. EPA Method 6010B	5.0	U*	mg/kg
1139-104-7.5	Lead	118186	U.S. EPA Method 6010B	5.0	U*	mg/kg
1139-101-0.0	Arsenic	118186 Addendum	U.S. EPA Method 6010B	0.72	J*	mg/kg
1139-102-0.0	Antimony	118186 Addendum	U.S. EPA Method 6010B	2.0	U*	mg/kg

Abbreviations and symbols:

mg/Kg = milligrams per kilogram

Data qualifier definitions:

U* = the analyte was positively identified but was not detected at a concentration greater than or equal to the PQL.

J* = the result is an estimated quantity qualified by AMEC. The associated numerical value is the approximate concentration of the analyte in the sample.

2.0 REFERENCES

California Department of Transportation (Caltrans), 2011, Route 405 Temple Avenue Bridge Repair, Aerially Deposited Lead Site Investigation, PM 3.4/4.5, Task Order 07A2730-17, EA 07-278301, May 19.

U.S. Environmental Protection Agency (U.S. EPA), 2008, USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., June.

U.S. EPA, 2010, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Final, Office of Superfund Remediation and Technology Innovation, Washington, D.C., January.

June 10, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 118185

Duane Paul/Vinnie Robino
AMEC Geomatrix
510 Superior Avenue, Suite 200
Newport Beach, CA 92663-3627

TEL: (949) 642-0245
FAX: (949) 642-4474

RE: Route 405 Temple Ave Bridge Repair ADL, 01

Attention: Duane Paul/Vinnie Robino

Enclosed are the results for sample(s) received on June 02, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *10-Jun-11*

CLIENT: AMEC Geomatrix
Project: Route 405 Temple Ave Bridge Repair ADL, 015
Lab Order: 118185

CASE NARRATIVE

All soil volatile analyses were performed using 5035 preservation requirements. Any high level dilutions were performed on a preserved methanol sample unless otherwise noted.

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 8015 (HC-VOA)

Surrogate recovery biased high for samples 118185-012E and 118185-012FDUP, possibly due to matrix interferences.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-TBW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:00:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-002A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS2_110608A** QC Batch: **Q11VW090** PrepDate: Analyst: **BD**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
1,1,1-Trichloroethane	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
1,1,2,2-Tetrachloroethane	ND	0.21	0.50		µg/L	1	6/8/2011 02:28 PM
1,1,2-Trichloroethane	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
1,1-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
1,1-Dichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
1,1-Dichloropropene	ND	0.22	0.50		µg/L	1	6/8/2011 02:28 PM
1,2,3-Trichlorobenzene	ND	0.22	0.50		µg/L	1	6/8/2011 02:28 PM
1,2,3-Trichloropropane	ND	0.18	0.50		µg/L	1	6/8/2011 02:28 PM
1,2,4-Trichlorobenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
1,2,4-Trimethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
1,2-Dibromo-3-chloropropane	ND	0.30	0.50		µg/L	1	6/8/2011 02:28 PM
1,2-Dibromoethane	ND	0.12	0.50		µg/L	1	6/8/2011 02:28 PM
1,2-Dichlorobenzene	ND	0.12	0.50		µg/L	1	6/8/2011 02:28 PM
1,2-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
1,2-Dichloropropane	ND	0.11	0.50		µg/L	1	6/8/2011 02:28 PM
1,3,5-Trimethylbenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
1,3-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
1,3-Dichloropropane	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
1,4-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
2,2-Dichloropropane	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
2-Chlorotoluene	ND	0.12	0.50		µg/L	1	6/8/2011 02:28 PM
4-Chlorotoluene	ND	0.11	0.50		µg/L	1	6/8/2011 02:28 PM
4-Isopropyltoluene	ND	0.16	0.50		µg/L	1	6/8/2011 02:28 PM
Benzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
Bromobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
Bromodichloromethane	ND	0.18	0.50		µg/L	1	6/8/2011 02:28 PM
Bromoform	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
Bromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 02:28 PM
Carbon tetrachloride	ND	0.20	0.50		µg/L	1	6/8/2011 02:28 PM
Chlorobenzene	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
Chloroethane	ND	0.20	0.50		µg/L	1	6/8/2011 02:28 PM
Chloroform	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
Chloromethane	ND	0.19	0.50		µg/L	1	6/8/2011 02:28 PM
cis-1,2-Dichloroethene	ND	0.29	0.50		µg/L	1	6/8/2011 02:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-TBW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:00:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-002A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS2_110608A**	QC Batch: **Q11VW090**				PrepDate:		Analyst: **BD**
cis-1,3-Dichloropropene	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
Di-isopropyl ether	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
Dibromochloromethane	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
Dibromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 02:28 PM
Dichlorodifluoromethane	ND	0.24	0.50		µg/L	1	6/8/2011 02:28 PM
Ethyl tert-butyl ether	ND	0.13	0.50		µg/L	1	6/8/2011 02:28 PM
Ethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
Hexachlorobutadiene	ND	0.25	0.50		µg/L	1	6/8/2011 02:28 PM
Isopropylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
m,p-Xylene	ND	0.29	1.0		µg/L	1	6/8/2011 02:28 PM
Methylene chloride	ND	1.0	1.0		µg/L	1	6/8/2011 02:28 PM
MTBE	ND	0.12	0.50		µg/L	1	6/8/2011 02:28 PM
n-Butylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
n-Propylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 02:28 PM
Naphthalene	ND	0.18	0.50		µg/L	1	6/8/2011 02:28 PM
o-Xylene	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
sec-Butylbenzene	ND	0.19	0.50		µg/L	1	6/8/2011 02:28 PM
Styrene	ND	0.11	0.50		µg/L	1	6/8/2011 02:28 PM
Tert-amyl methyl ether	ND	0.11	0.50		µg/L	1	6/8/2011 02:28 PM
Tert-Butanol	ND	2.4	10		µg/L	1	6/8/2011 02:28 PM
tert-Butylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 02:28 PM
Tetrachloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
Toluene	ND	0.17	0.50		µg/L	1	6/8/2011 02:28 PM
trans-1,2-Dichloroethene	ND	0.14	0.50		µg/L	1	6/8/2011 02:28 PM
Trichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:28 PM
Trichlorofluoromethane	ND	0.36	0.50		µg/L	1	6/8/2011 02:28 PM
Vinyl chloride	ND	0.16	0.50		µg/L	1	6/8/2011 02:28 PM
Xylenes, Total	ND	1.5	1.5		µg/L	1	6/8/2011 02:28 PM
Surr: 1,2-Dichloroethane-d4	103	0	70-130		%REC	1	6/8/2011 02:28 PM
Surr: 4-Bromofluorobenzene	111	0	70-130		%REC	1	6/8/2011 02:28 PM
Surr: Dibromofluoromethane	100	0	70-130		%REC	1	6/8/2011 02:28 PM
Surr: Toluene-d8	99.7	0	70-130		%REC	1	6/8/2011 02:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-SW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:35:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-003A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS2_110608A** QC Batch: **Q11VW090** PrepDate: Analyst: **BD**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
1,1,1-Trichloroethane	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
1,1,2,2-Tetrachloroethane	ND	0.21	0.50		µg/L	1	6/8/2011 03:08 PM
1,1,2-Trichloroethane	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
1,1-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
1,1-Dichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
1,1-Dichloropropene	ND	0.22	0.50		µg/L	1	6/8/2011 03:08 PM
1,2,3-Trichlorobenzene	ND	0.22	0.50		µg/L	1	6/8/2011 03:08 PM
1,2,3-Trichloropropane	ND	0.18	0.50		µg/L	1	6/8/2011 03:08 PM
1,2,4-Trichlorobenzene	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
1,2,4-Trimethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
1,2-Dibromo-3-chloropropane	ND	0.30	0.50		µg/L	1	6/8/2011 03:08 PM
1,2-Dibromoethane	ND	0.12	0.50		µg/L	1	6/8/2011 03:08 PM
1,2-Dichlorobenzene	ND	0.12	0.50		µg/L	1	6/8/2011 03:08 PM
1,2-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
1,2-Dichloropropane	ND	0.11	0.50		µg/L	1	6/8/2011 03:08 PM
1,3,5-Trimethylbenzene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
1,3-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
1,3-Dichloropropane	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
1,4-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
2,2-Dichloropropane	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
2-Chlorotoluene	ND	0.12	0.50		µg/L	1	6/8/2011 03:08 PM
4-Chlorotoluene	ND	0.11	0.50		µg/L	1	6/8/2011 03:08 PM
4-Isopropyltoluene	ND	0.16	0.50		µg/L	1	6/8/2011 03:08 PM
Benzene	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
Bromobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
Bromodichloromethane	0.21	0.18	0.50	J	µg/L	1	6/8/2011 03:08 PM
Bromoform	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
Bromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 03:08 PM
Carbon tetrachloride	ND	0.20	0.50		µg/L	1	6/8/2011 03:08 PM
Chlorobenzene	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
Chloroethane	ND	0.20	0.50		µg/L	1	6/8/2011 03:08 PM
Chloroform	0.55	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
Chloromethane	0.25	0.19	0.50	J	µg/L	1	6/8/2011 03:08 PM
cis-1,2-Dichloroethene	ND	0.29	0.50		µg/L	1	6/8/2011 03:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-SW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:35:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-003A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS2_110608A**	QC Batch: **Q11VW090**				PrepDate:		Analyst: **BD**
cis-1,3-Dichloropropene	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
Di-isopropyl ether	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
Dibromochloromethane	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
Dibromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 03:08 PM
Dichlorodifluoromethane	ND	0.24	0.50		µg/L	1	6/8/2011 03:08 PM
Ethyl tert-butyl ether	ND	0.13	0.50		µg/L	1	6/8/2011 03:08 PM
Ethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
Hexachlorobutadiene	ND	0.25	0.50		µg/L	1	6/8/2011 03:08 PM
Isopropylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
m,p-Xylene	ND	0.29	1.0		µg/L	1	6/8/2011 03:08 PM
Methylene chloride	ND	1.0	1.0		µg/L	1	6/8/2011 03:08 PM
MTBE	ND	0.12	0.50		µg/L	1	6/8/2011 03:08 PM
n-Butylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
n-Propylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 03:08 PM
Naphthalene	ND	0.18	0.50		µg/L	1	6/8/2011 03:08 PM
o-Xylene	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
sec-Butylbenzene	ND	0.19	0.50		µg/L	1	6/8/2011 03:08 PM
Styrene	ND	0.11	0.50		µg/L	1	6/8/2011 03:08 PM
Tert-amyl methyl ether	ND	0.11	0.50		µg/L	1	6/8/2011 03:08 PM
Tert-Butanol	ND	2.4	10		µg/L	1	6/8/2011 03:08 PM
tert-Butylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 03:08 PM
Tetrachloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
Toluene	ND	0.17	0.50		µg/L	1	6/8/2011 03:08 PM
trans-1,2-Dichloroethene	ND	0.14	0.50		µg/L	1	6/8/2011 03:08 PM
Trichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 03:08 PM
Trichlorofluoromethane	ND	0.36	0.50		µg/L	1	6/8/2011 03:08 PM
Vinyl chloride	ND	0.16	0.50		µg/L	1	6/8/2011 03:08 PM
Xylenes, Total	ND	1.5	1.5		µg/L	1	6/8/2011 03:08 PM
Surr: 1,2-Dichloroethane-d4	92.4	0	70-130		%REC	1	6/8/2011 03:08 PM
Surr: 4-Bromofluorobenzene	104	0	70-130		%REC	1	6/8/2011 03:08 PM
Surr: Dibromofluoromethane	92.3	0	70-130		%REC	1	6/8/2011 03:08 PM
Surr: Toluene-d8	94.3	0	70-130		%REC	1	6/8/2011 03:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-SW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:35:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-003B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC19_110607B**	QC Batch: **M11VW113**				PrepDate:		Analyst: **DDL**
T/R Hydrocarbons: C4-C8	ND	0.050	0.050		mg/L	1	6/7/2011 10:00 PM
Surr: Bromofluorobenzene (FID)	89.3	0	70-130		%REC	1	6/7/2011 10:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-SW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:35:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-003C		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3510C		**EPA 8015B(M)**				
RunID: **GC21_110607A**	QC Batch: **73376**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C13-C14	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C15-C16	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C17-C18	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C19-C20	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C21-C22	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C23-C24	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C25-C26	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C27-C28	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C29-C30	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C31-C32	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
T/R Hydrocarbons: C9-C10	ND	0.020	0.020		mg/L	1	6/7/2011 07:38 PM
Surr: 2-Fluorobiphenyl	48.5	0	34-110		%REC	1	6/7/2011 07:38 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-SW-060211
Lab Order:	118185	**Collection Date:**	6/2/2011 9:35:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-003D		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ICP							
	EPA 3010A			**EPA 6010B**			
RunID: **ICP10_110608A**	QC Batch: **73029**				PrepDate:	**6/7/2011**	Analyst: **IL**
Lead	0.0039	0.00081	0.25	J	mg/L	1	6/8/2011 11:29 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 9:40:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-004A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS2_110608A** QC Batch: **Q11VW090** PrepDate: Analyst: **BD**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
1,1,1-Trichloroethane	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
1,1,2,2-Tetrachloroethane	ND	0.21	0.50		µg/L	1	6/8/2011 01:48 PM
1,1,2-Trichloroethane	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
1,1-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
1,1-Dichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
1,1-Dichloropropene	ND	0.22	0.50		µg/L	1	6/8/2011 01:48 PM
1,2,3-Trichlorobenzene	ND	0.22	0.50		µg/L	1	6/8/2011 01:48 PM
1,2,3-Trichloropropane	ND	0.18	0.50		µg/L	1	6/8/2011 01:48 PM
1,2,4-Trichlorobenzene	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
1,2,4-Trimethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
1,2-Dibromo-3-chloropropane	ND	0.30	0.50		µg/L	1	6/8/2011 01:48 PM
1,2-Dibromoethane	ND	0.12	0.50		µg/L	1	6/8/2011 01:48 PM
1,2-Dichlorobenzene	ND	0.12	0.50		µg/L	1	6/8/2011 01:48 PM
1,2-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
1,2-Dichloropropane	ND	0.11	0.50		µg/L	1	6/8/2011 01:48 PM
1,3,5-Trimethylbenzene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
1,3-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
1,3-Dichloropropane	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
1,4-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
2,2-Dichloropropane	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
2-Chlorotoluene	ND	0.12	0.50		µg/L	1	6/8/2011 01:48 PM
4-Chlorotoluene	ND	0.11	0.50		µg/L	1	6/8/2011 01:48 PM
4-Isopropyltoluene	ND	0.16	0.50		µg/L	1	6/8/2011 01:48 PM
Benzene	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
Bromobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
Bromodichloromethane	0.21	0.18	0.50	J	µg/L	1	6/8/2011 01:48 PM
Bromoform	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
Bromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 01:48 PM
Carbon tetrachloride	ND	0.20	0.50		µg/L	1	6/8/2011 01:48 PM
Chlorobenzene	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
Chloroethane	ND	0.20	0.50		µg/L	1	6/8/2011 01:48 PM
Chloroform	0.56	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
Chloromethane	0.32	0.19	0.50	J	µg/L	1	6/8/2011 01:48 PM
cis-1,2-Dichloroethene	ND	0.29	0.50		µg/L	1	6/8/2011 01:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 9:40:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-004A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS2_110608A**	QC Batch: **Q11VW090**				PrepDate:		Analyst: **BD**
cis-1,3-Dichloropropene	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
Di-isopropyl ether	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
Dibromochloromethane	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
Dibromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 01:48 PM
Dichlorodifluoromethane	ND	0.24	0.50		µg/L	1	6/8/2011 01:48 PM
Ethyl tert-butyl ether	ND	0.13	0.50		µg/L	1	6/8/2011 01:48 PM
Ethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
Hexachlorobutadiene	ND	0.25	0.50		µg/L	1	6/8/2011 01:48 PM
Isopropylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
m,p-Xylene	ND	0.29	1.0		µg/L	1	6/8/2011 01:48 PM
Methylene chloride	ND	1.0	1.0		µg/L	1	6/8/2011 01:48 PM
MTBE	ND	0.12	0.50		µg/L	1	6/8/2011 01:48 PM
n-Butylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
n-Propylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 01:48 PM
Naphthalene	ND	0.18	0.50		µg/L	1	6/8/2011 01:48 PM
o-Xylene	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
sec-Butylbenzene	ND	0.19	0.50		µg/L	1	6/8/2011 01:48 PM
Styrene	ND	0.11	0.50		µg/L	1	6/8/2011 01:48 PM
Tert-amyl methyl ether	ND	0.11	0.50		µg/L	1	6/8/2011 01:48 PM
Tert-Butanol	ND	2.4	10		µg/L	1	6/8/2011 01:48 PM
tert-Butylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 01:48 PM
Tetrachloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
Toluene	ND	0.17	0.50		µg/L	1	6/8/2011 01:48 PM
trans-1,2-Dichloroethene	ND	0.14	0.50		µg/L	1	6/8/2011 01:48 PM
Trichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 01:48 PM
Trichlorofluoromethane	ND	0.36	0.50		µg/L	1	6/8/2011 01:48 PM
Vinyl chloride	ND	0.16	0.50		µg/L	1	6/8/2011 01:48 PM
Xylenes, Total	ND	1.5	1.5		µg/L	1	6/8/2011 01:48 PM
Surr: 1,2-Dichloroethane-d4	93.0	0	70-130		%REC	1	6/8/2011 01:48 PM
Surr: 4-Bromofluorobenzene	110	0	70-130		%REC	1	6/8/2011 01:48 PM
Surr: Dibromofluoromethane	97.5	0	70-130		%REC	1	6/8/2011 01:48 PM
Surr: Toluene-d8	102	0	70-130		%REC	1	6/8/2011 01:48 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 9:40:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-004B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC19_110607B**	QC Batch: **M11VW113**				PrepDate:		Analyst: **DDL**
T/R Hydrocarbons: C4-C8	ND	0.050	0.050		mg/L	1	6/7/2011 09:01 PM
Surr: Bromofluorobenzene (FID)	91.7	0	70-130		%REC	1	6/7/2011 09:01 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 9:40:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-004C		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3510C		**EPA 8015B(M)**				
RunID: **GC21_110607A**	QC Batch: **73376**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C13-C14	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C15-C16	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C17-C18	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C19-C20	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C21-C22	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C23-C24	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C25-C26	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C27-C28	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C29-C30	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C31-C32	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
T/R Hydrocarbons: C9-C10	ND	0.020	0.020		mg/L	1	6/7/2011 07:55 PM
Surr: 2-Fluorobiphenyl	49.5	0	34-110		%REC	1	6/7/2011 07:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 9:40:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-004D		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ICP							
	EPA 3010A			**EPA 6010B**			
RunID: **ICP10_110608A**	QC Batch: **73029**				PrepDate:	**6/7/2011**	Analyst: **IL**
Lead	0.0015	0.00081	0.25	J	mg/L	1	6/8/2011 11:32 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 4:30:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-005A		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS2_110608A** QC Batch: **Q11VW090** PrepDate: Analyst: **BD**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
1,1,1-Trichloroethane	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
1,1,2,2-Tetrachloroethane	ND	0.21	0.50		µg/L	1	6/8/2011 02:08 PM
1,1,2-Trichloroethane	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
1,1-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
1,1-Dichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
1,1-Dichloropropene	ND	0.22	0.50		µg/L	1	6/8/2011 02:08 PM
1,2,3-Trichlorobenzene	ND	0.22	0.50		µg/L	1	6/8/2011 02:08 PM
1,2,3-Trichloropropane	ND	0.18	0.50		µg/L	1	6/8/2011 02:08 PM
1,2,4-Trichlorobenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
1,2,4-Trimethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
1,2-Dibromo-3-chloropropane	ND	0.30	0.50		µg/L	1	6/8/2011 02:08 PM
1,2-Dibromoethane	ND	0.12	0.50		µg/L	1	6/8/2011 02:08 PM
1,2-Dichlorobenzene	ND	0.12	0.50		µg/L	1	6/8/2011 02:08 PM
1,2-Dichloroethane	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
1,2-Dichloropropane	ND	0.11	0.50		µg/L	1	6/8/2011 02:08 PM
1,3,5-Trimethylbenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
1,3-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
1,3-Dichloropropane	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
1,4-Dichlorobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
2,2-Dichloropropane	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
2-Chlorotoluene	ND	0.12	0.50		µg/L	1	6/8/2011 02:08 PM
4-Chlorotoluene	ND	0.11	0.50		µg/L	1	6/8/2011 02:08 PM
4-Isopropyltoluene	ND	0.16	0.50		µg/L	1	6/8/2011 02:08 PM
Benzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
Bromobenzene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
Bromodichloromethane	ND	0.18	0.50		µg/L	1	6/8/2011 02:08 PM
Bromoform	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
Bromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 02:08 PM
Carbon tetrachloride	ND	0.20	0.50		µg/L	1	6/8/2011 02:08 PM
Chlorobenzene	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
Chloroethane	ND	0.20	0.50		µg/L	1	6/8/2011 02:08 PM
Chloroform	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
Chloromethane	ND	0.19	0.50		µg/L	1	6/8/2011 02:08 PM
cis-1,2-Dichloroethene	ND	0.29	0.50		µg/L	1	6/8/2011 02:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 4:30:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-005A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS2_110608A**	QC Batch: **Q11VW090**				PrepDate:		Analyst: **BD**
cis-1,3-Dichloropropene	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
Di-isopropyl ether	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
Dibromochloromethane	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
Dibromomethane	ND	0.50	0.50		µg/L	1	6/8/2011 02:08 PM
Dichlorodifluoromethane	ND	0.24	0.50		µg/L	1	6/8/2011 02:08 PM
Ethyl tert-butyl ether	ND	0.13	0.50		µg/L	1	6/8/2011 02:08 PM
Ethylbenzene	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
Hexachlorobutadiene	ND	0.25	0.50		µg/L	1	6/8/2011 02:08 PM
Isopropylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
m,p-Xylene	ND	0.29	1.0		µg/L	1	6/8/2011 02:08 PM
Methylene chloride	ND	1.0	1.0		µg/L	1	6/8/2011 02:08 PM
MTBE	ND	0.12	0.50		µg/L	1	6/8/2011 02:08 PM
n-Butylbenzene	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
n-Propylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 02:08 PM
Naphthalene	ND	0.18	0.50		µg/L	1	6/8/2011 02:08 PM
o-Xylene	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
sec-Butylbenzene	ND	0.19	0.50		µg/L	1	6/8/2011 02:08 PM
Styrene	ND	0.11	0.50		µg/L	1	6/8/2011 02:08 PM
Tert-amyl methyl ether	ND	0.11	0.50		µg/L	1	6/8/2011 02:08 PM
Tert-Butanol	ND	2.4	10		µg/L	1	6/8/2011 02:08 PM
tert-Butylbenzene	ND	0.16	0.50		µg/L	1	6/8/2011 02:08 PM
Tetrachloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
Toluene	ND	0.17	0.50		µg/L	1	6/8/2011 02:08 PM
trans-1,2-Dichloroethene	ND	0.14	0.50		µg/L	1	6/8/2011 02:08 PM
Trichloroethene	ND	0.15	0.50		µg/L	1	6/8/2011 02:08 PM
Trichlorofluoromethane	ND	0.36	0.50		µg/L	1	6/8/2011 02:08 PM
Vinyl chloride	ND	0.16	0.50		µg/L	1	6/8/2011 02:08 PM
Xylenes, Total	ND	1.5	1.5		µg/L	1	6/8/2011 02:08 PM
Surr: 1,2-Dichloroethane-d4	91.8	0	70-130		%REC	1	6/8/2011 02:08 PM
Surr: 4-Bromofluorobenzene	104	0	70-130		%REC	1	6/8/2011 02:08 PM
Surr: Dibromofluoromethane	90.7	0	70-130		%REC	1	6/8/2011 02:08 PM
Surr: Toluene-d8	96.4	0	70-130		%REC	1	6/8/2011 02:08 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 4:30:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-005B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC19_110607B**	QC Batch: **M11VW113**				PrepDate:		Analyst: **DDL**
T/R Hydrocarbons: C4-C8	ND	0.050	0.050		mg/L	1	6/7/2011 09:40 PM
Surr: Bromofluorobenzene (FID)	90.1	0	70-130		%REC	1	6/7/2011 09:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 4:30:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-005C		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3510C		**EPA 8015B(M)**				
RunID: **GC21_110607A**	QC Batch: **73376**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C13-C14	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C15-C16	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C17-C18	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C19-C20	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C21-C22	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C23-C24	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C25-C26	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C27-C28	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C29-C30	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C31-C32	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
T/R Hydrocarbons: C9-C10	ND	0.020	0.020		mg/L	1	6/7/2011 08:12 PM
Surr: 2-Fluorobiphenyl	40.8	0	34-110		%REC	1	6/7/2011 08:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-1
Lab Order:	118185	**Collection Date:**	6/2/2011 4:30:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-005D		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ICP							
	EPA 3010A			**EPA 6010B**			
RunID: **ICP10_110608A**	QC Batch: **73029**				PrepDate:	**6/7/2011**	Analyst: **IL**
Lead	0.0011	0.00081	0.25	J	mg/L	1	6/8/2011 11:33 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-EB-060211-2
Lab Order:	118185	**Collection Date:**	6/2/2011 6:40:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-006A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ICP							
	EPA 3010A			**EPA 6010B**			
RunID: **ICP10_110608A**	QC Batch: **73029**				PrepDate:	**6/7/2011**	Analyst: **IL**
Lead	0.0018	0.00081	0.25	J	mg/L	1	6/8/2011 11:34 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-100-FB-060211-2
Lab Order:	118185	**Collection Date:**	6/2/2011 6:42:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	WATER
Lab ID:	118185-007A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
LEAD BY ICP							
	EPA 3010A			**EPA 6010B**			
RunID: **ICP10_110608A**	QC Batch: **73029**				PrepDate:	**6/7/2011**	Analyst: **IL**
Lead	ND	0.00081	0.25		mg/L	1	6/8/2011 11:35 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 12:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-008A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:44 PM
Surr: 2-Fluorobiphenyl	37.9	0	27-100		%REC	1	6/7/2011 10:44 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 12:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-008B		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	1.3	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1,1-Trichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1,2,2-Tetrachloroethane	ND	1.5	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1,2-Trichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1-Dichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1-Dichloroethene	ND	0.96	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,1-Dichloropropene	ND	2.0	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2,3-Trichlorobenzene	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2,3-Trichloropropane	ND	2.0	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2,4-Trichlorobenzene	ND	0.81	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2,4-Trimethylbenzene	ND	0.91	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2-Dibromo-3-chloropropane	ND	3.1	9.1		µg/Kg	1	6/6/2011 11:19 AM
1,2-Dibromoethane	ND	1.3	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2-Dichlorobenzene	ND	0.69	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2-Dichloroethane	ND	0.86	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,2-Dichloropropane	ND	0.95	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,3,5-Trimethylbenzene	ND	0.88	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,3-Dichlorobenzene	ND	0.65	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,3-Dichloropropane	ND	1.0	4.6		µg/Kg	1	6/6/2011 11:19 AM
1,4-Dichlorobenzene	ND	0.60	4.6		µg/Kg	1	6/6/2011 11:19 AM
2,2-Dichloropropane	ND	0.99	4.6		µg/Kg	1	6/6/2011 11:19 AM
2-Chlorotoluene	ND	0.82	4.6		µg/Kg	1	6/6/2011 11:19 AM
4-Chlorotoluene	ND	0.89	4.6		µg/Kg	1	6/6/2011 11:19 AM
4-Isopropyltoluene	ND	0.64	4.6		µg/Kg	1	6/6/2011 11:19 AM
Benzene	ND	0.74	4.6		µg/Kg	1	6/6/2011 11:19 AM
Bromobenzene	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Bromodichloromethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Bromoform	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Bromomethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 11:19 AM
Carbon tetrachloride	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Chlorobenzene	ND	0.66	4.6		µg/Kg	1	6/6/2011 11:19 AM
Chloroethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 11:19 AM
Chloroform	ND	0.94	4.6		µg/Kg	1	6/6/2011 11:19 AM
Chloromethane	ND	1.4	4.6		µg/Kg	1	6/6/2011 11:19 AM
cis-1,2-Dichloroethene	ND	1.4	4.6		µg/Kg	1	6/6/2011 11:19 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 12:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-008B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	1.5	4.6		µg/Kg	1	6/6/2011 11:19 AM
Di-isopropyl ether	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Dibromochloromethane	ND	1.4	4.6		µg/Kg	1	6/6/2011 11:19 AM
Dibromomethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 11:19 AM
Dichlorodifluoromethane	ND	0.58	4.6		µg/Kg	1	6/6/2011 11:19 AM
Ethyl Tert-butyl ether	ND	1.2	4.6		µg/Kg	1	6/6/2011 11:19 AM
Ethylbenzene	ND	0.69	4.6		µg/Kg	1	6/6/2011 11:19 AM
Hexachlorobutadiene	ND	1.6	4.6		µg/Kg	1	6/6/2011 11:19 AM
Isopropylbenzene	ND	0.75	4.6		µg/Kg	1	6/6/2011 11:19 AM
m,p-Xylene	ND	1.2	9.1		µg/Kg	1	6/6/2011 11:19 AM
Methylene chloride	ND	4.6	4.6		µg/Kg	1	6/6/2011 11:19 AM
MTBE	ND	1.2	4.6		µg/Kg	1	6/6/2011 11:19 AM
n-Butylbenzene	ND	0.86	4.6		µg/Kg	1	6/6/2011 11:19 AM
n-Propylbenzene	ND	0.53	4.6		µg/Kg	1	6/6/2011 11:19 AM
Naphthalene	ND	0.68	4.6		µg/Kg	1	6/6/2011 11:19 AM
o-Xylene	ND	0.70	4.6		µg/Kg	1	6/6/2011 11:19 AM
sec-Butylbenzene	ND	0.80	4.6		µg/Kg	1	6/6/2011 11:19 AM
Styrene	ND	1.0	4.6		µg/Kg	1	6/6/2011 11:19 AM
Tert-amyl methyl ether	ND	1.1	4.6		µg/Kg	1	6/6/2011 11:19 AM
Tert-Butanol	ND	8.9	91		µg/Kg	1	6/6/2011 11:19 AM
tert-Butylbenzene	ND	0.65	4.6		µg/Kg	1	6/6/2011 11:19 AM
Tetrachloroethene	ND	1.0	4.6		µg/Kg	1	6/6/2011 11:19 AM
Toluene	ND	0.71	4.6		µg/Kg	1	6/6/2011 11:19 AM
trans-1,2-Dichloroethene	ND	0.88	4.6		µg/Kg	1	6/6/2011 11:19 AM
Trichloroethene	ND	0.85	4.6		µg/Kg	1	6/6/2011 11:19 AM
Trichlorofluoromethane	ND	0.90	4.6		µg/Kg	1	6/6/2011 11:19 AM
Vinyl chloride	ND	0.88	4.6		µg/Kg	1	6/6/2011 11:19 AM
Xylenes, Total	ND	9.1	14		µg/Kg	1	6/6/2011 11:19 AM
Surr: 1,2-Dichloroethane-d4	105	0	65-141		%REC	1	6/6/2011 11:19 AM
Surr: 4-Bromofluorobenzene	91.5	0	57-134		%REC	1	6/6/2011 11:19 AM
Surr: Dibromofluoromethane	108	0	70-128		%REC	1	6/6/2011 11:19 AM
Surr: Toluene-d8	93.8	0	72-123		%REC	1	6/6/2011 11:19 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 12:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-008E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	ND	0.11	1.0		mg/Kg	1	6/7/2011 10:59 AM
Surr: Bromofluorobenzene (FID)	139	0	51-161		%REC	1	6/7/2011 10:59 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 1:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-009A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:10 PM
Surr: 2-Fluorobiphenyl	37.8	0	27-100		%REC	1	6/7/2011 10:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 1:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-009B		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	1.5	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1,1-Trichloroethane	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1,2,2-Tetrachloroethane	ND	1.7	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1,2-Trichloroethane	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1-Dichloroethane	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1-Dichloroethene	ND	1.1	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,1-Dichloropropene	ND	2.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2,3-Trichlorobenzene	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2,3-Trichloropropane	ND	2.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2,4-Trichlorobenzene	ND	0.94	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2,4-Trimethylbenzene	ND	1.1	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2-Dibromo-3-chloropropane	ND	3.6	11		µg/Kg	1	6/6/2011 11:37 AM
1,2-Dibromoethane	ND	1.5	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2-Dichlorobenzene	ND	0.81	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2-Dichloroethane	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,2-Dichloropropane	ND	1.1	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,3,5-Trimethylbenzene	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,3-Dichlorobenzene	ND	0.76	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,3-Dichloropropane	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
1,4-Dichlorobenzene	ND	0.70	5.3		µg/Kg	1	6/6/2011 11:37 AM
2,2-Dichloropropane	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
2-Chlorotoluene	ND	0.95	5.3		µg/Kg	1	6/6/2011 11:37 AM
4-Chlorotoluene	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
4-Isopropyltoluene	ND	0.74	5.3		µg/Kg	1	6/6/2011 11:37 AM
Benzene	ND	0.86	5.3		µg/Kg	1	6/6/2011 11:37 AM
Bromobenzene	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
Bromodichloromethane	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
Bromoform	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
Bromomethane	ND	1.8	5.3		µg/Kg	1	6/6/2011 11:37 AM
Carbon tetrachloride	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
Chlorobenzene	ND	0.77	5.3		µg/Kg	1	6/6/2011 11:37 AM
Chloroethane	ND	1.9	5.3		µg/Kg	1	6/6/2011 11:37 AM
Chloroform	ND	1.1	5.3		µg/Kg	1	6/6/2011 11:37 AM
Chloromethane	ND	1.7	5.3		µg/Kg	1	6/6/2011 11:37 AM
cis-1,2-Dichloroethene	ND	1.6	5.3		µg/Kg	1	6/6/2011 11:37 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 1:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-009B		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
cis-1,3-Dichloropropene	ND	1.8	5.3		µg/Kg	1	6/6/2011 11:37 AM
Di-isopropyl ether	ND	1.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
Dibromochloromethane	ND	1.6	5.3		µg/Kg	1	6/6/2011 11:37 AM
Dibromomethane	ND	1.9	5.3		µg/Kg	1	6/6/2011 11:37 AM
Dichlorodifluoromethane	ND	0.67	5.3		µg/Kg	1	6/6/2011 11:37 AM
Ethyl Tert-butyl ether	ND	1.4	5.3		µg/Kg	1	6/6/2011 11:37 AM
Ethylbenzene	ND	0.80	5.3		µg/Kg	1	6/6/2011 11:37 AM
Hexachlorobutadiene	ND	1.9	5.3		µg/Kg	1	6/6/2011 11:37 AM
Isopropylbenzene	7.7	0.87	5.3		µg/Kg	1	6/6/2011 11:37 AM
m,p-Xylene	ND	1.4	11		µg/Kg	1	6/6/2011 11:37 AM
Methylene chloride	ND	5.3	5.3		µg/Kg	1	6/6/2011 11:37 AM
MTBE	ND	1.4	5.3		µg/Kg	1	6/6/2011 11:37 AM
n-Butylbenzene	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
n-Propylbenzene	0.90	0.62	5.3	J	µg/Kg	1	6/6/2011 11:37 AM
Naphthalene	ND	0.80	5.3		µg/Kg	1	6/6/2011 11:37 AM
o-Xylene	ND	0.82	5.3		µg/Kg	1	6/6/2011 11:37 AM
sec-Butylbenzene	ND	0.93	5.3		µg/Kg	1	6/6/2011 11:37 AM
Styrene	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
Tert-amyl methyl ether	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
Tert-Butanol	200	10	110		µg/Kg	1	6/6/2011 11:37 AM
tert-Butylbenzene	ND	0.75	5.3		µg/Kg	1	6/6/2011 11:37 AM
Tetrachloroethene	ND	1.2	5.3		µg/Kg	1	6/6/2011 11:37 AM
Toluene	ND	0.83	5.3		µg/Kg	1	6/6/2011 11:37 AM
trans-1,2-Dichloroethene	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
Trichloroethene	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
Trichlorofluoromethane	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
Vinyl chloride	ND	1.0	5.3		µg/Kg	1	6/6/2011 11:37 AM
Xylenes, Total	ND	11	16		µg/Kg	1	6/6/2011 11:37 AM
Surr: 1,2-Dichloroethane-d4	105	0	65-141		%REC	1	6/6/2011 11:37 AM
Surr: 4-Bromofluorobenzene	96.1	0	57-134		%REC	1	6/6/2011 11:37 AM
Surr: Dibromofluoromethane	106	0	70-128		%REC	1	6/6/2011 11:37 AM
Surr: Toluene-d8	89.9	0	72-123		%REC	1	6/6/2011 11:37 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 1:20:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-009E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
EPA 8015B(M)							
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	0.23	0.085	0.81	J	mg/Kg	1	6/7/2011 11:14 AM
Surr: Bromofluorobenzene (FID)	145	0	51-161		%REC	1	6/7/2011 11:14 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-15.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:07:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-010A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 10:27 PM
Surr: 2-Fluorobiphenyl	42.1	0	27-100		%REC	1	6/7/2011 10:27 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT: AMEC Geomatrix
Client Sample ID: 1139-101-15.0
Lab Order: 118185
Collection Date: 6/2/2011 2:07:00 PM
Project: Route 405 Temple Ave Bridge Repair ADL, 0
Matrix: SOIL
Lab ID: 118185-010B

