IN SITU CHEMICAL OXIDATION PILOT STUDY REPORT

Broadway Pantano Water Quality Assurance Revolving Fund Site
Tucson, Arizona

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June 9, 2017

Job No. 14-2016-2026
ADEQ Task Order ADEQ14-077536:33

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LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
2-D	2-dimensional
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
APP	Aquifer Protection Permit
ARS	Arizona Revised Statute
ASTM	American Society for Testing and Materials
AWQS	Aquifer Water Quality Standard
bgs	below ground surface
BNL	Broadway North Landfill
CMD	contaminant mass discharge
COC(s)	chemical(s) of concern
EPA	United States Environmental Protection Agency
ERA	Early Response Action
ft	foot, feet
ft/day	feet per day
g/kg	grams per kilogram
GOU	Groundwater Operable Unit
gpm	gallons per minute
ISCO	in situ chemical oxidation
lbs	pounds
mg/L	milligrams per liter
mV	millivolt
NOD	natural oxidant demand
ORP	oxidation reduction potential
PCE	tetrachloroethene
PQGWWP	Poor Quality Groundwater Withdrawal Permit
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
TCE	trichloroethene
µg/L	micrograms per liter
VFD	variable frequency drive
VOC(s)	volatile organic compound(s)
WQARF	Water Quality Assurance Revolving Fund

1.0 INTRODUCTION

This report presents the procedures, results and findings of an in situ chemical oxidation (ISCO) pilot study conducted at the Broadway Pantano Water Quality Assurance Revolving Fund Site (the Site) located in Tucson, Arizona. The pilot study documented herein supports a Feasibility Study evaluating groundwater remediation alternatives for the Site.

The pilot study occurred at Broadway North Landfill (BNL) to develop a conceptual level design (and estimate full-scale costs) for an ISCO treatment system capable of addressing residual Site contamination in one of the Groundwater Operable Unit (GOU) source areas. The conceptual design for the ISCO study included the use of an injection well to introduce the oxidant to the subsurface. One downgradient extraction well was used to recirculate the groundwater and promote oxidant distribution (**Figure 1**) longitudinally with groundwater flow. In addition, a cross gradient extraction well was installed to recirculate the groundwater and promote the lateral spread of oxidant.

The location of the ISCO pilot study was in the vicinity of monitoring well WR-274A, which is the most western groundwater well located at BNL, adjacent to a residential neighborhood bordering the Site (**Figure 2**). Monitoring well WR-274A is where tetrachloroethene (PCE) concentrations increased from approximately 44 micrograms per liter (µg/L) to 190 µg/L in September 2011 following completion of a soil vapor extraction (SVE) Early Response Action (ERA) conducted in September 2002. The increase in concentrations was likely due to rising water levels that mobilized residual PCE from impacted soils (and/or soil vapors) into groundwater located under BNL. As of January 2015, the PCE concentration at WR-274A was approximately 120 µg/L which was the highest chemical of concern (COC) concentration in the Site GOU during 2015.

The depth to groundwater measured at WR-274A was approximately 311 feet (ft) below ground surface (bgs) in February 2015. Based on Site well boring logs, sediments consist predominantly of sand and sandy gravel and are relatively unconsolidated down to approximately 500 ft bgs. No distinct or continuous lithologic layering is indicated by BNL area boring logs.

2.0 PILOT STUDY OBJECTIVES

The objectives of the ISCO pilot study were as follows:

- Confirm that ISCO is a technically feasible, cost-effective, and reliable remedial approach for groundwater treatment in the source area at the Site.
- Collect information that supports the design of a full-scale oxidant injection system including evaluation of:
  - The natural oxidant demand (NOD) of the aquifer;
  - Injection strategy (i.e., batch injection versus recirculation);
  - Required well spacing for effective oxidant distribution;
  - Oxidant dosage;

- Time and operating parameters (e.g., flow rates, injection pressures) necessary to achieve hydraulic communication between treatment wells; and
- Changes in aquifer chemistry due to oxidant injection.

3.0 ACTIVITIES PERFORMED

3.1 Well Installation

The pilot study wells were drilled and installed by Layne Christensen using a percussion hammer rig from January 11, 2016 through February 8, 2016. **Table 1** summarizes well construction details for the new wells and existing well WR-274A. **Figure 3** presents the location of pilot study wells. The distances between wells were designed to evaluate the effects of oxidant injections over short duration test periods. The remediation and monitoring well layout for the pilot study included:

- One new downgradient monitoring well referred to as BP-26 (24.8 ft downgradient of the injection well) to evaluate longitudinal dispersion of oxidant injections at BP-27. This well was screened across the water table (311 ft bgs in 2015) from 305 to 365 ft bgs. The measured depth to water at this well during baseline sampling was 306.92 feet below top of casing (ft btoc);
- One new centrally located injection well referred to as BP-27 (49.7 ft upgradient of WR-274A). BP-27 was screened from 285 to 365 ft bgs to account for rising water levels and mounding during injection. The measured depth to water at this well during baseline sampling was 308.34 ft btoc;
- One new lateral monitoring well referred to as BP-28 (12.9 from the injection well) to evaluate lateral dispersion of oxidant injections at BP-27. This well was screened from 305 to 365 ft bgs. The measured depth to water at this well during baseline sampling was 307.61 ft btoc;
- One new lateral recirculation well referred to as BP-29 (25.4 ft from the injection well) to conduct the lateral recirculation and lateral sweeping portions of the test. This well was screened from 305 to 375 ft bgs. The measured depth to water at this well during baseline sampling was 307.62 ft btoc; and
- Existing monitoring well WR-274A which was used as a downgradient recirculation well during the batch injection sweeping, downgradient recirculation and downgradient sweeping portions of the test. WR-274A is screened from 306 to 346 ft bgs and is located 49.7 ft downgradient from BP-27. The measured depth to water at this well during baseline sampling was 308.34 ft btoc.

Drilling activities included:

- Soil logging (visual inspection) and field screening using a photoionization detector (PID) to evaluate the presence of volatile contamination.
- Collection of soil samples with a split spoon sampler (or equivalent) at various locations and depths for laboratory analysis. Samples were analyzed for volatile organic

compounds (VOCs) via United States Environmental Protection Agency (EPA) Method 8260B; for the eight Resource Conservation and Recovery Act (RCRA) metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) plus manganese and iron via EPA Method 6010B; and for NOD analysis via American Society for Testing and Materials (ASTM) Method D7262-10 (Test Method A) by the oxidant supplier (Carus Corporation). Collection of representative samples was difficult due to the coarse-grained nature of the material and sampling depth.

- Collection of six depth-specific groundwater samples using a Hydropunch™ sampler. Hydropunch™ groundwater samples were evaluated by EPA Method 8260B for VOCs.
- Management and disposal of landfill waste, drill cuttings, and development water/drilling fluids. The cuttings, landfill waste, and any excess fluids were tested and classified as not hazardous. There were no contaminants present in cuttings at concentrations that exceeded Residential Soil Remediation Levels; this soil was spread on the surface in the northern portion of the BNL. Landfill waste was profiled and disposed of off-site at a properly permitted landfill. Development water generated during development of the new wells was temporarily containerized in the site frac tank and analyzed for VOCs. No VOCs were detected. This water was discharged back into BP-27.

The boring logs and well completion diagrams for the four newly installed wells (and well construction diagram for WR-274A) are presented in **Appendix A.** The well locations and elevations were surveyed by a Registered Land Surveyor. Well coordinates and reference elevations (top of well seal or sounder tube) are presented in **Table 1**.

Laboratory reports of analyses for samples collected during drilling activities are presented in **Appendix B**. Analytical results corresponding to depth-specific soil and groundwater sampling activities are summarized in **Table B.1** (**Appendix B**).

3.2 Pump Installation

After well development, new chemical resistant (stainless steel) 4-inch diameter submersible pumps were installed in WR-274A and BP-29 by Yellow Jacket Drilling Services. The pumps were able to achieve maximum flow rates of approximately 16 gallons per minute (gpm). After installation, short duration pumping tests were conducted with the new pumps to preliminarily assess drawdown at surrounding wells prior to conducting the pilot study.

3.3 Pumping and Recovery Test

A short-duration pumping and recovery test was conducted at BP-29 from February 25 to 26, 2016. The well was pumped for eight hours at approximately 16 gpm and discharged into the site frac tank. Water levels were monitored during both pumping and 15 hours of recovery in the pumping well and one observation well (BP-28) using a handheld water level sounder and pressure transducers. Water levels at an additional observation well (BP-26) were monitored using a handheld sounder. Water level data collected during the pumping test (**Appendix C**) were analyzed using the Cooper-Jacobs Method to obtain aquifer parameters in the test area (transducer data were used in this analysis for all wells except BP-26). The drawdown curves

corresponding to pumping and observation wells are presented in **Appendix C**, **Figure C.1**. Results are summarized in **Table C.1**.

3.4 Baseline Groundwater Sampling

Baseline groundwater samples were collected from the new wells (BP-26, BP-27, BP-28, and BP-29) and WR-274A prior to the start of oxidant injection. Samples were collected from the pump discharge from wells equipped with dedicated pumps (i.e., BP-29 and WR-274; the discharge rate was lowered prior to sample collection) after water quality monitoring using a multi-meter and flow-through cell indicated stabilization of parameters (including dissolved oxygen, oxidation reduction potential [ORP], pH and temperature) had occurred. Field forms summarizing water quality parameters are included in **Appendix D**. In remaining wells (BP-26, BP-27, and BP-28), groundwater samples were collected from the screened interval of each well using HydraSleeve samplers to