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	1.1	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1,1-Trichloroethane	ND	0.98	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1,2,2-Tetrachloroethane	ND	1.3	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1,2-Trichloroethane	ND	0.99	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1-Dichloroethane	ND	0.98	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1-Dichloroethene	ND	0.85	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,1-Dichloropropene	ND	1.7	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2,3-Trichlorobenzene	ND	1.0	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2,3-Trichloropropane	ND	1.7	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2,4-Trichlorobenzene	ND	0.71	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2,4-Trimethylbenzene	ND	0.80	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2-Dibromo-3-chloropropane	ND	2.7	8.0		µg/Kg	1	6/6/2011 11:54 AM
1,2-Dibromoethane	ND	1.1	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2-Dichlorobenzene	ND	0.61	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2-Dichloroethane	ND	0.75	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,2-Dichloropropane	ND	0.83	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,3,5-Trimethylbenzene	ND	0.77	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,3-Dichlorobenzene	ND	0.57	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,3-Dichloropropane	ND	0.90	4.0		µg/Kg	1	6/6/2011 11:54 AM
1,4-Dichlorobenzene	ND	0.52	4.0		µg/Kg	1	6/6/2011 11:54 AM
2,2-Dichloropropane	ND	0.87	4.0		µg/Kg	1	6/6/2011 11:54 AM
2-Chlorotoluene	ND	0.72	4.0		µg/Kg	1	6/6/2011 11:54 AM
4-Chlorotoluene	ND	0.78	4.0		µg/Kg	1	6/6/2011 11:54 AM
4-Isopropyltoluene	ND	0.56	4.0		µg/Kg	1	6/6/2011 11:54 AM
Benzene	42	0.65	4.0		µg/Kg	1	6/6/2011 11:54 AM
Bromobenzene	ND	0.98	4.0		µg/Kg	1	6/6/2011 11:54 AM
Bromodichloromethane	ND	0.99	4.0		µg/Kg	1	6/6/2011 11:54 AM
Bromoform	ND	0.97	4.0		µg/Kg	1	6/6/2011 11:54 AM
Bromomethane	ND	1.4	4.0		µg/Kg	1	6/6/2011 11:54 AM
Carbon tetrachloride	ND	0.94	4.0		µg/Kg	1	6/6/2011 11:54 AM
Chlorobenzene	ND	0.58	4.0		µg/Kg	1	6/6/2011 11:54 AM
Chloroethane	ND	1.4	4.0		µg/Kg	1	6/6/2011 11:54 AM
Chloroform	ND	0.83	4.0		µg/Kg	1	6/6/2011 11:54 AM
Chloromethane	ND	1.3	4.0		µg/Kg	1	6/6/2011 11:54 AM
cis-1,2-Dichloroethene	ND	1.2	4.0		µg/Kg	1	6/6/2011 11:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT: AMEC Geomatrix
Client Sample ID: 1139-101-15.0
Lab Order: 118185
Collection Date: 6/2/2011 2:07:00 PM
Project: Route 405 Temple Ave Bridge Repair ADL, 0
Matrix: SOIL
Lab ID: 118185-010B

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	1.4	4.0		µg/Kg	1	6/6/2011 11:54 AM
Di-isopropyl ether	ND	0.96	4.0		µg/Kg	1	6/6/2011 11:54 AM
Dibromochloromethane	ND	1.2	4.0		µg/Kg	1	6/6/2011 11:54 AM
Dibromomethane	ND	1.4	4.0		µg/Kg	1	6/6/2011 11:54 AM
Dichlorodifluoromethane	ND	0.51	4.0		µg/Kg	1	6/6/2011 11:54 AM
Ethyl Tert-butyl ether	ND	1.1	4.0		µg/Kg	1	6/6/2011 11:54 AM
Ethylbenzene	0.92	0.61	4.0	J	µg/Kg	1	6/6/2011 11:54 AM
Hexachlorobutadiene	ND	1.4	4.0		µg/Kg	1	6/6/2011 11:54 AM
Isopropylbenzene	ND	0.66	4.0		µg/Kg	1	6/6/2011 11:54 AM
m,p-Xylene	1.7	1.1	8.0	J	µg/Kg	1	6/6/2011 11:54 AM
Methylene chloride	ND	4.0	4.0		µg/Kg	1	6/6/2011 11:54 AM
MTBE	ND	1.0	4.0		µg/Kg	1	6/6/2011 11:54 AM
n-Butylbenzene	ND	0.76	4.0		µg/Kg	1	6/6/2011 11:54 AM
n-Propylbenzene	ND	0.47	4.0		µg/Kg	1	6/6/2011 11:54 AM
Naphthalene	ND	0.60	4.0		µg/Kg	1	6/6/2011 11:54 AM
o-Xylene	0.80	0.61	4.0	J	µg/Kg	1	6/6/2011 11:54 AM
sec-Butylbenzene	ND	0.70	4.0		µg/Kg	1	6/6/2011 11:54 AM
Styrene	ND	0.90	4.0		µg/Kg	1	6/6/2011 11:54 AM
Tert-amyl methyl ether	ND	0.93	4.0		µg/Kg	1	6/6/2011 11:54 AM
Tert-Butanol	21	7.8	80	J	µg/Kg	1	6/6/2011 11:54 AM
tert-Butylbenzene	ND	0.57	4.0		µg/Kg	1	6/6/2011 11:54 AM
Tetrachloroethene	ND	0.89	4.0		µg/Kg	1	6/6/2011 11:54 AM
Toluene	20	0.62	4.0		µg/Kg	1	6/6/2011 11:54 AM
trans-1,2-Dichloroethene	ND	0.77	4.0		µg/Kg	1	6/6/2011 11:54 AM
Trichloroethene	ND	0.75	4.0		µg/Kg	1	6/6/2011 11:54 AM
Trichlorofluoromethane	ND	0.79	4.0		µg/Kg	1	6/6/2011 11:54 AM
Vinyl chloride	ND	0.77	4.0		µg/Kg	1	6/6/2011 11:54 AM
Xylenes, Total	ND	8.0	12		µg/Kg	1	6/6/2011 11:54 AM
Surr: 1,2-Dichloroethane-d4	102	0	65-141		%REC	1	6/6/2011 11:54 AM
Surr: 4-Bromofluorobenzene	92.6	0	57-134		%REC	1	6/6/2011 11:54 AM
Surr: Dibromofluoromethane	99.8	0	70-128		%REC	1	6/6/2011 11:54 AM
Surr: Toluene-d8	89.0	0	72-123		%REC	1	6/6/2011 11:54 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-15.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:07:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-010E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	0.97	0.096	0.91		mg/Kg	1	6/7/2011 11:30 AM
Surr: Bromofluorobenzene (FID)	124	0	51-161		%REC	1	6/7/2011 11:30 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:45:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-011A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:00 PM
Surr: 2-Fluorobiphenyl	43.3	0	27-100		%REC	1	6/7/2011 11:00 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:45:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-011B		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	2.0	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1,1-Trichloroethane	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1,2,2-Tetrachloroethane	ND	2.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1,2-Trichloroethane	ND	1.8	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1-Dichloroethane	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1-Dichloroethene	ND	1.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,1-Dichloropropene	ND	3.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2,3-Trichlorobenzene	ND	1.8	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2,3-Trichloropropane	ND	3.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2,4-Trichlorobenzene	ND	1.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2,4-Trimethylbenzene	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2-Dibromo-3-chloropropane	ND	4.8	14		µg/Kg	1	6/6/2011 12:12 PM
1,2-Dibromoethane	ND	2.0	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2-Dichlorobenzene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2-Dichloroethane	ND	1.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,2-Dichloropropane	ND	1.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,3,5-Trimethylbenzene	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,3-Dichlorobenzene	ND	1.0	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,3-Dichloropropane	ND	1.6	7.1		µg/Kg	1	6/6/2011 12:12 PM
1,4-Dichlorobenzene	ND	0.93	7.1		µg/Kg	1	6/6/2011 12:12 PM
2,2-Dichloropropane	ND	1.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
2-Chlorotoluene	ND	1.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
4-Chlorotoluene	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
4-Isopropyltoluene	ND	0.99	7.1		µg/Kg	1	6/6/2011 12:12 PM
Benzene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
Bromobenzene	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
Bromodichloromethane	ND	1.8	7.1		µg/Kg	1	6/6/2011 12:12 PM
Bromoform	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
Bromomethane	ND	2.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
Carbon tetrachloride	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
Chlorobenzene	ND	1.0	7.1		µg/Kg	1	6/6/2011 12:12 PM
Chloroethane	ND	2.6	7.1		µg/Kg	1	6/6/2011 12:12 PM
Chloroform	ND	1.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
Chloromethane	ND	2.2	7.1		µg/Kg	1	6/6/2011 12:12 PM
cis-1,2-Dichloroethene	ND	2.2	7.1		µg/Kg	1	6/6/2011 12:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:45:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-011B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	2.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
Di-isopropyl ether	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
Dibromochloromethane	ND	2.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
Dibromomethane	ND	2.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
Dichlorodifluoromethane	ND	0.90	7.1		µg/Kg	1	6/6/2011 12:12 PM
Ethyl Tert-butyl ether	ND	1.9	7.1		µg/Kg	1	6/6/2011 12:12 PM
Ethylbenzene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
Hexachlorobutadiene	ND	2.5	7.1		µg/Kg	1	6/6/2011 12:12 PM
Isopropylbenzene	ND	1.2	7.1		µg/Kg	1	6/6/2011 12:12 PM
m,p-Xylene	ND	1.9	14		µg/Kg	1	6/6/2011 12:12 PM
Methylene chloride	ND	7.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
MTBE	ND	1.9	7.1		µg/Kg	1	6/6/2011 12:12 PM
n-Butylbenzene	ND	1.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
n-Propylbenzene	ND	0.83	7.1		µg/Kg	1	6/6/2011 12:12 PM
Naphthalene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
o-Xylene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
sec-Butylbenzene	ND	1.2	7.1		µg/Kg	1	6/6/2011 12:12 PM
Styrene	ND	1.6	7.1		µg/Kg	1	6/6/2011 12:12 PM
Tert-amyl methyl ether	ND	1.7	7.1		µg/Kg	1	6/6/2011 12:12 PM
Tert-Butanol	ND	14	140		µg/Kg	1	6/6/2011 12:12 PM
tert-Butylbenzene	ND	1.0	7.1		µg/Kg	1	6/6/2011 12:12 PM
Tetrachloroethene	ND	1.6	7.1		µg/Kg	1	6/6/2011 12:12 PM
Toluene	ND	1.1	7.1		µg/Kg	1	6/6/2011 12:12 PM
trans-1,2-Dichloroethene	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
Trichloroethene	ND	1.3	7.1		µg/Kg	1	6/6/2011 12:12 PM
Trichlorofluoromethane	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
Vinyl chloride	ND	1.4	7.1		µg/Kg	1	6/6/2011 12:12 PM
Xylenes, Total	ND	14	21		µg/Kg	1	6/6/2011 12:12 PM
Surr: 1,2-Dichloroethane-d4	96.8	0	65-141		%REC	1	6/6/2011 12:12 PM
Surr: 4-Bromofluorobenzene	88.0	0	57-134		%REC	1	6/6/2011 12:12 PM
Surr: Dibromofluoromethane	98.5	0	70-128		%REC	1	6/6/2011 12:12 PM
Surr: Toluene-d8	91.6	0	72-123		%REC	1	6/6/2011 12:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 2:45:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-011E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	ND	0.12	1.2		mg/Kg	1	6/7/2011 11:46 AM
Surr: Bromofluorobenzene (FID)	143	0	51-161		%REC	1	6/7/2011 11:46 AM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 3:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-012A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 11:51 PM
Surr: 2-Fluorobiphenyl	42.5	0	27-100		%REC	1	6/7/2011 11:51 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 3:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-012B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
1,1,1,2-Tetrachloroethane	ND	1.5	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1,1-Trichloroethane	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1,2,2-Tetrachloroethane	ND	1.7	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1,2-Trichloroethane	110	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1-Dichloroethane	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1-Dichloroethene	ND	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,1-Dichloropropene	ND	2.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2,3-Trichlorobenzene	ND	1.4	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2,3-Trichloropropane	ND	2.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2,4-Trichlorobenzene	ND	0.96	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2,4-Trimethylbenzene	21	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2-Dibromo-3-chloropropane	ND	3.6	11		µg/Kg	1	6/6/2011 12:29 PM
1,2-Dibromoethane	ND	1.5	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2-Dichlorobenzene	ND	0.82	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2-Dichloroethane	ND	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,2-Dichloropropane	ND	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,3,5-Trimethylbenzene	7.7	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,3-Dichlorobenzene	ND	0.77	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,3-Dichloropropane	ND	1.2	5.4		µg/Kg	1	6/6/2011 12:29 PM
1,4-Dichlorobenzene	ND	0.71	5.4		µg/Kg	1	6/6/2011 12:29 PM
2,2-Dichloropropane	ND	1.2	5.4		µg/Kg	1	6/6/2011 12:29 PM
2-Chlorotoluene	3.2	0.97	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
4-Chlorotoluene	ND	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
4-Isopropyltoluene	1.3	0.75	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
Benzene	3.6	0.87	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
Bromobenzene	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Bromodichloromethane	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Bromoform	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Bromomethane	ND	1.9	5.4		µg/Kg	1	6/6/2011 12:29 PM
Carbon tetrachloride	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Chlorobenzene	ND	0.78	5.4		µg/Kg	1	6/6/2011 12:29 PM
Chloroethane	ND	1.9	5.4		µg/Kg	1	6/6/2011 12:29 PM
Chloroform	ND	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
Chloromethane	ND	1.7	5.4		µg/Kg	1	6/6/2011 12:29 PM
cis-1,2-Dichloroethene	ND	1.6	5.4		µg/Kg	1	6/6/2011 12:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 3:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-012B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	1.8	5.4		µg/Kg	1	6/6/2011 12:29 PM
Di-isopropyl ether	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Dibromochloromethane	ND	1.6	5.4		µg/Kg	1	6/6/2011 12:29 PM
Dibromomethane	ND	1.9	5.4		µg/Kg	1	6/6/2011 12:29 PM
Dichlorodifluoromethane	ND	0.68	5.4		µg/Kg	1	6/6/2011 12:29 PM
Ethyl Tert-butyl ether	ND	1.4	5.4		µg/Kg	1	6/6/2011 12:29 PM
Ethylbenzene	32	0.82	5.4		µg/Kg	1	6/6/2011 12:29 PM
Hexachlorobutadiene	ND	1.9	5.4		µg/Kg	1	6/6/2011 12:29 PM
Isopropylbenzene	10	0.88	5.4		µg/Kg	1	6/6/2011 12:29 PM
m,p-Xylene	18	1.5	11		µg/Kg	1	6/6/2011 12:29 PM
Methylene chloride	ND	5.4	5.4		µg/Kg	1	6/6/2011 12:29 PM
MTBE	ND	1.4	5.4		µg/Kg	1	6/6/2011 12:29 PM
n-Butylbenzene	ND	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
n-Propylbenzene	10	0.63	5.4		µg/Kg	1	6/6/2011 12:29 PM
Naphthalene	0.95	0.81	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
o-Xylene	1.6	0.83	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
sec-Butylbenzene	1.5	0.95	5.4	J	µg/Kg	1	6/6/2011 12:29 PM
Styrene	ND	1.2	5.4		µg/Kg	1	6/6/2011 12:29 PM
Tert-amyl methyl ether	ND	1.3	5.4		µg/Kg	1	6/6/2011 12:29 PM
Tert-Butanol	200	10	110		µg/Kg	1	6/6/2011 12:29 PM
tert-Butylbenzene	ND	0.76	5.4		µg/Kg	1	6/6/2011 12:29 PM
Tetrachloroethene	ND	1.2	5.4		µg/Kg	1	6/6/2011 12:29 PM
Toluene	ND	0.84	5.4		µg/Kg	1	6/6/2011 12:29 PM
trans-1,2-Dichloroethene	ND	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
Trichloroethene	ND	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
Trichlorofluoromethane	ND	1.1	5.4		µg/Kg	1	6/6/2011 12:29 PM
Vinyl chloride	ND	1.0	5.4		µg/Kg	1	6/6/2011 12:29 PM
Xylenes, Total	19	11	16		µg/Kg	1	6/6/2011 12:29 PM
Surr: 1,2-Dichloroethane-d4	103	0	65-141		%REC	1	6/6/2011 12:29 PM
Surr: 4-Bromofluorobenzene	105	0	57-134		%REC	1	6/6/2011 12:29 PM
Surr: Dibromofluoromethane	101	0	70-128		%REC	1	6/6/2011 12:29 PM
Surr: Toluene-d8	105	0	72-123		%REC	1	6/6/2011 12:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 3:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-012E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	2.1	0.092	0.88		mg/Kg	1	6/7/2011 12:02 PM
Surr: Bromofluorobenzene (FID)	190	0	51-161	S	%REC	1	6/7/2011 12:02 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 5:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-013A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:53 PM
Surr: 2-Fluorobiphenyl	37.0	0	27-100		%REC	1	6/7/2011 09:53 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 5:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-013B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
1,1,1,2-Tetrachloroethane	ND	1.3	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1,1-Trichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1,2,2-Tetrachloroethane	ND	1.5	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1,2-Trichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1-Dichloroethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1-Dichloroethene	ND	0.97	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,1-Dichloropropene	ND	2.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2,3-Trichlorobenzene	ND	1.2	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2,3-Trichloropropane	ND	2.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2,4-Trichlorobenzene	ND	0.81	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2,4-Trimethylbenzene	ND	0.92	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2-Dibromo-3-chloropropane	ND	3.1	9.2		µg/Kg	1	6/6/2011 12:47 PM
1,2-Dibromoethane	ND	1.3	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2-Dichlorobenzene	ND	0.70	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2-Dichloroethane	ND	0.86	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,2-Dichloropropane	ND	0.95	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,3,5-Trimethylbenzene	ND	0.88	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,3-Dichlorobenzene	ND	0.65	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,3-Dichloropropane	ND	1.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
1,4-Dichlorobenzene	ND	0.60	4.6		µg/Kg	1	6/6/2011 12:47 PM
2,2-Dichloropropane	ND	1.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
2-Chlorotoluene	ND	0.82	4.6		µg/Kg	1	6/6/2011 12:47 PM
4-Chlorotoluene	ND	0.90	4.6		µg/Kg	1	6/6/2011 12:47 PM
4-Isopropyltoluene	ND	0.64	4.6		µg/Kg	1	6/6/2011 12:47 PM
Benzene	ND	0.74	4.6		µg/Kg	1	6/6/2011 12:47 PM
Bromobenzene	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Bromodichloromethane	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Bromoform	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Bromomethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
Carbon tetrachloride	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Chlorobenzene	ND	0.66	4.6		µg/Kg	1	6/6/2011 12:47 PM
Chloroethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
Chloroform	ND	0.95	4.6		µg/Kg	1	6/6/2011 12:47 PM
Chloromethane	ND	1.4	4.6		µg/Kg	1	6/6/2011 12:47 PM
cis-1,2-Dichloroethene	ND	1.4	4.6		µg/Kg	1	6/6/2011 12:47 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 5:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-013B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	1.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
Di-isopropyl ether	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Dibromochloromethane	ND	1.4	4.6		µg/Kg	1	6/6/2011 12:47 PM
Dibromomethane	ND	1.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
Dichlorodifluoromethane	ND	0.58	4.6		µg/Kg	1	6/6/2011 12:47 PM
Ethyl Tert-butyl ether	ND	1.2	4.6		µg/Kg	1	6/6/2011 12:47 PM
Ethylbenzene	ND	0.69	4.6		µg/Kg	1	6/6/2011 12:47 PM
Hexachlorobutadiene	ND	1.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
Isopropylbenzene	ND	0.75	4.6		µg/Kg	1	6/6/2011 12:47 PM
m,p-Xylene	ND	1.2	9.2		µg/Kg	1	6/6/2011 12:47 PM
Methylene chloride	ND	4.6	4.6		µg/Kg	1	6/6/2011 12:47 PM
MTBE	ND	1.2	4.6		µg/Kg	1	6/6/2011 12:47 PM
n-Butylbenzene	ND	0.87	4.6		µg/Kg	1	6/6/2011 12:47 PM
n-Propylbenzene	ND	0.53	4.6		µg/Kg	1	6/6/2011 12:47 PM
Naphthalene	ND	0.69	4.6		µg/Kg	1	6/6/2011 12:47 PM
o-Xylene	ND	0.70	4.6		µg/Kg	1	6/6/2011 12:47 PM
sec-Butylbenzene	ND	0.80	4.6		µg/Kg	1	6/6/2011 12:47 PM
Styrene	ND	1.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
Tert-amyl methyl ether	ND	1.1	4.6		µg/Kg	1	6/6/2011 12:47 PM
Tert-Butanol	ND	8.9	92		µg/Kg	1	6/6/2011 12:47 PM
tert-Butylbenzene	ND	0.65	4.6		µg/Kg	1	6/6/2011 12:47 PM
Tetrachloroethene	ND	1.0	4.6		µg/Kg	1	6/6/2011 12:47 PM
Toluene	ND	0.71	4.6		µg/Kg	1	6/6/2011 12:47 PM
trans-1,2-Dichloroethene	ND	0.88	4.6		µg/Kg	1	6/6/2011 12:47 PM
Trichloroethene	ND	0.86	4.6		µg/Kg	1	6/6/2011 12:47 PM
Trichlorofluoromethane	ND	0.90	4.6		µg/Kg	1	6/6/2011 12:47 PM
Vinyl chloride	ND	0.88	4.6		µg/Kg	1	6/6/2011 12:47 PM
Xylenes, Total	ND	9.2	14		µg/Kg	1	6/6/2011 12:47 PM
Surr: 1,2-Dichloroethane-d4	105	0	65-141		%REC	1	6/6/2011 12:47 PM
Surr: 4-Bromofluorobenzene	91.8	0	57-134		%REC	1	6/6/2011 12:47 PM
Surr: Dibromofluoromethane	105	0	70-128		%REC	1	6/6/2011 12:47 PM
Surr: Toluene-d8	93.4	0	72-123		%REC	1	6/6/2011 12:47 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-5.0
Lab Order:	118185	**Collection Date:**	6/2/2011 5:35:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-013E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	0.12	0.089	0.85	J	mg/Kg	1	6/7/2011 12:34 PM
Surr: Bromofluorobenzene (FID)	140	0	51-161		%REC	1	6/7/2011 12:34 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 6:10:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-014A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
	EPA 3550B		**EPA 8015B(M)**				
RunID: **GC21_110607B**	QC Batch: **73383**				PrepDate:	**6/7/2011**	Analyst: **CBR**
T/R Hydrocarbons: C11-C12	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C13-C14	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C15-C16	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C17-C18	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C19-C20	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C21-C22	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C23-C24	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C25-C26	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C27-C28	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C29-C30	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C31-C32	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
T/R Hydrocarbons: C9-C10	ND	3.0	3.0		mg/Kg	1	6/7/2011 09:19 PM
Surr: 2-Fluorobiphenyl	39.3	0	27-100		%REC	1	6/7/2011 09:19 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 6:10:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-014B		

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: **MS4_110606A** QC Batch: **K11VS169** PrepDate: **6/2/2011** Analyst: **SLL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	1.4	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1,1-Trichloroethane	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1,2,2-Tetrachloroethane	ND	1.6	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1,2-Trichloroethane	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1-Dichloroethane	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1-Dichloroethene	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,1-Dichloropropene	ND	2.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2,3-Trichlorobenzene	ND	1.3	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2,3-Trichloropropane	ND	2.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2,4-Trichlorobenzene	ND	0.90	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2,4-Trimethylbenzene	ND	1.0	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2-Dibromo-3-chloropropane	ND	3.4	10		µg/Kg	1	6/6/2011 01:05 PM
1,2-Dibromoethane	ND	1.4	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2-Dichlorobenzene	ND	0.77	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2-Dichloroethane	ND	0.95	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,2-Dichloropropane	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,3,5-Trimethylbenzene	ND	0.98	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,3-Dichlorobenzene	ND	0.72	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,3-Dichloropropane	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
1,4-Dichlorobenzene	ND	0.66	5.1		µg/Kg	1	6/6/2011 01:05 PM
2,2-Dichloropropane	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
2-Chlorotoluene	ND	0.91	5.1		µg/Kg	1	6/6/2011 01:05 PM
4-Chlorotoluene	ND	0.99	5.1		µg/Kg	1	6/6/2011 01:05 PM
4-Isopropyltoluene	ND	0.71	5.1		µg/Kg	1	6/6/2011 01:05 PM
Benzene	ND	0.82	5.1		µg/Kg	1	6/6/2011 01:05 PM
Bromobenzene	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
Bromodichloromethane	ND	1.3	5.1		µg/Kg	1	6/6/2011 01:05 PM
Bromoform	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
Bromomethane	ND	1.7	5.1		µg/Kg	1	6/6/2011 01:05 PM
Carbon tetrachloride	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
Chlorobenzene	ND	0.73	5.1		µg/Kg	1	6/6/2011 01:05 PM
Chloroethane	ND	1.8	5.1		µg/Kg	1	6/6/2011 01:05 PM
Chloroform	ND	1.0	5.1		µg/Kg	1	6/6/2011 01:05 PM
Chloromethane	ND	1.6	5.1		µg/Kg	1	6/6/2011 01:05 PM
cis-1,2-Dichloroethene	ND	1.5	5.1		µg/Kg	1	6/6/2011 01:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 6:10:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-014B		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS							
			EPA 8260B				
RunID: **MS4_110606A**	QC Batch: **K11VS169**				PrepDate:	**6/2/2011**	Analyst: **SLL**
cis-1,3-Dichloropropene	ND	1.7	5.1		µg/Kg	1	6/6/2011 01:05 PM
Di-isopropyl ether	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
Dibromochloromethane	ND	1.5	5.1		µg/Kg	1	6/6/2011 01:05 PM
Dibromomethane	ND	1.8	5.1		µg/Kg	1	6/6/2011 01:05 PM
Dichlorodifluoromethane	ND	0.64	5.1		µg/Kg	1	6/6/2011 01:05 PM
Ethyl Tert-butyl ether	ND	1.4	5.1		µg/Kg	1	6/6/2011 01:05 PM
Ethylbenzene	ND	0.77	5.1		µg/Kg	1	6/6/2011 01:05 PM
Hexachlorobutadiene	ND	1.8	5.1		µg/Kg	1	6/6/2011 01:05 PM
Isopropylbenzene	ND	0.83	5.1		µg/Kg	1	6/6/2011 01:05 PM
m,p-Xylene	ND	1.4	10		µg/Kg	1	6/6/2011 01:05 PM
Methylene chloride	ND	5.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
MTBE	ND	1.3	5.1		µg/Kg	1	6/6/2011 01:05 PM
n-Butylbenzene	ND	0.96	5.1		µg/Kg	1	6/6/2011 01:05 PM
n-Propylbenzene	ND	0.59	5.1		µg/Kg	1	6/6/2011 01:05 PM
Naphthalene	ND	0.76	5.1		µg/Kg	1	6/6/2011 01:05 PM
o-Xylene	ND	0.78	5.1		µg/Kg	1	6/6/2011 01:05 PM
sec-Butylbenzene	ND	0.89	5.1		µg/Kg	1	6/6/2011 01:05 PM
Styrene	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
Tert-amyl methyl ether	ND	1.2	5.1		µg/Kg	1	6/6/2011 01:05 PM
Tert-Butanol	ND	9.8	100		µg/Kg	1	6/6/2011 01:05 PM
tert-Butylbenzene	ND	0.72	5.1		µg/Kg	1	6/6/2011 01:05 PM
Tetrachloroethene	ND	1.1	5.1		µg/Kg	1	6/6/2011 01:05 PM
Toluene	ND	0.79	5.1		µg/Kg	1	6/6/2011 01:05 PM
trans-1,2-Dichloroethene	ND	0.97	5.1		µg/Kg	1	6/6/2011 01:05 PM
Trichloroethene	ND	0.95	5.1		µg/Kg	1	6/6/2011 01:05 PM
Trichlorofluoromethane	ND	1.0	5.1		µg/Kg	1	6/6/2011 01:05 PM
Vinyl chloride	ND	0.97	5.1		µg/Kg	1	6/6/2011 01:05 PM
Xylenes, Total	ND	10	15		µg/Kg	1	6/6/2011 01:05 PM
Surr: 1,2-Dichloroethane-d4	108	0	65-141		%REC	1	6/6/2011 01:05 PM
Surr: 4-Bromofluorobenzene	92.1	0	57-134		%REC	1	6/6/2011 01:05 PM
Surr: Dibromofluoromethane	105	0	70-128		%REC	1	6/6/2011 01:05 PM
Surr: Toluene-d8	98.0	0	72-123		%REC	1	6/6/2011 01:05 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

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Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *10-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-104-10.0
Lab Order:	118185	**Collection Date:**	6/2/2011 6:10:00 PM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118185-014E		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HYDROCARBON CHAIN IDENTIFICATION							
			EPA 8015B(M)				
RunID: **GC2_110607A**	QC Batch: **E11VS213**				PrepDate:	**6/2/2011**	Analyst: **TP**
T/R Hydrocarbons: C4-C8	0.14	0.11	1.1	J	mg/Kg	1	6/7/2011 12:50 PM
Surr: Bromofluorobenzene (FID)	149	0	51-161		%REC	1	6/7/2011 12:50 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_WPB

Sample ID: **MB-73029** SampType: **MBLK** TestCode: **6010_WPB** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133719**
Client ID: **PBW** Batch ID: **73029** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **6/8/2011** SeqNo: **2182952**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.002	0.25									J

Sample ID: **LCS-73029** SampType: **LCS** TestCode: **6010_WPB** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133719**
Client ID: **LCSW** Batch ID: **73029** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **6/8/2011** SeqNo: **2182953**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.973	0.25	1.000	0.002216	97.1	85	115				

Sample ID: **118185-003D-DUP** SampType: **DUP** TestCode: **6010_WPB** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133719**
Client ID: **1139-100-SW-06021** Batch ID: **73029** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **6/8/2011** SeqNo: **2182955**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.001	0.25						0.003887	0	20	J

Sample ID: **118185-007A-MS** SampType: **MS** TestCode: **6010_WPB** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133719**
Client ID: **1139-100-FB-060211** Batch ID: **73029** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **6/8/2011** SeqNo: **2182960**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.308	0.25	2.500	0	92.3	80	118				

Sample ID: **118185-007A-MSD** SampType: **MSD** TestCode: **6010_WPB** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133719**
Client ID: **1139-100-FB-060211** Batch ID: **73029** TestNo: **EPA 6010B** **EPA 3010A** Analysis Date: **6/8/2011** SeqNo: **2182961**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.399	0.25	2.500	0	96.0	80	118	2.308	3.86	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **K110606LCS1** SampType: **LCS** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **LCSS** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	52.290	5.0	50.00	0	105	70	130				
Benzene	114.240	5.0	100.0	0	114	70	130				
Chlorobenzene	55.070	5.0	50.00	0	110	70	130				
MTBE	49.700	5.0	50.00	0	99.4	70	130				
Toluene	118.370	5.0	100.0	0	118	70	130				
Trichloroethene	51.370	5.0	50.00	0	103	70	130				
Surr: 1,2-Dichloroethane-d4	40.890		50.00		81.8	65	141				
Surr: 4-Bromofluorobenzene	47.660		50.00		95.3	57	134				
Surr: Dibromofluoromethane	45.280		50.00		90.6	70	128				
Surr: Toluene-d8	46.350		50.00		92.7	72	123				

Sample ID: **K110606MB2MS** SampType: **MS** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **ZZZZZZ** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183282**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	52.750	5.0	50.00	0	106	70	130				
Benzene	117.440	5.0	100.0	0	117	70	130				
Chlorobenzene	56.780	5.0	50.00	0	114	70	130				
MTBE	49.240	5.0	50.00	0	98.5	70	130				
Toluene	121.210	5.0	100.0	0	121	70	130				
Trichloroethene	51.130	5.0	50.00	0	102	70	130				
Surr: 1,2-Dichloroethane-d4	39.310		50.00		78.6	65	141				
Surr: 4-Bromofluorobenzene	47.470		50.00		94.9	57	134				
Surr: Dibromofluoromethane	44.820		50.00		89.6	70	128				
Surr: Toluene-d8	46.670		50.00		93.3	72	123				

Sample ID: **K110606MB2MSD** SampType: **MSD** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **ZZZZZZ** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183283**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **K110606MB2MSD** SampType: **MSD** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **ZZZZZZ** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183283**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	56.410	5.0	50.00	0	113	70	130	52.75	6.71	20	
Benzene	118.830	5.0	100.0	0	119	70	130	117.4	1.18	20	
Chlorobenzene	60.660	5.0	50.00	0	121	70	130	56.78	6.61	20	
MTBE	54.950	5.0	50.00	0	110	70	130	49.24	11.0	20	
Toluene	124.150	5.0	100.0	0	124	70	130	121.2	2.40	20	
Trichloroethene	50.840	5.0	50.00	0	102	70	130	51.13	0.569	20	
Surr: 1,2-Dichloroethane-d4	44.840		50.00		89.7	65	141		0	0	
Surr: 4-Bromofluorobenzene	53.110		50.00		106	57	134		0	0	
Surr: Dibromofluoromethane	49.030		50.00		98.1	70	128		0	0	
Surr: Toluene-d8	48.550		50.00		97.1	72	123		0	0	

Sample ID: **K110606MB2** SampType: **MBLK** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **PBS** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183284**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **K110606MB2** SampType: **MBLK** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **PBS** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183284**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Di-isopropyl ether	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethyl Tert-butyl ether	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	10									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **K110606MB2** SampType: **MBLK** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: RunNo: **133740**
Client ID: **PBS** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183284**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	5.0									
MTBE	ND	5.0									
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
Tert-amyl methyl ether	ND	5.0									
Tert-Butanol	ND	100									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									
Xylenes, Total	ND	15									
Surr: 1,2-Dichloroethane-d4	44.690		50.00		89.4	65	141				
Surr: 4-Bromofluorobenzene	43.250		50.00		86.5	57	134				
Surr: Dibromofluoromethane	48.260		50.00		96.5	70	128				
Surr: Toluene-d8	46.260		50.00		92.5	72	123				

Sample ID: **118185-008CDUP** SampType: **DUP** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: **6/2/2011** RunNo: **133740**
Client ID: **1139-101-5.0** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	4.3						0	0	20	
1,1,1-Trichloroethane	ND	4.3						0	0	20	
1,1,2,2-Tetrachloroethane	ND	4.3						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **118185-008CDUP** SampType: **DUP** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: **6/2/2011** RunNo: **133740**
Client ID: **1139-101-5.0** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	ND	4.3						0	0	20	
1,1-Dichloroethane	ND	4.3						0	0	20	
1,1-Dichloroethene	ND	4.3						0	0	20	
1,1-Dichloropropene	ND	4.3						0	0	20	
1,2,3-Trichlorobenzene	ND	4.3						0	0	20	
1,2,3-Trichloropropane	ND	4.3						0	0	20	
1,2,4-Trichlorobenzene	ND	4.3						0	0	20	
1,2,4-Trimethylbenzene	ND	4.3						0	0	20	
1,2-Dibromo-3-chloropropane	ND	8.7						0	0	20	
1,2-Dibromoethane	ND	4.3						0	0	20	
1,2-Dichlorobenzene	ND	4.3						0	0	20	
1,2-Dichloroethane	ND	4.3						0	0	20	
1,2-Dichloropropane	ND	4.3						0	0	20	
1,3,5-Trimethylbenzene	ND	4.3						0	0	20	
1,3-Dichlorobenzene	ND	4.3						0	0	20	
1,3-Dichloropropane	ND	4.3						0	0	20	
1,4-Dichlorobenzene	ND	4.3						0	0	20	
2,2-Dichloropropane	ND	4.3						0	0	20	
2-Chlorotoluene	ND	4.3						0	0	20	
4-Chlorotoluene	ND	4.3						0	0	20	
4-Isopropyltoluene	ND	4.3						0	0	20	
Benzene	ND	4.3						0	0	20	
Bromobenzene	ND	4.3						0	0	20	
Bromodichloromethane	ND	4.3						0	0	20	
Bromoform	ND	4.3						0	0	20	
Bromomethane	ND	4.3						0	0	20	
Carbon tetrachloride	ND	4.3						0	0	20	
Chlorobenzene	ND	4.3						0	0	20	
Chloroethane	ND	4.3						0	0	20	
Chloroform	ND	4.3						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **118185-008CDUP** SampType: **DUP** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: **6/2/2011** RunNo: **133740**
Client ID: **1139-101-5.0** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	4.3						0	0	20	
cis-1,2-Dichloroethene	ND	4.3						0	0	20	
cis-1,3-Dichloropropene	ND	4.3						0	0	20	
Di-isopropyl ether	ND	4.3						0	0	20	
Dibromochloromethane	ND	4.3						0	0	20	
Dibromomethane	ND	4.3						0	0	20	
Dichlorodifluoromethane	ND	4.3						0	0	20	
Ethyl Tert-butyl ether	ND	4.3						0	0	20	
Ethylbenzene	ND	4.3						0	0	20	
Hexachlorobutadiene	ND	4.3						0	0	20	
Isopropylbenzene	ND	4.3						0	0	20	
m,p-Xylene	ND	8.7						0	0	20	
Methylene chloride	ND	4.3						0	0	20	
MTBE	ND	4.3						0	0	20	
n-Butylbenzene	ND	4.3						0	0	20	
n-Propylbenzene	ND	4.3						0	0	20	
Naphthalene	ND	4.3						0	0	20	
o-Xylene	ND	4.3						0	0	20	
sec-Butylbenzene	ND	4.3						0	0	20	
Styrene	ND	4.3						0	0	20	
Tert-amyl methyl ether	ND	4.3						0	0	20	
Tert-Butanol	ND	87						0	0	20	
tert-Butylbenzene	ND	4.3						0	0	20	
Tetrachloroethene	ND	4.3						0	0	20	
Toluene	ND	4.3						0	0	20	
trans-1,2-Dichloroethene	ND	4.3						0	0	20	
Trichloroethene	ND	4.3						0	0	20	
Trichlorofluoromethane	ND	4.3						0	0	20	
Vinyl chloride	ND	4.3						0	0	20	
Xylenes, Total	ND	13						0	0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S_5035

Sample ID: **118185-008CDUP** SampType: **DUP** TestCode: **8260_S_5035** Units: **µg/Kg** Prep Date: **6/2/2011** RunNo: **133740**
Client ID: **1139-101-5.0** Batch ID: **K11VS169** TestNo: **EPA 8260B** Analysis Date: **6/6/2011** SeqNo: **2183292**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	43.522		43.48		100	65	141		0	0	
Surr: 4-Bromofluorobenzene	39.278		43.48		90.3	57	134		0	0	
Surr: Dibromofluoromethane	43.843		43.48		101	70	128		0	0	
Surr: Toluene-d8	39.391		43.48		90.6	72	123		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **Q110608MB3LCS1** SampType: **LCS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **LCSW** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183923**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	18.430	0.50	20.00	0	92.2	70	130				
Benzene	38.220	0.50	40.00	0	95.6	70	130				
Chlorobenzene	20.290	0.50	20.00	0	101	70	130				
MTBE	18.340	0.50	20.00	0	91.7	70	130				
Toluene	40.330	0.50	40.00	0	101	70	130				
Trichloroethene	21.270	0.50	20.00	0	106	70	130				
Surr: 1,2-Dichloroethane-d4	21.390		25.00		85.6	70	130				
Surr: 4-Bromofluorobenzene	26.240		25.00		105	70	130				
Surr: Dibromofluoromethane	22.060		25.00		88.2	70	130				
Surr: Toluene-d8	24.540		25.00		98.2	70	130				

Sample ID: **Q110608MB3MS** SampType: **MS** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **ZZZZZZ** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183924**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	18.620	0.50	20.00	0	93.1	70	130				
Benzene	38.310	0.50	40.00	0	95.8	70	130				
Chlorobenzene	20.260	0.50	20.00	0	101	70	130				
MTBE	18.430	0.50	20.00	0	92.2	70	130				
Toluene	40.300	0.50	40.00	0	101	70	130				
Trichloroethene	20.830	0.50	20.00	0	104	70	130				
Surr: 1,2-Dichloroethane-d4	20.740		25.00		83.0	70	130				
Surr: 4-Bromofluorobenzene	26.250		25.00		105	70	130				
Surr: Dibromofluoromethane	21.780		25.00		87.1	70	130				
Surr: Toluene-d8	24.300		25.00		97.2	70	130				

Sample ID: **Q110608MB3MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **ZZZZZZ** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183925**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **Q110608MB3MSD** SampType: **MSD** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **ZZZZZZ** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183925**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	20.390	0.50	20.00	0	102	70	130	18.62	9.07	20	
Benzene	41.010	0.50	40.00	0	103	70	130	38.31	6.81	20	
Chlorobenzene	21.760	0.50	20.00	0	109	70	130	20.26	7.14	20	
MTBE	20.020	0.50	20.00	0	100	70	130	18.43	8.27	20	
Toluene	43.210	0.50	40.00	0	108	70	130	40.30	6.97	20	
Trichloroethene	22.200	0.50	20.00	0	111	70	130	20.83	6.37	20	
Surr: 1,2-Dichloroethane-d4	22.180		25.00		88.7	70	130		0	0	
Surr: 4-Bromofluorobenzene	27.900		25.00		112	70	130		0	0	
Surr: Dibromofluoromethane	23.350		25.00		93.4	70	130		0	0	
Surr: Toluene-d8	26.090		25.00		104	70	130		0	0	

Sample ID: **Q110608MB3** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **PBW** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183926**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
1,1-Dichloropropene	ND	0.50									
1,2,3-Trichlorobenzene	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
1,2,4-Trichlorobenzene	ND	0.50									
1,2,4-Trimethylbenzene	ND	0.50									
1,2-Dibromo-3-chloropropane	ND	0.50									
1,2-Dibromoethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,2-Dichloroethane	ND	0.50									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **Q110608MB3** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **PBW** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183926**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	ND	0.50									
1,3,5-Trimethylbenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,3-Dichloropropane	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
2,2-Dichloropropane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
4-Isopropyltoluene	ND	0.50									
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
Di-isopropyl ether	ND	0.50									
Dibromochloromethane	ND	0.50									
Dibromomethane	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
Ethyl tert-butyl ether	ND	0.50									
Ethylbenzene	ND	0.50									
Hexachlorobutadiene	ND	0.50									
Isopropylbenzene	ND	0.50									
m,p-Xylene	ND	1.0									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **Q110608MB3** SampType: **MBLK** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **PBW** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183926**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	ND	1.0									
MTBE	ND	0.50									
n-Butylbenzene	ND	0.50									
n-Propylbenzene	ND	0.50									
Naphthalene	ND	0.50									
o-Xylene	ND	0.50									
sec-Butylbenzene	ND	0.50									
Styrene	ND	0.50									
Tert-amyl methyl ether	ND	0.50									
Tert-Butanol	ND	10									
tert-Butylbenzene	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
Vinyl chloride	ND	0.50									
Xylenes, Total	ND	1.5									
Surr: 1,2-Dichloroethane-d4	25.030		25.00		100	70	130				
Surr: 4-Bromofluorobenzene	27.520		25.00		110	70	130				
Surr: Dibromofluoromethane	24.460		25.00		97.8	70	130				
Surr: Toluene-d8	25.220		25.00		101	70	130				

Sample ID: **118185-002ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **1139-100-TBW-0602** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	0.50						0	0	20	
1,1,1-Trichloroethane	ND	0.50						0	0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **118185-002ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **1139-100-TBW-0602** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethane	ND	0.50						0	0	20	
1,1-Dichloroethene	ND	0.50						0	0	20	
1,1-Dichloropropene	ND	0.50						0	0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	0	20	
1,2,3-Trichloropropane	ND	0.50						0	0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	0	20	
1,2,4-Trimethylbenzene	ND	0.50						0	0	20	
1,2-Dibromo-3-chloropropane	ND	0.50						0	0	20	
1,2-Dibromoethane	ND	0.50						0	0	20	
1,2-Dichlorobenzene	ND	0.50						0	0	20	
1,2-Dichloroethane	ND	0.50						0	0	20	
1,2-Dichloropropane	ND	0.50						0	0	20	
1,3,5-Trimethylbenzene	ND	0.50						0	0	20	
1,3-Dichlorobenzene	ND	0.50						0	0	20	
1,3-Dichloropropane	ND	0.50						0	0	20	
1,4-Dichlorobenzene	ND	0.50						0	0	20	
2,2-Dichloropropane	ND	0.50						0	0	20	
2-Chlorotoluene	ND	0.50						0	0	20	
4-Chlorotoluene	ND	0.50						0	0	20	
4-Isopropyltoluene	ND	0.50						0	0	20	
Benzene	ND	0.50						0	0	20	
Bromobenzene	ND	0.50						0	0	20	
Bromodichloromethane	ND	0.50						0	0	20	
Bromoform	ND	0.50						0	0	20	
Bromomethane	ND	0.50						0	0	20	
Carbon tetrachloride	ND	0.50						0	0	20	
Chlorobenzene	ND	0.50						0	0	20	
Chloroethane	ND	0.50						0	0	20	
Chloroform	ND	0.50						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **118185-002ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **1139-100-TBW-0602** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	0.50						0	0	20	
cis-1,2-Dichloroethene	ND	0.50						0	0	20	
cis-1,3-Dichloropropene	ND	0.50						0	0	20	
Di-isopropyl ether	ND	0.50						0	0	20	
Dibromochloromethane	ND	0.50						0	0	20	
Dibromomethane	ND	0.50						0	0	20	
Dichlorodifluoromethane	ND	0.50						0	0	20	
Ethyl tert-butyl ether	ND	0.50						0	0	20	
Ethylbenzene	ND	0.50						0	0	20	
Hexachlorobutadiene	ND	0.50						0	0	20	
Isopropylbenzene	ND	0.50						0	0	20	
m,p-Xylene	ND	1.0						0	0	20	
Methylene chloride	ND	1.0						0	0	20	
MTBE	ND	0.50						0	0	20	
n-Butylbenzene	ND	0.50						0	0	20	
n-Propylbenzene	ND	0.50						0	0	20	
Naphthalene	ND	0.50						0	0	20	
o-Xylene	ND	0.50						0	0	20	
sec-Butylbenzene	ND	0.50						0	0	20	
Styrene	ND	0.50						0	0	20	
Tert-amyl methyl ether	ND	0.50						0	0	20	
Tert-Butanol	ND	10						0	0	20	
tert-Butylbenzene	ND	0.50						0	0	20	
Tetrachloroethene	ND	0.50						0	0	20	
Toluene	ND	0.50						0	0	20	
trans-1,2-Dichloroethene	ND	0.50						0	0	20	
Trichloroethene	ND	0.50						0	0	20	
Trichlorofluoromethane	ND	0.50						0	0	20	
Vinyl chloride	ND	0.50						0	0	20	
Xylenes, Total	ND	1.5						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_WP_LL

Sample ID: **118185-002ADUP** SampType: **DUP** TestCode: **8260_WP_LL** Units: **µg/L** Prep Date: RunNo: **133773**
Client ID: **1139-100-TBW-0602** Batch ID: **Q11VW090** TestNo: **EPA 8260B** Analysis Date: **6/8/2011** SeqNo: **2183930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	23.470		25.00		93.9	70	130		0	20	
Surr: 4-Bromofluorobenzene	26.110		25.00		104	70	130		0	20	
Surr: Dibromofluoromethane	23.260		25.00		93.0	70	130		0	20	
Surr: Toluene-d8	23.710		25.00		94.8	70	130		0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_S_SEMILL_AMECG

Sample ID: **MB-73383** SampType: **MBLK** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **PBS** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182836**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C11-C12	ND	3.0									
T/R Hydrocarbons: C13-C14	ND	3.0									
T/R Hydrocarbons: C15-C16	ND	3.0									
T/R Hydrocarbons: C17-C18	ND	3.0									
T/R Hydrocarbons: C19-C20	ND	3.0									
T/R Hydrocarbons: C21-C22	ND	3.0									
T/R Hydrocarbons: C23-C24	ND	3.0									
T/R Hydrocarbons: C25-C26	ND	3.0									
T/R Hydrocarbons: C27-C28	ND	3.0									
T/R Hydrocarbons: C29-C30	ND	3.0									
T/R Hydrocarbons: C31-C32	ND	3.0									
T/R Hydrocarbons: C9-C10	ND	3.0									
Surr: 2-Fluorobiphenyl	5.104		12.00		42.5	27	100				

Sample ID: **LCS-73383** SampType: **LCS** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **LCSS** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182837**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	10.365	3.0	24.00	0	43.2	35	118				
T/R Hydrocarbons: C21-C22	11.301	3.0	24.00	0	47.1	35	118				
T/R Hydrocarbons: C25-C26	11.410	3.0	24.00	0	47.5	35	118				
T/R Hydrocarbons: C29-C30	11.817	3.0	24.00	0	49.2	35	118				
Surr: 2-Fluorobiphenyl	6.691		12.00		55.8	27	100				

Sample ID: **118185-014ADUP** SampType: **DUP** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **1139-104-10.0** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182839**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C11-C12	ND	3.0						0	0	20	
T/R Hydrocarbons: C13-C14	ND	3.0						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_S_SEMILL_AMECG

Sample ID: **118185-014ADUP** SampType: **DUP** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **1139-104-10.0** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182839**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C15-C16	ND	3.0						0	0	20	
T/R Hydrocarbons: C17-C18	ND	3.0						0	0	20	
T/R Hydrocarbons: C19-C20	ND	3.0						0	0	20	
T/R Hydrocarbons: C21-C22	ND	3.0						0	0	20	
T/R Hydrocarbons: C23-C24	ND	3.0						0	0	20	
T/R Hydrocarbons: C25-C26	ND	3.0						0	0	20	
T/R Hydrocarbons: C27-C28	ND	3.0						0	0	20	
T/R Hydrocarbons: C29-C30	ND	3.0						0	0	20	
T/R Hydrocarbons: C31-C32	ND	3.0						0	0	20	
T/R Hydrocarbons: C9-C10	ND	3.0						0	0	20	
Surr: 2-Fluorobiphenyl	4.207		12.00		35.1	27	100		0	0	

Sample ID: **118185-008AMS** SampType: **MS** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **1139-101-5.0** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182845**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	10.710	3.0	24.00	0	44.6	25	129				
T/R Hydrocarbons: C21-C22	12.325	3.0	24.00	0	51.4	25	129				
T/R Hydrocarbons: C25-C26	13.095	3.0	24.00	0	54.6	25	129				
T/R Hydrocarbons: C29-C30	14.474	3.0	24.00	0	60.3	25	129				
Surr: 2-Fluorobiphenyl	6.645		12.00		55.4	27	100				

Sample ID: **118185-008AMSD** SampType: **MSD** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **1139-101-5.0** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182846**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	10.145	3.0	24.00	0	42.3	25	129	10.71	5.42	20	
T/R Hydrocarbons: C21-C22	11.776	3.0	24.00	0	49.1	25	129	12.32	4.56	20	
T/R Hydrocarbons: C25-C26	12.503	3.0	24.00	0	52.1	25	129	13.10	4.63	20	
T/R Hydrocarbons: C29-C30	14.253	3.0	24.00	0	59.4	25	129	14.47	1.54	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_S_SEMILL_AMECG

Sample ID: **118185-008AMSD** SampType: **MSD** TestCode: **HC_S_SEMIL** Units: **mg/Kg** Prep Date: **6/7/2011** RunNo: **133709**
Client ID: **1139-101-5.0** Batch ID: **73383** TestNo: **EPA 8015B(M EPA 3550B** Analysis Date: **6/7/2011** SeqNo: **2182846**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Fluorobiphenyl	6.451		12.00		53.8	27	129		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_S_VOA5035AMECG

Sample ID: **E110607LC1** SampType: **LCS** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: RunNo: **133721**
Client ID: **LCSS** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183003**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	5.685	1.0	5.000	0	114	70	130				
Surr: Bromofluorobenzene (FID)	127.902		100.0		128	51	161				

Sample ID: **E110607MB1MS** SampType: **MS** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: RunNo: **133721**
Client ID: **ZZZZZZ** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183004**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	5.600	1.0	5.000	0	112	41	146				
Surr: Bromofluorobenzene (FID)	129.194		100.0		129	51	161				

Sample ID: **E110607MB1MSD** SampType: **MSD** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: RunNo: **133721**
Client ID: **ZZZZZZ** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183005**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	5.693	1.0	5.000	0	114	41	146	5.600	1.65	20	
Surr: Bromofluorobenzene (FID)	128.380		100.0		128	51	161		0	0	

Sample ID: **E110607MB1** SampType: **MBLK** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: RunNo: **133721**
Client ID: **PBS** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183006**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	ND	1.0									
Surr: Bromofluorobenzene (FID)	103.196		100.0		103	51	161				

Sample ID: **118185-012FDUP** SampType: **DUP** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: **6/2/2011** RunNo: **133721**
Client ID: **1139-102-10.0** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183012**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	1.747	0.92						2.096	18.2	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_S_VOA5035AMECG

Sample ID: **118185-012FDUP** SampType: **DUP** TestCode: **HC_S_VOA50** Units: **mg/Kg** Prep Date: **6/2/2011** RunNo: **133721**
Client ID: **1139-102-10.0** Batch ID: **E11VS213** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183012**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	163.781		91.74		179	51	161		0	0	S

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_W_SEMILL_AMEC

Sample ID: **MB-73376** SampType: **MBLK** TestCode: **HC_W_SEMI** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133708**
Client ID: **PBW** Batch ID: **73376** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **6/7/2011** SeqNo: **2182829**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C11-C12	ND	0.020									
T/R Hydrocarbons: C13-C14	ND	0.020									
T/R Hydrocarbons: C15-C16	ND	0.020									
T/R Hydrocarbons: C17-C18	ND	0.020									
T/R Hydrocarbons: C19-C20	ND	0.020									
T/R Hydrocarbons: C21-C22	ND	0.020									
T/R Hydrocarbons: C23-C24	ND	0.020									
T/R Hydrocarbons: C25-C26	ND	0.020									
T/R Hydrocarbons: C27-C28	ND	0.020									
T/R Hydrocarbons: C29-C30	ND	0.020									
T/R Hydrocarbons: C31-C32	ND	0.020									
T/R Hydrocarbons: C9-C10	ND	0.020									
Surr: 2-Fluorobiphenyl	0.034		0.08000		42.3	34	110				

Sample ID: **LCS-73376** SampType: **LCS** TestCode: **HC_W_SEMI** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133708**
Client ID: **LCSW** Batch ID: **73376** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **6/7/2011** SeqNo: **2182830**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	0.093	0.020	0.1600	0	58.1	52	128				
T/R Hydrocarbons: C21-C22	0.112	0.020	0.1600	0	70.0	52	128				
T/R Hydrocarbons: C25-C26	0.113	0.020	0.1600	0	70.6	52	128				
T/R Hydrocarbons: C29-C30	0.118	0.020	0.1600	0	73.5	52	128				
Surr: 2-Fluorobiphenyl	0.050		0.08000		62.8	34	110				

Sample ID: **MB-73376MS** SampType: **MS** TestCode: **HC_W_SEMI** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133708**
Client ID: **ZZZZZZ** Batch ID: **73376** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **6/7/2011** SeqNo: **2182831**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	0.105	0.020	0.1600	0	65.5	52	128				
T/R Hydrocarbons: C21-C22	0.116	0.020	0.1600	0	72.7	52	128				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_W_SEMILL_AMEC

Sample ID: **MB-73376MS** SampType: **MS** TestCode: **HC_W_SEMI** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133708**
Client ID: **ZZZZZZ** Batch ID: **73376** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **6/7/2011** SeqNo: **2182831**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C25-C26	0.117	0.020	0.1600	0	73.1	52	128				
T/R Hydrocarbons: C29-C30	0.121	0.020	0.1600	0	75.6	52	128				
Surr: 2-Fluorobiphenyl	0.050		0.08000		62.4	34	110				

Sample ID: **MB-73376MSD** SampType: **MSD** TestCode: **HC_W_SEMI** Units: **mg/L** Prep Date: **6/7/2011** RunNo: **133708**
Client ID: **ZZZZZZ** Batch ID: **73376** TestNo: **EPA 8015B(M EPA 3510C** Analysis Date: **6/7/2011** SeqNo: **2182832**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C13-C14	0.107	0.020	0.1600	0	66.7	52	128	0.1048	1.69	20	
T/R Hydrocarbons: C21-C22	0.119	0.020	0.1600	0	74.1	52	128	0.1163	1.96	20	
T/R Hydrocarbons: C25-C26	0.119	0.020	0.1600	0	74.5	52	128	0.1170	1.94	20	
T/R Hydrocarbons: C29-C30	0.123	0.020	0.1600	0	77.0	52	128	0.1210	1.87	20	
Surr: 2-Fluorobiphenyl	0.052		0.08000		64.4	34	110		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_W_VOALLAMECG

Sample ID: **M110607MB2** SampType: **MBLK** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **PBW** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183404**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	ND	0.050									
Surr: Bromofluorobenzene (FID)	89.657		100.0		89.7	70	130				

Sample ID: **118185-004BDUP** SampType: **DUP** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **1139-100-FB-060211** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183406**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	ND	0.050						0	0	20	
Surr: Bromofluorobenzene (FID)	90.323		100.0		90.3	70	130		0	0	

Sample ID: **M110607MB2MS** SampType: **MS** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **ZZZZZZ** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183409**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	1.058	0.050	1.000	0	106	70	130				
Surr: Bromofluorobenzene (FID)	91.275		100.0		91.3	70	130				

Sample ID: **M110607MB2MSD** SampType: **MSD** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **ZZZZZZ** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183410**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	1.065	0.050	1.000	0	106	70	130	1.058	0.659	20	
Surr: Bromofluorobenzene (FID)	92.066		100.0		92.1	70	130		0	0	

Sample ID: **M110607LCS4** SampType: **LCS** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **LCSW** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183429**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
T/R Hydrocarbons: C4-C8	1.025	0.050	1.000	0	103	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118185
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: HC_W_VOALLAMECG

Sample ID: **M110607LCS4** SampType: **LCS** TestCode: **HC_W_VOAL** Units: **mg/L** Prep Date: RunNo: **133744**
Client ID: **LCSW** Batch ID: **M11VW113** TestNo: **EPA 8015B(M** Analysis Date: **6/7/2011** SeqNo: **2183429**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Bromofluorobenzene (FID)	92.089		100.0		92.1	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

ATTN: Diane Galvin

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O. #: ____ Quote #: ____
Logged By: ____ Date: 6/3/11

NOTE: Please include your Quote No. to ensure proper pricing of your project.

FOR LABORATORY USE ONLY

Method of Transport: ☑ Client ☐ ATL ☐ FedEx ☐ OnTrac ☐ GSO ☐ Other:

Sample Condition Upon Receipt (TB: 0.2)
1. CHILLED 0.2 Y ☑ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☑
5. # OF SPLS MATCH COC Y ☑ N ☐
6. PRESERVED Y ☐ N ☑

Client: AMEC Geomatrix
Attention: D. Paul / V. Robino
Address: 510 Superior Ave. Ste 210
City: Newport Beach State: CA Zip Code: 92663
Tel: 949 642 0245
Fax: " " 4444

Project Name: Route 405 Temple Ave Bridge Repair
Project #: ADL Invoice 0153240170
Sampler: VR / EG (Signature) Eric Stark

Relinquished by: (Signature and Printed Name)	Date	Time	Received by: (Signature and Printed Name)	Date	Time
V. Robino	6/2/11	1949	F Ponza	6/2/11	1949

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: ____
Print Name Date
Signature

Send Report To: Attn: ____ Co: ____ Addr: ____ City: State: Zip:

Bill To: Attn: ____ Co: ____ Addr: ____ City: State: Zip:

Special Instructions/Comments:
GC Speciation: C_4-C_8 & individual speciation to C32.
Report MPL & PQL.
Samples on ice.

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8021 (BTEX), 8015B (DRO), TITLE 22 / CAM 17 (6010 / 7000), LUFT (GC/MS 8260B), TPH C4-C32 GC speciation, Lead (6010)

SPECIFY APPROPRIATE MATRIX: SEDIMENT, SOLID, SOIL, DRINKING WATER, GROUND WATER, WASTEWATER, STORMWATER, AQUEOUS (water)

QA/QC: RTNE ☐ CT ☐ Legal ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample Description: Sample ID / Location	Date	Time	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	118185-1	TEMPERATURE BLANK	6/2/11	—	5	1			
	-2	1139-100-TBW-060211 V.R		0900		3		✓	40ml VOA
	-3	1139-100-SW-060211 V.R		0935		8		✓	6x VOA, 1 poly, 1 amber
	-4	1139-100-FB-060211-1		0940		8		✓	
	-5	1139-100-EB-060211-1		1030		8		✓	
	-6	1139-100-EB-060211-2		1040		1			1 poly
	-7	1139-100-FB-060211-2		1042		1			
	-8	1139-101-5.0		1220		7		✓	6x VOA (5035), 1x4oz jar
	-9	1139-101-10.0		1320		7		✓	
	-10	1139-101-15.0		1407		7		✓	6x VOA (5035) 1x4oz jar.
	-11	1139-102-5.0		1445		7		✓	
	-12	1139-102-10.0		1535		7		✓	
	-13	1139-104-5.0		1735		7		✓	
	-14	1139-104-10.0		1810		7		✓	

VR 6/2/11

- TAT starts 8AM the following day if samples received after 5 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

June 22, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 118186

Duane Paul/Vinnie Robino
AMEC Geomatrix
510 Superior Avenue, Suite 200
Newport Beach, CA 92663-3627

TEL: (949) 642-0245
FAX: (949) 642-4474

RE: Route 405 Temple Ave Bridge Repair ADL, 01

Attention: Duane Paul/Vinnie Robino

Enclosed are the results for sample(s) received on June 02, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter and the case narrative are an integral part of this analytical report and cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: AMEC Geomatrix
Project: Route 405 Temple Ave Bridge Repair ADL, 015
Lab Order: 118186

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

RPD for Duplicate (DUP) is outside criteria for sample 118186-010ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Analytical Comments for Method 7420

Dilution was necessary for sample 118186-001A, due to sample matrix.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	SRB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-001A	1139-101-0.0	1100	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-002A	1139-101-1.0	62	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-003A	1139-101-2.0	24	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-004A	1139-101-3.0	17	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-005A	1139-102-0.0	74	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-006A	1139-102-1.0	21	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-007A	1139-102-2.0	29	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-008A	1139-102-3.0	22	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-009A	1139-103-0.0	60	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-010A	1139-103-1.0	52	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-011A	1139-103-2.0	28	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-012A	1139-103-3.0	9.8	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-013A	1139-101-5.0	9.9	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-014A	1139-101-7.5	6.2	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-015A	1139-101-10.0	5.9	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-016A	1139-102-5.0	42	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-017A	1139-102-7.5	14	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-018A	1139-102-10.0	26	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

LEAD BY ICP
EPA 6010B

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	SRB

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-019A	1139-104-0.0	13	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-020A	1139-104-1.0	5.3	mg/Kg	73410	0.13	5.0		1	6/2/2011	6/8/2011
118186-021A	1139-104-2.0	10	mg/Kg	73411	0.13	5.0		1	6/2/2011	6/8/2011
118186-022A	1139-104-5.0	3.4	mg/Kg	73411	0.13	5.0	J	1	6/2/2011	6/8/2011
118186-023A	1139-104-7.5	3.7	mg/Kg	73411	0.13	5.0	J	1	6/2/2011	6/8/2011
118186-024A	1139-104-10.0	11	mg/Kg	73411	0.13	5.0		1	6/2/2011	6/8/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION
WET DI/ EPA 7420

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-001A	1139-101-0.0	ND	mg/L	73712	0.21	0.25		1	6/2/2011	6/21/2011

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

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Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (STLC)
WET/ EPA 7420

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-001A	1139-101-0.0	29	mg/L	73550	1.0	1.2		5	6/2/2011	6/15/2011
118186-002A	1139-101-1.0	1.6	mg/L	73550	0.21	0.25		1	6/2/2011	6/15/2011
118186-005A	1139-102-0.0	2.6	mg/L	73550	0.21	0.25		1	6/2/2011	6/15/2011
118186-009A	1139-103-0.0	3.1	mg/L	73550	0.21	0.25		1	6/2/2011	6/15/2011
118186-010A	1139-103-1.0	1.9	mg/L	73550	0.21	0.25		1	6/2/2011	6/15/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-001A	1139-101-0.0	0.44	mg/L	73604	0.21	0.25		1	6/2/2011	6/15/2011

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
		Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

Date: 6/22/2011

ANALYTICAL RESULTS

pH
EPA 9045C

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	pH	**Analyst:**	PT

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-001A	1139-101-0.0	7.9	pH Units	R133639	0.10	0.10		1	6/2/2011	6/6/2011
118186-005A	1139-102-0.0	7.9	pH Units	R133639	0.10	0.10		1	6/2/2011	6/6/2011
118186-010A	1139-103-1.0	7.2	pH Units	R133639	0.10	0.10		1	6/2/2011	6/6/2011
118186-019A	1139-104-0.0	7.5	pH Units	R133639	0.10	0.10		1	6/2/2011	6/6/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-73410A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **PBS** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183320**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.154	5.0									J

Sample ID: **LCS-73410** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **LCSS** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183321**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	278.434	5.0	250.0	0.1542	111	80	120				

Sample ID: **118186-010A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **1139-103-1.0** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183332**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	35.208	5.0						52.32	39.1	20	R

Sample ID: **118186-010A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **1139-103-1.0** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183333**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	254.432	5.0	250.0	52.32	80.8	34	126				

Sample ID: **MB-73410B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **PBS** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183334**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.374	5.0									J

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **118186-020A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **1139-104-1.0** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183345**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.840	5.0						5.277	0	20	J

Sample ID: **118186-020A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **1139-104-1.0** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183346**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	225.649	5.0	250.0	5.277	88.1	34	126				

Sample ID: **118186-020A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133741**
Client ID: **1139-104-1.0** Batch ID: **73410** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183347**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	221.218	5.0	250.0	5.277	86.4	34	126	225.6	1.98	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **MB-73411A** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **PBS** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183348**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.196	5.0									J

Sample ID: **LCS-73411** SampType: **LCS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **LCSS** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183349**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	269.154	5.0	250.0	0.1959	108	80	120				

Sample ID: **118236-006A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **ZZZZZZ** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183360**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.141	5.0						2.346	0	20	J

Sample ID: **118236-006A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **ZZZZZZ** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183361**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	228.965	5.0	250.0	2.346	90.6	34	126				

Sample ID: **MB-73411B** SampType: **MBLK** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **PBS** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.234	5.0									J

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPB

Sample ID: **118236-016A-DUP** SampType: **DUP** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **ZZZZZZ** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183373**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.943	5.0						1.971	0	20	J

Sample ID: **118236-016A-MS** SampType: **MS** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **ZZZZZZ** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183374**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	233.974	5.0	250.0	1.971	92.8	34	126				

Sample ID: **118236-016A-MSD** SampType: **MSD** TestCode: **6010_SPB** Units: **mg/Kg** Prep Date: **6/8/2011** RunNo: **133743**
Client ID: **ZZZZZZ** Batch ID: **73411** TestNo: **EPA 6010B** **EPA 3050M** Analysis Date: **6/8/2011** SeqNo: **2183375**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	232.290	5.0	250.0	1.971	92.1	34	126	234.0	0.722	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_DI

Sample ID: **LCS-73712** SampType: **LCS** TestCode: **7420_DI** Units: **mg/L** Prep Date: **6/18/2011** RunNo: **134241**
Client ID: **LCSS** Batch ID: **73712** TestNo: **WET DI/ EPA WET** Analysis Date: **6/21/2011** SeqNo: **2193857**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.980	0.25	5.000	0	99.6	80	120				

Sample ID: **MB-73712B** SampType: **MBLK** TestCode: **7420_DI** Units: **mg/L** Prep Date: **6/18/2011** RunNo: **134241**
Client ID: **PBS** Batch ID: **73712** TestNo: **WET DI/ EPA WET** Analysis Date: **6/21/2011** SeqNo: **2193869**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **118186-001A-DUP** SampType: **DUP** TestCode: **7420_DI** Units: **mg/L** Prep Date: **6/18/2011** RunNo: **134241**
Client ID: **1139-101-0.0** Batch ID: **73712** TestNo: **WET DI/ EPA WET** Analysis Date: **6/21/2011** SeqNo: **2193872**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **118186-001A-MS** SampType: **MS** TestCode: **7420_DI** Units: **mg/L** Prep Date: **6/18/2011** RunNo: **134241**
Client ID: **1139-101-0.0** Batch ID: **73712** TestNo: **WET DI/ EPA WET** Analysis Date: **6/21/2011** SeqNo: **2193873**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.877	0.25	5.000	0	97.5	70	130				

Sample ID: **118186-001A-MSD** SampType: **MSD** TestCode: **7420_DI** Units: **mg/L** Prep Date: **6/18/2011** RunNo: **134241**
Client ID: **1139-101-0.0** Batch ID: **73712** TestNo: **WET DI/ EPA WET** Analysis Date: **6/21/2011** SeqNo: **2193874**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.919	0.25	5.000	0	98.4	70	130	4.877	0.856	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_ST

Sample ID: **MB-73550A** SampType: **MBLK** TestCode: **7420_ST** Units: **mg/L** Prep Date: **6/13/2011** RunNo: **134007**
Client ID: **PBS** Batch ID: **73550** TestNo: **WET/ EPA 74 WET** Analysis Date: **6/15/2011** SeqNo: **2188781**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-73550** SampType: **LCS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **6/13/2011** RunNo: **134007**
Client ID: **LCSS** Batch ID: **73550** TestNo: **WET/ EPA 74 WET** Analysis Date: **6/15/2011** SeqNo: **2188782**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	4.660	0.25	5.000	0	93.2	80	120				

Sample ID: **118186-010A-DUP** SampType: **DUP** TestCode: **7420_ST** Units: **mg/L** Prep Date: **6/13/2011** RunNo: **134007**
Client ID: **1139-103-1.0** Batch ID: **73550** TestNo: **WET/ EPA 74 WET** Analysis Date: **6/15/2011** SeqNo: **2188790**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.851	0.25						1.927	4.00	20	

Sample ID: **118186-010A-MS** SampType: **MS** TestCode: **7420_ST** Units: **mg/L** Prep Date: **6/13/2011** RunNo: **134007**
Client ID: **1139-103-1.0** Batch ID: **73550** TestNo: **WET/ EPA 74 WET** Analysis Date: **6/15/2011** SeqNo: **2188791**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.702	0.25	5.000	1.927	95.5	80	120				

Sample ID: **118186-010A-MSD** SampType: **MSD** TestCode: **7420_ST** Units: **mg/L** Prep Date: **6/13/2011** RunNo: **134007**
Client ID: **1139-103-1.0** Batch ID: **73550** TestNo: **WET/ EPA 74 WET** Analysis Date: **6/15/2011** SeqNo: **2188792**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	6.785	0.25	5.000	1.927	97.2	80	120	6.702	1.24	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-73604A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189216**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-73586A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189217**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-73604** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **LCSS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189218**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.125	0.25	1.000	0	113	80	120				

Sample ID: **118095-037A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.885	0.25						0.9496	6.99	20	

Sample ID: **118095-037A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189226**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.508	0.25	2.500	0.9496	102	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-73604B** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189227**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-73586B TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189228**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **118236-029A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189240**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.665	0.25						0.6698	0.784	20	

Sample ID: **118236-029A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189241**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.245	0.25	2.500	0.6698	103	70	130				

Sample ID: **118236-029A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134024**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/15/2011** SeqNo: **2189242**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.276	0.25	2.500	0.6698	104	70	130	3.245	0.946	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-73604A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134063**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/16/2011** SeqNo: **2189908**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-73586A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134063**
Client ID: **PBS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/16/2011** SeqNo: **2189909**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-73604** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134063**
Client ID: **LCSS** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/16/2011** SeqNo: **2189910**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	1.003	0.25	1.000	0	100	80	120				

Sample ID: **118095-037A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134063**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/16/2011** SeqNo: **2189916**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.689	0.25						0.6952	0.889	20	

Sample ID: **118095-037A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/15/2011** RunNo: **134063**
Client ID: **ZZZZZZ** Batch ID: **73604** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/16/2011** SeqNo: **2189917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	3.387	0.25	2.500	0.6952	108	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
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ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-73764A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **PBS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-73744A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **PBS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-73764** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **LCSS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.897	0.25	1.000	0	89.7	80	120				

Sample ID: **118309-094A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **118309-094A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193931**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.462	0.25	2.500	0	98.5	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **118309-094A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193932**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.488	0.25	2.500	0	99.5	70	130	2.462	1.04	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 9045_S

Sample ID: **118186-010ADUP** SampType: **DUP** TestCode: **9045_S** Units: **pH Units** Prep Date: RunNo: **133639**
Client ID: **1139-103-1.0** Batch ID: **R133639** TestNo: **EPA 9045C** Analysis Date: **6/6/2011** SeqNo: **2181824**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.450	0.10						7.210	3.27	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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ATTN: Diane Galvin

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O. #: Quote #:
Logged By: Date: 6/2/11

NOTE: Please include your Quote No. to ensure proper pricing of your project.

FOR LABORATORY USE ONLY

Method of Transport: ☑ Client ☐ ATL ☐ FedEx ☐ OnTrac ☐ GSO ☐ Other:

TB = 5.2

Sample Condition Upon Receipt:
1. CHILLED 5.2 Y ☑ N ☐
2. HEADSPACE (VOA) Y ☐ N ☐
3. CONTAINER INTACT Y ☑ N ☐
4. SEALED Y ☐ N ☑
5. # OF SPLS MATCH COC Y ☑ N ☐
6. PRESERVED Y ☐ N ☑

Client: AMEC Geomatrix
Attention: P. Paul / V. Robino
Address: 510 Superior Ave Ste 200
City: Newport Beach State: CA Zip Code: 92663
Tel: 949 642 0245
Fax: " " 4494

Project Name: Temple Avenue Route 405 Bridge Repair, Addinvestigation
Project #: 0153240
Sampler: VR / EG (Signature) Eric Gustafson

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
V. Robino	6-2-11	1949	APDIWA	6/2/11	1949

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter:
Print Name Date
Signature

Send Report To: Attn: Co: Addr: City: State: Zip:

Bill To: Attn: Co: Addr: City: State: Zip:

Special Instructions/Comments:
Temp blank included. Report MDL & PQL
TTLC results ≥ 50mg/kg analyze by STLC WET
STLC WET results ≥ 5mg/L analyze by
STLC WET-DI. TTLC results ≥ 1000 mg/kg
analyze by TCLP. Samples on ice.

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides), 8082 (PCB), 8260B (Volatiles), 8270C (BNA), 6010B (Total Metal), 8015B (GRO) / 8021 (BTEX), 8015B (DRO), TITLE 22 / CAM 17 (6010 / 7000), Total Lead EPA 6010, pH EPA

SPECIFY APPROPRIATE MATRIX: SEDIMENT, SOLID, SOIL, DRINKING WATER, GROUND WATER, WASTEWATER, STORMWATER, AQUEOUS

PRESERVATION

QA/QC: RTNE ☐ CT ☐ Legal ☐ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A	8082	8260B	8270C	6010B	8015B (GRO)	8015B (DRO)	TITLE 22 / CAM 17	Total Lead EPA 6010	pH EPA	SEDIMENT	SOLID	SOIL	DRINKING WATER	GROUND WATER	WASTEWATER	STORMWATER	AQUEOUS	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	118136-1	1139-101-0.0	6/2/11	1024								X	X			X							5	1			4 oz Glass
	-2	1139-101-1.0		1035								X				X								1			
	-3	1139-101-2.0		1045								X				X								1			
	-4	1139-101-3.0		1055								X				X								1			
	-5	1139-102-0.0		1103								X	X			X								1			
	-6	1139-102-1.0		1108								X				X								1			
	-7	1139-102-2.0		1114								X				X								1			
	-8	1139-102-3.0		1122								X				X								1			
	-9	1139-103-0.0		1135								X				X								1			
	-10	1139-103-1.0		1145								X	X			X								1			
	-11	1139-103-2.0		1150								X				X								1			
	-12	1139-103-3.0		1155								X				X								1			
	-13	1139-101-5.0		1220								X				X								1			
	-14	1139-101-7.5		1250								X				X								1			
	-15	1139-101-10.0		1320								X				X								1			
	-16	1139-102-5.0		1445								X				X								1			
	-17	1139-102-7.5		1510								X				X								1			
	-18	1139-102-10.0		1535								X				X								1			
	-19	1139-104-0.0		1700								X	X			X								1			
	-20	1139-104-1.0		1709								X				X								1			
	-21	1139-104-2.0		1715								X				X								1			
	~~1139-104-3.0~~											X				X								1			

VR

■ TAT starts 8AM the following day if samples received after 5 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Rev. 2010-0325

ATTN: Drew Galvin

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O. #: _____ Quote #: _____
Logged By: _____ Date: _____

NOTE: Please include your Quote No. to ensure proper pricing of your project.

FOR LABORATORY USE ONLY

Method of Transport: ☑ Client ☐ ATL ☐ FedEx ☐ OnTrac ☐ GSO ☐ Other: _____

Sample Condition Upon Receipt

1. CHILLED	Y ☑ N ☐	4. SEALED	Y ☐ N ☐
2. HEADSPACE (VOA)	Y ☐ N ☐	5. # OF SPLS MATCH COC	Y ☐ N ☐
3. CONTAINER INTACT	Y ☐ N ☐	6. PRESERVED	Y ☐ N ☐

Client: AMEC Geomatrix
Attention:
Address: 510 Superior Avenue Ste 200
City: Newport Beach State: CA Zip Code: 92663
Tel: 949 642 0245
Fax: -- -- 4474

Project Name: Route 405 Temple Ave Bridge Repair, ADL Investigation
Project #: 01572401 70
Sampler: VR/EG (Signature)

Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
V. Robino	6/2/11	1949	FPDiwa	6/2/11	1949

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: _____ Print Name _____ Date _____ Signature

Send Report To: Attn: _____ Co: _____ Addr: _____ City: _____ State: _____ Zip: _____

Bill To: Attn: _____ Co: _____ Addr: _____ City: _____ State: _____ Zip: _____

Special Instructions/Comments: See note page 1 of 2

Samples on ice.

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample :$2.00 / sample /mo (after 45 days)
- Records: $1 /ATL workorder /mo (after 1 year)

Circle or Add Analysis(es) Requested

SPECIFY APPROPRIATE MATRIX

QA/QC: RTNE ☐ CT ☐ Legal ☐ SWRCB ☐ Logcode _____ OTHER _____

ITEM	LAB USE ONLY: Batch #: Lab No.	Sample Description: Sample ID / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / 8021 (BTEX)	TITLE 22 / CAM 17 (6010 / 7000)	TOTAL Lead EPA 6010	pH EPA 9045	SEDIMENT	SOLID	SOIL	DRINKING WATER	GROUND WATER	WASTEWATER	STORMWATER	AQUEOUS	TAT	Container(s) #	Type	PRESERVATION	REMARKS
	118186-22	1139-104-5.0	6/2/11	1735								X				X						5	1			40 z glass
	-23	1139-104-7.5		1750								X				X							1			
	-24	1139-104-10.0		1810								X				X							1			

VR 6/2/11

- TAT starts 8AM the following day if samples received after 5 PM

TAT: ☐ A = Overnight ≤ 24 hrs ☐ B = Emergency Next Workday ☐ C = Critical 2 Workdays ☐ D = Urgent 3 Workdays ☐ E = Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=HCl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

Diane Galvan

From: Carmen Aguila
Sent: Wednesday, June 08, 2011 9:01 AM
To: Diane Galvan
Cc: Ed Caballero - ATLSH; Eddie Rodriguez; Edgar Morrison
Subject: Fw: Route 405 Temple Ave Bridge Repair ADL Investigation ,0153240170

From: "Robino, Vinnie" <Vinnie.Robino@amec.com>
Date: Wed, 8 Jun 2011 11:44:51 -0400
To: 'carmen@atlglobal.com'<carmen@atlglobal.com>
Subject: Re: Route 405 Temple Ave Bridge Repair ADL Investigation , 0153240170

Yes, filter the sample then preserve prior to analysis.

Thanks.

From: Carmen Aguila [mailto:carmen@atlglobal.com]
Sent: Tuesday, June 07, 2011 01:45 PM
To: Robino, Vinnie
Cc: Diane Galvan <diane@atlglobal.com>
Subject: Route 405 Temple Ave Bridge Repair ADL Investigation , 0153240170

Hi Vinnie,

I would like to verify if the water samples for Total lead needs to be filtered and preserved prior to analysis since the containers requested are not preserved. Please advise.

Attached is a copy of the coc.

Thank you,

Carmen Aguila
Sample Control Manager

Advanced Technology Laboratories
www.atlglobal.com
Tel: (562) 989-4045 ext. 245
Fax: (562) 989-4040
Advanced Technology Laboratories is a full-service environmental lab providing organic and inorganic analyses of soil, water, wastewater, storm water and hazardous waste samples. ATL is accredited by the State of California, NELAP and State of Nevada and holds various SBE, DBE and MBE certificates and a USDA soil permit. ATL takes pride in providing our customers with quick turnaround time, excellent customer service and defensible data while offering very competitive rates. *Advanced Technology Labs - Your Partner for Quality Environmental Testing*
This message is intended for the use of the individual or entity to which it is addressed. This may contain information that is privileged, confidential, and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify us immediately by telephone and delete the original message. Thank you.

June 22, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 118186

Duane Paul/Vinnie Robino
AMEC Geomatrix
510 Superior Avenue, Suite 200
Newport Beach, CA 92663-3627

TEL: (949) 642-0245
FAX: (949) 642-4474

RE: Route 405 Temple Ave Bridge Repair ADL, 01

Attention: Duane Paul/Vinnie Robino

Enclosed are the results for sample(s) received on June 02, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: AMEC Geomatrix
Project: Route 405 Temple Ave Bridge Repair ADL, 015
Lab Order: 118186

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for Method 6010

RPD for Duplicate (DUP) is outside criteria for sample 118186-001ADUP; however, the Laboratory Control Sample (LCS) validated the analytical batch.

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *22-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-101-0.0
Lab Order:	118186	**Collection Date:**	6/2/2011 10:24:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118186-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS							
	EPA 3050B		**EPA 6010B**				
RunID: **ICP8_110616F**	QC Batch: **73626**				PrepDate:	**6/16/2011**	Analyst: **CBB**
Antimony	1.8	0.16	2.0	J	mg/Kg	1	6/16/2011 05:38 PM
Arsenic	0.72	0.20	1.0	J	mg/Kg	1	6/16/2011 05:38 PM
Barium	200	0.056	1.0		mg/Kg	1	6/16/2011 05:38 PM
Beryllium	ND	0.042	1.0		mg/Kg	1	6/16/2011 05:38 PM
Cadmium	1.4	0.043	1.0		mg/Kg	1	6/16/2011 05:38 PM
Chromium	30	0.13	1.0		mg/Kg	1	6/16/2011 05:38 PM
Cobalt	11	0.11	1.0		mg/Kg	1	6/16/2011 05:38 PM
Copper	47	0.18	2.0		mg/Kg	1	6/16/2011 05:38 PM
Molybdenum	0.97	0.097	1.0	J	mg/Kg	1	6/16/2011 05:38 PM
Nickel	28	0.11	1.0		mg/Kg	1	6/16/2011 05:38 PM
Selenium	ND	0.28	1.0		mg/Kg	1	6/16/2011 05:38 PM
Silver	ND	0.042	1.0		mg/Kg	1	6/16/2011 05:38 PM
Thallium	ND	0.098	1.0		mg/Kg	1	6/16/2011 05:38 PM
Vanadium	39	0.088	1.0		mg/Kg	1	6/16/2011 05:38 PM
Zinc	330	0.13	1.0		mg/Kg	1	6/16/2011 05:38 PM
MERCURY BY COLD VAPOR TECHNIQUE							
			EPA 7471A				
RunID: **AA1_110620D**	QC Batch: **73690**				PrepDate:	**6/20/2011**	Analyst: **VV**
Mercury	0.098	0.0076	0.10	J	mg/Kg	1	6/20/2011 02:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *22-Jun-11*

CLIENT:	AMEC Geomatrix	**Client Sample ID:**	1139-102-0.0
Lab Order:	118186	**Collection Date:**	6/2/2011 11:03:00 AM
Project:	Route 405 Temple Ave Bridge Repair ADL, 0	**Matrix:**	SOIL
Lab ID:	118186-005A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS							
	EPA 3050B		**EPA 6010B**				
RunID: **ICP8_110616H**	QC Batch: **73627**				PrepDate:	**6/16/2011**	Analyst: **CBB**
Antimony	1.6	0.16	2.0	J	mg/Kg	1	6/16/2011 06:39 PM
Arsenic	20	0.20	1.0		mg/Kg	1	6/16/2011 06:39 PM
Barium	210	0.056	1.0		mg/Kg	1	6/16/2011 06:39 PM
Beryllium	ND	0.042	1.0		mg/Kg	1	6/16/2011 06:39 PM
Cadmium	0.86	0.043	1.0	J	mg/Kg	1	6/16/2011 06:39 PM
Chromium	29	0.13	1.0		mg/Kg	1	6/16/2011 06:39 PM
Cobalt	15	0.11	1.0		mg/Kg	1	6/16/2011 06:39 PM
Copper	50	0.18	2.0		mg/Kg	1	6/16/2011 06:39 PM
Molybdenum	ND	0.097	1.0		mg/Kg	1	6/16/2011 06:39 PM
Nickel	26	0.11	1.0		mg/Kg	1	6/16/2011 06:39 PM
Selenium	ND	0.28	1.0		mg/Kg	1	6/16/2011 06:39 PM
Silver	ND	0.042	1.0		mg/Kg	1	6/16/2011 06:39 PM
Thallium	ND	0.098	1.0		mg/Kg	1	6/16/2011 06:39 PM
Vanadium	55	0.088	1.0		mg/Kg	1	6/16/2011 06:39 PM
Zinc	92	0.13	1.0		mg/Kg	1	6/16/2011 06:39 PM
MERCURY BY COLD VAPOR TECHNIQUE							
			EPA 7471A				
RunID: **AA1_110620D**	QC Batch: **73690**				PrepDate:	**6/20/2011**	Analyst: **VV**
Mercury	0.056	0.0076	0.10	J	mg/Kg	1	6/20/2011 02:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-73626** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **PBS** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191330**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	0.677	1.0									J
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	0.146	1.0									J

Sample ID: **LCS-73626** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **LCSS** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191331**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	51.210	2.0	50.00	0	102	80	120				
Arsenic	51.702	1.0	50.00	0	103	80	120				
Barium	53.145	1.0	50.00	0.6765	105	80	120				
Beryllium	51.629	1.0	50.00	0	103	80	120				
Cadmium	51.404	1.0	50.00	0	103	80	120				
Chromium	49.042	1.0	50.00	0	98.1	80	120				
Cobalt	53.284	1.0	50.00	0	107	80	120				
Copper	53.268	2.0	50.00	0	107	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-73626** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **LCSS** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191331**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Molybdenum	54.062	1.0	50.00	0	108	80	120				
Nickel	50.949	1.0	50.00	0	102	80	120				
Selenium	48.010	1.0	50.00	0	96.0	80	120				
Silver	50.848	1.0	50.00	0	102	80	120				
Thallium	49.879	1.0	50.00	0	99.8	80	120				
Vanadium	53.277	1.0	50.00	0	107	80	120				
Zinc	52.643	1.0	50.00	0.1457	105	80	120				

Sample ID: **118186-001A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **1139-101-0.0** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191333**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.603	2.0						1.773	0	20	J
Arsenic	2.067	1.0						0.7220	96.5	20	R
Barium	192.777	1.0						197.3	2.32	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	1.431	1.0						1.422	0.669	20	
Chromium	29.140	1.0						29.93	2.66	20	
Cobalt	10.964	1.0						10.94	0.193	20	
Copper	42.886	2.0						46.50	8.09	20	
Molybdenum	0.323	1.0						0.9663	0	20	J
Nickel	26.182	1.0						27.93	6.45	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	41.433	1.0						38.90	6.30	20	
Zinc	307.096	1.0						334.6	8.57	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **118186-001A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **1139-101-0.0** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191334**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	82.373	2.0	125.0	1.773	64.5	32	105				
Arsenic	104.186	1.0	125.0	0.7220	82.8	49	106				
Barium	306.485	1.0	125.0	197.3	87.4	31	133				
Beryllium	100.798	1.0	125.0	0	80.6	56	106				
Cadmium	96.369	1.0	125.0	1.422	76.0	51	103				
Chromium	125.084	1.0	125.0	29.93	76.1	45	114				
Cobalt	110.573	1.0	125.0	10.94	79.7	52	106				
Copper	161.156	2.0	125.0	46.50	91.7	54	125				
Molybdenum	102.295	1.0	125.0	0.9663	81.1	54	106				
Nickel	124.364	1.0	125.0	27.93	77.1	45	111				
Selenium	96.158	1.0	125.0	0	76.9	47	104				
Silver	108.152	1.0	125.0	0	86.5	56	112				
Thallium	78.539	1.0	125.0	0	62.8	46	101				
Vanadium	145.684	1.0	125.0	38.90	85.4	54	114				
Zinc	443.743	1.0	125.0	334.6	87.3	28	125				

Sample ID: **118186-001A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **1139-101-0.0** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191335**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	84.294	2.0	125.0	1.773	66.0	32	105	82.37	2.31	20	
Arsenic	106.961	1.0	125.0	0.7220	85.0	49	106	104.2	2.63	20	
Barium	338.336	1.0	125.0	197.3	113	31	133	306.5	9.88	20	
Beryllium	101.101	1.0	125.0	0	80.9	56	106	100.8	0.300	20	
Cadmium	97.325	1.0	125.0	1.422	76.7	51	103	96.37	0.987	20	
Chromium	128.713	1.0	125.0	29.93	79.0	45	114	125.1	2.86	20	
Cobalt	112.852	1.0	125.0	10.94	81.5	52	106	110.6	2.04	20	
Copper	162.454	2.0	125.0	46.50	92.8	54	125	161.2	0.802	20	
Molybdenum	104.283	1.0	125.0	0.9663	82.7	54	106	102.3	1.93	20	
Nickel	125.996	1.0	125.0	27.93	78.5	45	111	124.4	1.30	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **118186-001A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134131**
Client ID: **1139-101-0.0** Batch ID: **73626** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191335**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	98.133	1.0	125.0	0	78.5	47	104	96.16	2.03	20	
Silver	110.059	1.0	125.0	0	88.0	56	112	108.2	1.75	20	
Thallium	79.410	1.0	125.0	0	63.5	46	101	78.54	1.10	20	
Vanadium	147.733	1.0	125.0	38.90	87.1	54	114	145.7	1.40	20	
Zinc	419.318	1.0	125.0	334.6	67.8	28	125	443.7	5.66	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-73627** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **PBS** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191552**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.185	2.0									J
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Molybdenum	ND	1.0									
Nickel	ND	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	1.0									
Vanadium	ND	1.0									
Zinc	0.297	1.0									J

Sample ID: **LCS-73627** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **LCSS** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191553**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	50.166	2.0	50.00	0.1854	100	80	120				
Arsenic	51.059	1.0	50.00	0	102	80	120				
Barium	51.476	1.0	50.00	0	103	80	120				
Beryllium	49.814	1.0	50.00	0	99.6	80	120				
Cadmium	49.901	1.0	50.00	0	99.8	80	120				
Chromium	47.570	1.0	50.00	0	95.1	80	120				
Cobalt	51.744	1.0	50.00	0	103	80	120				
Copper	51.373	2.0	50.00	0	103	80	120				
Molybdenum	53.608	1.0	50.00	0	107	80	120				
Nickel	49.454	1.0	50.00	0	98.9	80	120				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **LCS-73627** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **LCSS** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191553**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	47.481	1.0	50.00	0	95.0	80	120				
Silver	48.460	1.0	50.00	0	96.9	80	120				
Thallium	49.037	1.0	50.00	0	98.1	80	120				
Vanadium	51.462	1.0	50.00	0	103	80	120				
Zinc	50.858	1.0	50.00	0.2970	101	80	120				

Sample ID: **118186-005A-DUP** SampType: **DUP** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **1139-102-0.0** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191555**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.380	2.0						1.608	0	20	J
Arsenic	19.923	1.0						20.36	2.18	20	
Barium	209.453	1.0						212.3	1.36	20	
Beryllium	ND	1.0						0	0	20	
Cadmium	0.923	1.0						0.8642	0	20	J
Chromium	31.323	1.0						28.79	8.44	20	
Cobalt	15.666	1.0						15.43	1.52	20	
Copper	54.639	2.0						49.82	9.22	20	
Molybdenum	ND	1.0						0	0	20	
Nickel	28.088	1.0						26.16	7.12	20	
Selenium	ND	1.0						0	0	20	
Silver	ND	1.0						0	0	20	
Thallium	ND	1.0						0	0	20	
Vanadium	56.728	1.0						54.80	3.46	20	
Zinc	104.223	1.0						91.97	12.5	20	

Sample ID: **118186-005A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **1139-102-0.0** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191556**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **118186-005A-MS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **1139-102-0.0** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191556**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	71.391	2.0	125.0	1.608	55.8	32	105				
Arsenic	116.340	1.0	125.0	20.36	76.8	49	106				
Barium	296.972	1.0	125.0	212.3	67.7	31	133				
Beryllium	93.910	1.0	125.0	0	75.1	56	106				
Cadmium	88.774	1.0	125.0	0.8642	70.3	51	103				
Chromium	121.334	1.0	125.0	28.79	74.0	45	114				
Cobalt	106.964	1.0	125.0	15.43	73.2	52	106				
Copper	164.382	2.0	125.0	49.82	91.6	54	125				
Molybdenum	94.362	1.0	125.0	0	75.5	54	106				
Nickel	114.012	1.0	125.0	26.16	70.3	45	111				
Selenium	89.494	1.0	125.0	0	71.6	47	104				
Silver	105.081	1.0	125.0	0	84.1	56	112				
Thallium	66.502	1.0	125.0	0	53.2	46	101				
Vanadium	155.675	1.0	125.0	54.80	80.7	54	114				
Zinc	180.823	1.0	125.0	91.97	71.1	28	125				

Sample ID: **118186-005A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **1139-102-0.0** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191557**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	73.174	2.0	125.0	1.608	57.3	32	105	71.39	2.47	20	
Arsenic	114.652	1.0	125.0	20.36	75.4	49	106	116.3	1.46	20	
Barium	289.061	1.0	125.0	212.3	61.4	31	133	297.0	2.70	20	
Beryllium	93.176	1.0	125.0	0	74.5	56	106	93.91	0.785	20	
Cadmium	87.065	1.0	125.0	0.8642	69.0	51	103	88.77	1.94	20	
Chromium	117.825	1.0	125.0	28.79	71.2	45	114	121.3	2.93	20	
Cobalt	106.319	1.0	125.0	15.43	72.7	52	106	107.0	0.605	20	
Copper	161.894	2.0	125.0	49.82	89.7	54	125	164.4	1.52	20	
Molybdenum	93.776	1.0	125.0	0	75.0	54	106	94.36	0.623	20	
Nickel	113.098	1.0	125.0	26.16	69.6	45	111	114.0	0.805	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **118186-005A-MSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **6/16/2011** RunNo: **134139**
Client ID: **1139-102-0.0** Batch ID: **73627** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **6/16/2011** SeqNo: **2191557**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	88.401	1.0	125.0	0	70.7	47	104	89.49	1.23	20	
Silver	103.683	1.0	125.0	0	82.9	56	112	105.1	1.34	20	
Thallium	66.710	1.0	125.0	0	53.4	46	101	66.50	0.312	20	
Vanadium	153.915	1.0	125.0	54.80	79.3	54	114	155.7	1.14	20	
Zinc	179.054	1.0	125.0	91.97	69.7	28	125	180.8	0.983	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7471_S

Sample ID: **MB-73690** SampType: **MBLK** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **6/20/2011** RunNo: **134198**
Client ID: **PBS** Batch ID: **73690** TestNo: **EPA 7471A** Analysis Date: **6/20/2011** SeqNo: **2193087**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-73690** SampType: **LCS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **6/20/2011** RunNo: **134198**
Client ID: **LCSS** Batch ID: **73690** TestNo: **EPA 7471A** Analysis Date: **6/20/2011** SeqNo: **2193088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.926	0.10	0.8300	0	112	80	120				

Sample ID: **118186-005A-MS** SampType: **MS** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **6/20/2011** RunNo: **134198**
Client ID: **1139-102-0.0** Batch ID: **73690** TestNo: **EPA 7471A** Analysis Date: **6/20/2011** SeqNo: **2193089**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.919	0.10	0.8300	0.05560	104	70	130				

Sample ID: **118186-005A-MSD** SampType: **MSD** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **6/20/2011** RunNo: **134198**
Client ID: **1139-102-0.0** Batch ID: **73690** TestNo: **EPA 7471A** Analysis Date: **6/20/2011** SeqNo: **2193090**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.922	0.10	0.8300	0.05560	104	70	130	0.9190	0.300	20	

Sample ID: **118186-005A-DUP** SampType: **DUP** TestCode: **7471_S** Units: **mg/Kg** Prep Date: **6/20/2011** RunNo: **134198**
Client ID: **1139-102-0.0** Batch ID: **73690** TestNo: **EPA 7471A** Analysis Date: **6/20/2011** SeqNo: **2193092**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.054	0.10						0.05560	0	20	J

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Robino, Vinnie [Vinnie.Robino@amec.com]
Sent: Tuesday, June 14, 2011 2:46 PM
To: Diane Galvan
Cc: Paul, Duane
Subject: RE: TTLC Results/EDD - Route 405 Temple Ave Bridge Repair, ADL Investigation (118186)

Hi Diane,

Please analyze the following two samples for Title 22 Metals (excluding lead) on standard TAT. Please call me if you have any questions.

Sample ID	Sample Date	Total Lead Result
1139-101-0.0	6/2/2011	1100 mg/kg
1139-102-0.0	6/2/2011	74 mg/kg

Thanks,
Vinnie

June 24, 2011

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003

Workorder No.: 118186

Duane Paul/Vinnie Robino
AMEC Geomatrix
510 Superior Avenue, Suite 200
Newport Beach, CA 92663-3627

TEL: (949) 642-0245
FAX: (949) 642-4474

RE: Route 405 Temple Ave Bridge Repair ADL, 01

Attention: Duane Paul/Vinnie Robino

Enclosed are the results for sample(s) received on June 02, 2011 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

for Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: AMEC Geomatrix
Project: Route 405 Temple Ave Bridge Repair ADL, 015
Lab Order: 118186

CASE NARRATIVE

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

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Advanced Technology Laboratories

Date: 6/24/2011

ANALYTICAL RESULTS

LEAD BY ATOMIC ABSORPTION (TCLP)
EPA 1311/ 7420

CLIENT:	AMEC Geomatrix	**Lab Order:**	118186
Project:	Route 405 Temple Ave Bridge Repair ADL, 015	**Date Received:**	6/2/2011 7:49:00 PM
Project No:		**Matrix:**	Soil
Analyte:	Lead	**Analyst:**	VV

Laboratory ID	Client Sample ID	Results	Units	QC Batch	MDL	PQL	Qual	DF	Date Collected	Date Analyzed
118186-002A	1139-101-1.0	ND	mg/L	73764	0.21	0.25		1	6/2/2011	6/21/2011
118186-005A	1139-102-0.0	ND	mg/L	73764	0.21	0.25		1	6/2/2011	6/21/2011

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

Advanced Technology Laboratories

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CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **MB-73764A** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **PBS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193917**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **MB-73744A TCLP** SampType: **MBLK** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **PBS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193918**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25									

Sample ID: **LCS-73764** SampType: **LCS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **LCSS** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193919**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	0.897	0.25	1.000	0	89.7	80	120				

Sample ID: **118309-094A-DUP** SampType: **DUP** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	ND	0.25						0	0	20	

Sample ID: **118309-094A-MS** SampType: **MS** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193931**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.462	0.25	2.500	0	98.5	70	130				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

CLIENT: AMEC Geomatrix
Work Order: 118186
Project: Route 405 Temple Ave Bridge Repair ADL, 015

ANALYTICAL QC SUMMARY REPORT

TestCode: 7420_TC

Sample ID: **118309-094A-MSD** SampType: **MSD** TestCode: **7420_TC** Units: **mg/L** Prep Date: **6/21/2011** RunNo: **134244**
Client ID: **ZZZZZZ** Batch ID: **73764** TestNo: **EPA 1311/ 74 EPA3010A** Analysis Date: **6/21/2011** SeqNo: **2193932**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.488	0.25	2.500	0	99.5	70	130	2.462	1.04	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

Advanced Technology Laboratories
3275 Walnut Avenue, Signal Hill, CA 90755 Tel: 562. 989.4045 Fax: 562.989.4040

Diane Galvan

From: Robino, Vinnie [Vinnie.Robino@amec.com]
Sent: Friday, June 17, 2011 4:49 PM
To: Diane Galvan
Cc: Paul, Duane
Subject: RE: STLC/TCLP Results/EDD - Route 405 Temple Ave Bridge Repair, ADL Investigation (118186)

Hi Diane,

Please proceed and analyze the following two soil samples for TCLP (on a standard TAT):

1139-101-1.0 and 1139-102-0.0

Please call me if you have any questions.

Thanks,
Vinnie

APPENDIX D

Photographic Log

View of boring location 1139-101

View of boring location 1139-102

Photographs of Boring Locations
Route 405, Temple Avenue Bridge Repair
ADL Site Investigation
Long Beach, California

By: VR	Date: 11/04/11	Project No.: 153240170
AMEC Geomatrix		Figure **D-1**

View of boring location 1139-103

View of boring location 1139-104

Photographs of Boring Locations
Route 405, Temple Avenue Bridge Repair
ADL Site Investigation
Long Beach, California

By:VR	Date: 11/04/11	Project No.: 153240170
AMEC Geomatrix		Figure **D-2**

APPENDIX E

Database
(on CD)

Materials Information

FINAL FOUNDATION REPORT FOR TEMPLE AVENUE OVERCROSSING
REPAIR BRIDGE NO. 53-1198
07-LA-405-PM 4.3, APRIL 27, 2012

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MINA PEZESHPOUR
OFFICE OF STRUCTURE DESIGN SOUTH 2
DEVISION OF ENGINEERING SERVICES

Date: April. 27, 2012

File: 07-LA-405-PM4.3
EA 07-278301
Temple Ave OC Repair
BR. No. 53-1198

Attn: Bin Shen

Project No. 0700000539

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
MET and Geotechnical Services – MS5
Office of Geotechnical Design – South 1

Subject: **Final Foundation Report for Temple Ave Overcrossing Repair**

The following is the Final Foundation Report (FR) for the repair of the existing Temple Ave Overcrossing, which is severely corroded by the leakage from 65"x40" Corrugated Metal Pipe Arch (CMPA) storm water pipes inside the existing box girder.

SCOPE OF WORK

The scope of work for this geotechnical study includes:

- Review of the as-built plans and the log of test borings (LOTBs)
- Field Investigations
- Laboratory testing of soil samples obtained during field investigation
- Evaluation of site geology, subsurface conditions, and groundwater
- Site seismicity study
- Engineering analyses
- Geotechnical foundation recommendations and construction considerations

This FR is based on review of the as-built log of test borings, foundation plan and general plan for the original bridge (1958) and seismic retrofit of the same bridge (1996), other geotechnical-related documents, environmental report for the nearby facilities, structure P&Q plans for the new bridge, and subsurface exploration near Bent 2, east of the bridge.

PROJECT DESCRIPTION

The Temple Ave Overcrossing (BR53-1198) spans 196 feet over Route 405 south of the Long Beach Airport in the City of Long Beach. Built in 1964, the continuous two span, nine cell, reinforced concrete box girder structure consists of backfilled, closed end cantilever abutments and column/pier bent, all supported on spread footings. This project proposes partial bridge demolition and the replacement of two bridge cells, which are severely corroded due to the leakage of the storm drain pipes inside the box girder.

The removed cells No. 8 and 9 of the existing box girder will be replaced by precast, pre-stressed bulb-T girder. The existing column, infill wall, and footing under cells No. 8 and 9 at the Bent 2 location will also be removed and replaced by a new pier wall and structure foundation. The existing abutments, abutment retaining walls at the job site will also be removed and replaced.

FIELD INVESTIGATION

One hollow-stem-auger (HSA) boring was drilled on north-bound HOV lane on Route 405, approximately 45 ft east of the bridge to obtain geotechnical information for this project. Standard Penetration Tests (SPT) were conducted in general accordance with ASTM D1586. Pocket penetrometer readings were also taken from cohesive soil samples at the selected depth for strength evaluation. The boring location is presented on Figure 1 of Attachments

It was planned that HSA drilling be conducted first to reach groundwater, followed by rotary wash boring for the rest of borehole depth. However, during subsurface exploration at the night of November 3, 2010, heavy gasoline odor was detected from the SPT sample (dry sand) that was retrieved from 25 feet below ground surface (bgs). The drilling was terminated at the penetration depth of 26.5 ft bgs, about 7.5 ft above mean sea level (MSL), before reaching the groundwater. Borehole was backfilled.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

General Geology

The project site is in the southern portion of the Los Angeles basin, a transitional zone between the Transverse Geomorphic Province and the Peninsular Ranges Geomorphic Province. The site is in a broad featureless Downey Plain, about 3 miles north of the San Pedro Bay. In the general vicinity of the site, the Downey Plain is a broad featureless area. Toward the south, Signal Hill rises to approximately 350 feet above MSL. The plain is slightly dissected by local streams and underlain by fine-grained marine and non-marine sediments.

For this report we reviewed the Bulletin Number 104, Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A, Ground Water Geology, by the California Department of Water Resources, 1961 (DWR 1961). The site is underlain by Quaternary Lakewood Formation which is characterized as marine and continental gravel, sand, sandy silt, silt and clay. According to the cross section by DWR 1961, within the vicinity of job site, the Lakewood formation is as much as 200 feet thick overlying partially lithified Pliocene (2.5 to 5 million years) San Fernando Formation.

A geologic map of the area is presented in Figure 2 of Attachments.

Subsurface Conditions

At Bent 2, soils from existing ground surface to approximately 23 feet bgs (or Elev. 11 ft) are mostly stiff/very stiff silt to medium dense silty fine sand (SM), interbedded with thin layer(s) of stiff clay and elastic silt. At 23 ft bgs, a very dense sand layer was encountered during November 3, 2010 subsurface exploration. The depth of the very dense sand layer seems to extend at least down to 40 ft bgs (Elev. -6 ft), according to 1958 LOTBs on as-built plans at abutments. No additional soil boring was performed, and the soil information interpreted in this report is based both on 1958 as-built LOTBs and the recent subsurface exploration at Bent 2.

The interpreted soil profile and engineering properties for the design of structure foundation are presented in Table 1.

Groundwater

Groundwater was not encountered during all subsurface explorations back to 1958, to a maximum depth of 40 ft bgs (Elev. - 6 ft). The highest groundwater recorded (August 7, 2000) near the project site is 3.64 ft above MSL, according to "Fourth Quarter 2004 Groundwater monitoring and Sampling Report" by Miller Brooks, Environmental Inc. This reading was taken from Monitoring Well #1 at Total Equipment Rental site, which is 300 ft north of Bent 2 of Temple Ave OC. Since no other ground water records are available, the above reading is used as ground water elevation for the design.

Table 1 Interpreted Soil Profile and Engineering Properties

Elevation (ft)	Predominant Soil Type, USCS	Average Blowcount, N_{60}	Total Unit Weight (pcf)	Apparent Friction Angle (degree)	Apparent Cohesion /Undrained Shear Strength (psf)
Bent 2					
+34' to +26'	ML	15	120	N/A	2500
+26' to +20'	SM	20	120	34	N/A
+20' to +18.5'	MH	N/A	120	N/A	1200
+18.5' to +11'	SP-SM	22	120	32	N/A
+11' to -7'	SP	100	125	40	N/A
Abutment 1					
+56' to +44'	MH	16	120	N/A	2000
+44' to +25'	MH	30	125	N/A	3000
+25' to +18'	SM/ML	15	120	30	N/A
+18' to +0.0'	SP	100	125	40	N/A
Abutment 3					
+54' to +41'	SM	10	120	30	N/A
+41' to +29'	MH	22	120	N/A	2500
+29' to +26'	MH	10	120	N/A	1000
+26' to +17'	SM/ML	16	120	30	N/A
+17' to -7'	SP	100	125	40	N/A

CORROSION EVALUATION

Bulk samples were obtained during subsurface exploration for corrosion test. The samples were collected from cuttings from 2.0 ft bgs to 20 ft bgs. The test results are presented on Table 2 of this report. Based on the test results, the soils for the bridge foundations are non-corrosive to reinforced concrete.

Table 2 Corrosion Test Results

Location of Sampling	Depth of Sample (ft)	pH	Soluble Sulfates	Soluble Chlorides	Minimum Resistivity
A-10-001	2-20 Composite	7.29	N/A	N/A	1246

Note: Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5.or less. It is the practice of Caltrans Corrosion Technology Section (with the exception of MSE Walls) if the minimum resistivity of the sample is greater than 1000 ohm-cm and the pH is greater than 5.5, the sample is considered to be noncorrosive.

SEISMIC RECOMMENDATIONS

Surface Fault Rupture Hazards

The project site is in a seismically active area of Southern California. However, no known fault passes through or extends toward the site. Therefore, ground surface rupture hazard risk due to fault movement is low for the subject bridge.

Ground Motion Hazards

A seismic hazard analysis was performed to develop the design ground motion parameters, including the Acceleration Response Spectrum (ARS) for bridge design. This analysis was performed in accordance with the Caltrans' 2009 design ground motion evaluation procedure for Ordinary bridge structures. This procedure is documented in detail in the Appendix B of the Seismic Design Criteria (SDC) and the Geotechnical Services Design Manual (2009), Version 1.0. The "*Caltrans ARS Online"* web tool was used to evaluate deterministic, probabilistic (Return Period ≈1,100 years) and the design ground motion as defined in the SDC.

Based on the 1958 as-built Log of Test Borings (LOTB), the soil profile at the site can be classified as Type D corresponding to a V_{s30} of 180 to 360 m/sec (590 to1180 feet/sec). Here, V_{s30} is the weighted average shear wave velocity for the upper 100 feet of the subsurface profile. An average V_{s30} of 270 m/sec (886 feet/sec) was used in the ground motion analysis.

The recommended ARS curve developed based on the above analysis is shown on Figure 3 of the attachments. The corresponding ARS data points are presented in the Table 1 of Attachments. As seen from these results, the deterministic ARS curves from two different nearby faults control the design ground motion at this site. For structures with natural periods $T \leq 0.35$ seconds, the controlling ground motion is due to the maximum earthquake of moment magnitude 6.8 associated with the Compton-Los Alamitos Fault. This blind thrust fault is located at a distance (R_{rup}) of

about 7.4 km (4.6 miles) from the site. Ground motion from the maximum earthquake of moment magnitude 7.5 associated with the Newport-Inglewood-Rose Canyon fault controls the design ground motion for structures with natural periods T > 0.35 sec. The Newport-Inglewood-Rose Canyon fault located at a distance of about 1.4 km (0.87 mils) from the site is a strike slip fault. The peak bedrock acceleration (PBA) at the job site is expected to be 0.7g.

Liquefaction Hazard

As described in groundwater section, the ground water table is more than 30 ft bgs, and a very dense sand layer was encountered at 23 feet bgs, and is expected to extend to 40 ft bgs. Therefore, liquefaction potential of the site is low, and the potential of lateral spreading is also low.

AS-BUILT FOUNDATION DATA

Built in 1962, the existing bridge is a two-span reinforced concrete (RC) continuous box girder bridge, supported by two closed end high cantilever RC seat abutments and an RC column bent. Spread footings (continuous type) were used at all structure support locations.

Based on the original LOTBs and the elevation contours on as-built foundation plan, Route 405 at the project site was built at the bottom of a 22-foot deep cut, with Temple Ave OC spanning over the highway.

The current grade on Route 405 at the eastern end of Bent 2 is approximately Elev. +34 ft (NAVD 1988). The elevation at the bottom of 8.5 feet wide existing bent footing is approximately Elev. +29 ft. The elevations at the bottom of existing spread footings for Abutments 1 and 3 are Elev. +28.83 ft and Elev. +28.33, respectively.

The soil borings shown on as-built plans were located near Abutments 1 and 3 of the bridge. The subsurface materials were mostly “stiff to hard clayey silt” to “loose to compact (medium dense) fine sand and silt” from Elev. +34 ft to Elev. +15 ft. A very dense sand layer was also encountered during soil exploration conducted in 1958, with blow counts greater than 90 per foot. The finding in as-built LOTBs, though not exactly the same as what was found during recent subsurface explorations, is used as a reference for the abutment foundation design.

No settlement and ultimate bearing capacity data is available for the existing foundations of the bridge. No soil improvement for the bridge foundations are reported in any of the as-built plans in our records.

FOUNDATION RECOMMENDATIONS

Soil Contamination and Its Influence on Foundation Type Selection

The foundation soils were found contaminated during subsurface exploration conducted near Bent 2. Based on Groundwater Monitoring and Sampling Report (Miller Brooks Environmental Inc., 2005) at Total Equipment Rental Facility, about 300 ft north of the project site, a clay layer of at least 7 feet in thickness was found from 53 ft bgs (approximately Elev. -3 ft). Because of the insufficient depth of all previous subsurface explorations, the existence of the same low permeability layer under the project site and its vertical limit are unknown. The above information is important in determining the vertical extents of contaminants, since low hydraulic conductivity materials tend to contain the contaminant above them, forming a contaminated upper aquifer.

For the construction of bent foundation, a single, large diameter driven steel pipe pile or cast-in-steel-shell (CISS) will be the most time efficient solution. It introduces the least impact upon highway traffic due to relatively short time window required for highway lane closure. However, because of its deep penetration depth required, this option may not be viable due to cross contamination issue.

For the foundations at all bridge supports, it is the best to limit the structure foundation and the construction activity within both vertical and horizontal limits of contaminated zone. To prevent potential cross contamination, the shallow foundation option is preferred. The construction of shallow foundations can be accomplished without the need for additional environmental investigation and testing, groundwater monitoring, and cross-contamination prevention measures associated with deep foundation options.

Shallow Foundation

The existing bridge is on shallow foundation. The existing bridge foundations have performed well. However, due to design load increase under current design specifications and more stringent settlement control criteria under service condition, additional analysis was performed to verify that the bearing capacity is adequate and the expected settlement is within acceptable limit for the new structure.

Based on the footing dimensions, the design of shallow foundation is controlled by permissible contact stress associated with one inch settlement criteria mandated by Office of Structure Design, at all bridge supports. The bottom of the footing elevations at bridge abutments will match those of the existing structure. The bottom elevation of new footing at Bent 2 will be approximately 1.5 feet lower than the existing bottom of footing elevation.

Foundation Data Provided by Structural Designers

Based on the Department policy, Load and Resistance Factor Design (LRFD) is used for design of the bent foundation, and Work Stress Design (WSD) is used for the abutment foundations. The foundation design data and load data were provided by the structure designers and presented in the following tables:

Table 3 Foundation Data

Support No.	Design Method	Finished Grade Elevation (ft)	Bottom of Footing Elevation (ft)	Footing Size (ft)		Permissible Settlement under Service Load (in)
				B	L	
Abut 1	WSD	33.8	28.83	14.5	27.3	1.0
Bent 2	LRFD	33.7	27.47	11.0	22.0	1.0
Abut 3	WSD	33.3	28.33	13.5	22.8	1.0

Table 4 LRFD Service Limit State I

Support No.	Total Load				Permanent Load		
	Vertical Load (kip)	Effective Dimensions (ft)		Horizontal Load in Long. Direction (kip)	Vertical Load (kip)	Effective Dimensions (ft)	
		B'	L'			B'	L'
Abut 1	1145	10.37	N/A	356	780	11.4	N/A
Bent 2	1454*	11.0	N/A	N/A	1253	11.0	N/A
Abut 3	1038	9.03	N/A	343	675	15.6	N/A

* Based on Construction Staging Plan, temporary support will stand on new bent footing during superstructure construction. The foundation settlement that will impact future performance of the bridge is created by service load above the dead load by the end of Step 2 of construction sequence. This load was estimated to be 430 kips, and used for settlement analysis under service condition.
* Total and Permanent Loads are NET for Bents and GROSS for Abutments.

Table 5 LRFD Strength and Extreme Event Limit States

Support No.	Strength Limit State (Controlling Group)			Extreme Event Limit State (Controlling Group)		
	Vertical Load (kips)	Effective Dimensions (ft)		Vertical Load (kips)	Effective Dimensions (ft)	
		B'	L'		B'	L'
Bent 2	2088	11.0	N/A	1148	7.6	N/A

Axial Capacity of Bridge Foundations

Long-term settlement is negligible at all bridge support locations. The structure foundation settlement will occur immediately under applied loading, and will be mostly finished by the end of bridge construction.

Construction staging plans in Draft Structure P&Q package have been reviewed for determination of initial stress within foundation soils. The construction temporary support at Bent 2 will stand on top of the new pier wall footing, such that substructure loading and a portion of superstructure loading (mostly from precast bulb-T girder and bent cap) will be transferred to the structure foundation during early stage of superstructure construction. This will effectively reduce the net contact stress and the associated additional settlement that may impact the performance of bridge structure under future service condition.

It is estimated that the settlement at Bent 2 will be less than one inch by the end of Step 2 of construction sequence shown on Staging Plan. A settlement of less than 0.5 inches is expected from the end of step 2 of Construction Staging Plan to future service condition.

The foundation design recommendations for abutments and bent are presented in Table 6. The Spread Footing Data Table to be included in contract plans is presented in Table 7 below.

Table 6 Foundation Design Recommendations for Spread Footings

Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embed. Depth (ft)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
							Service	Strength φb = 0.45	Extreme Event φb = 1.0
	B	L			Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Abut 1	14.5	27.3	28.83	5.0	4.2	8.7	N/A	N/A	N/A
Bent 2	11.0	22.0	27.47	6.2	N/A	N/A	2.6*	20.8	39.5
Abut 3	13.5	22.8	28.33	5.0	3.5	8.2	N/A	N/A	N/A

* Permissible net contact stress represents the service load above the F.G. that is permitted by one-inch settlement control criteria. This may not be applicable for Bent 2, where temporary support will be established on top of new footing, based on construction sequence shown on Construction Staging Plans.

Table 7 Spread Footing Data Table

Support Location	Work Stress Design (WSD)		Load and Resistance Factor Design (LRFD)		
	Permissible Contact Stress (Settlement) (ksf)	Allowable Bearing Capacity (ksf)	Service Permissible Net Contact Stress (Settlement), (ksf)	Strength Factored Gross Nominal Bearing Resistance, ($\varphi_b = 0.45$), (ksf)	Extreme Event Factored Gross Nominal Bearing Resistance, ($\varphi_b = 1.0$), (ksf)
Abut 1	4.2	8.7	N/A	N/A	N/A
Bent 2	N/A	N/A	2.6*	20.8	39.5
Abut 3	3.5	8.2	N/A	N/A	N/A

* Permissible net contact stress represents the service loading above the F.G. that is permitted by one-inch settlement control criteria. This may not be applicable for this job, where temporary support will be established on top of new footing, based on construction sequence shown on Construction Staging Plans.

Abutment Retaining Walls

Standard Type 1 walls (Standard Plans 2010) with spread footings will be used for all abutment retaining walls. The alignment of new Type 1 walls will be the same as the one for existing retaining walls, which were also supported by spread footing and performed well over the years. The footing width for the new walls will, generally, be larger than those on As-Built. Wherever the bottom of new spread footing is higher than the existing, structure backfill should be compacted into the excavated area, following the removal of existing wall footing. A minimum factor of safety of 3.0 can be achieved for the bearing capacity of abutment retaining wall footings with design wall height up to 22 feet, based on foundation soil profiles on as-built LOTBs and engineering properties of compacted structure backfills.

Lateral Resistance of Spread Footing Foundation

Both sliding resistance along the base of the footing and passive resistance from footing and pier wall are considered against foundation sliding. It is recommended that the base sliding resistance of 2500 psf be used for lateral resistance at the bottom of the footing. For extreme event limit state, 100% of the passive resistance (i.e. resistance factor of 1.0) and 100% of the base sliding resistance (i.e. resistance factor of 1.0) can be combined against lateral movement of the structure foundation. The estimation of passive and sliding resistance of structure foundations should follow the procedure outlined in Section 3.11.5.4 and Section 10.6.3.4 of AASHTO LRFD Bridge Design Specifications (2007).

CONSTRUCTION CONSIDERATIONS

1) Based on the subsurface exploration, groundwater will not be encountered during footing excavation at all bridge support locations.

2) For abutment retaining walls, wherever the bottom of new spread footing is higher than the existing, structure backfill should be compacted into the excavated area, following the removal of existing wall footing. The structure backfill should be compacted to at least 95% of relative compaction.

Should you have any question or comment, please contact Haitao Liu at (916)-227-0992.

Prepared by:

HAITAO LIU, P.E. C 66398
Transportation Engineer (Civil)
Branch A
OGDS-1/GS/ DES

CC: Mabel Tran, D07 Project Manager
GS Corporate
DES Office Engineer, Office of PS&E
Structure Construction R.E. Pending Files
Kirsten Stahl, D07 Material Engineer

ATTACHMENTS

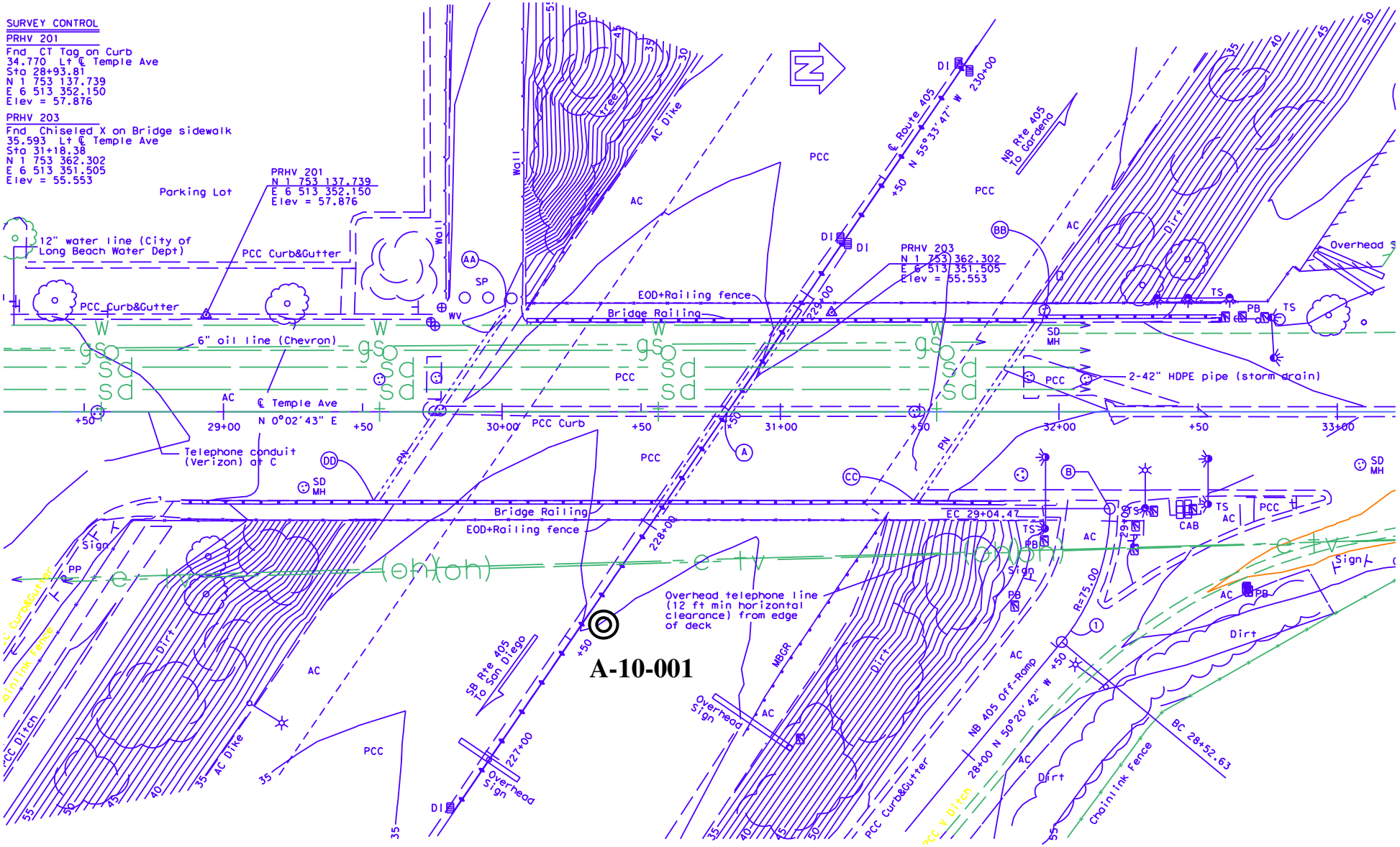

Figure 1 Boring Plan

CALTRANS DES / GS Office of Geotechnical Design South 1	EA: 07-278301 Date: April, 2012	**Geologic Map**
	Temple Ave. OC Repair 07-LA-405-PM4.3	**Figure No. 2**

Table 1 Data for Recommended ARS (Temple Ave OC)

Vs 30 =	270 m/sec		Damping =		5%
Period (Sec.)	Spectral Acceleration, g	Period (Sec.)	Spectral Acceleration, g	Period (Sec.)	Spectral Acceleration, g
0.010	0.572	0.240	1.198	2.200	0.523
0.020	0.583	0.250	1.198	2.400	0.475
0.022	0.589	0.260	1.195	2.500	0.455
0.025	0.608	0.280	1.190	2.600	0.435
0.029	0.630	0.290	1.186	2.800	0.401
0.030	0.635	0.300	1.182	3.000	0.371
0.032	0.646	0.320	1.171	3.200	0.345
0.035	0.660	0.340	1.159	3.400	0.322
0.036	0.664	0.350	1.153	3.500	0.311
0.040	0.682	0.360	1.151	3.600	0.301
0.042	0.690	0.380	1.145	3.800	0.283
0.044	0.698	0.400	1.140	4.000	0.266
0.045	0.702	0.420	1.140	4.200	0.252
0.046	0.706	0.440	1.140	4.400	0.239
0.048	0.713	0.450	1.141	4.600	0.228
0.050	0.720	0.460	1.141	4.800	0.217
0.055	0.737	0.480	1.141	5.000	0.207
0.060	0.753	0.500	1.142		
0.065	0.768	0.550	1.134	Legend:	
0.067	0.778	0.600	1.128	Controlling Fault	Compton-Los Alamitos Blind Thrust
0.070	0.792	0.650	1.121		
0.075	0.817	0.667	1.120		
0.080	0.842	0.700	1.116		
0.085	0.868	0.750	1.111		Mmax= 6.8
0.090	0.893	0.800	1.094		Type = R
0.095	0.917	0.850	1.079		Rrup = 7.4 km
0.100	0.941	0.900	1.065	Controlling Fault	Newport Inglewood-Rose Canyon (S. LA Basin Section-Northern)
0.110	0.983	0.950	1.052		
0.120	1.022	1.000	1.039		
0.130	1.056	1.100	0.974		
0.133	1.065	1.200	0.917		Mmax= 7.5
0.140	1.085	1.300	0.863		Type = SS
0.150	1.111	1.400	0.814		Rrup= 1.4 km
0.160	1.131	1.500	0.769		
0.170	1.149	1.600	0.723		
0.180	1.165	1.700	0.682		
0.190	1.179	1.800	0.644		
0.200	1.191	1.900	0.610		
0.220	1.196	2.000	0.580		

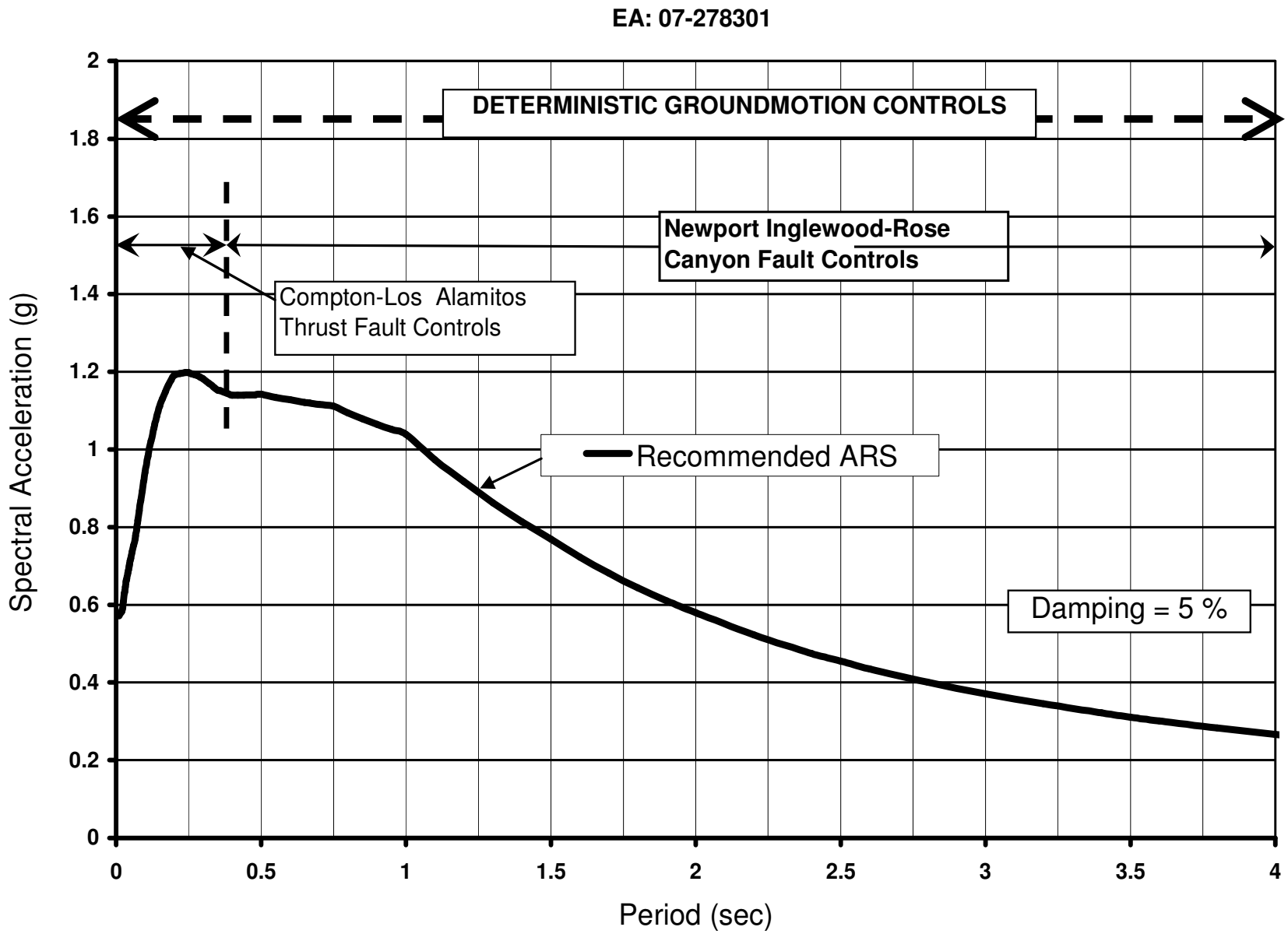

Figure 3 ARS Curve for Temple Ave OC (BR53-1198)

Materials Information

GEOTECHNICAL REVIEW FORM
TEMPLE AVENUE OVERCROSSING REPAIR
07-278301, 07-LA-405 PM 4.3

Geotechnical Review Form

To Pezeshpour, Mina (Structure Design Senior) Review Date 04/24/2012

Jang, Deh-Jeng (Geotechnical Design Senior) Review by Liu, Haitao

Pan, Mingxia (Structure Specs. Engineer) Reviewer Signature

EA (5 digits) 27830 Project ID (10 digits) 0700000539

Project Location	District	County	Route	Begin Post Mile	End Post Mile
	07	LA	405	4.3	4.3

Project Name, Description: Temple Ave OC Repair

Geotechnical Review Checklist

- [ ] Pile Types and Design Loads
- [ ] Pile Lengths
- [ ] Predrilling
- [ ] Pile Load Test
- [ ] Substitution of H Piles for Concrete Piles
  - [x] Yes [ ] No
- [x] Footing Elevations, Design Loads, and Locations
- [x] Seismic Data
- [x] Location of Adjacent Structures and Utilities
- [ ] Stability of Cuts or Fills
- [ ] Fill Time Delay
- [ ] Effect of Fills on Abutments and Bents
- [ ] Surcharge and Surcharge Period
- [ ] Approach Paving Slabs
- [ ] Scour
- [x] Ground Water
- [ ] Tremie Seals / Type D Excavation

Comments Need to be Addressed in Specifications and Plans

Review finished without further comment.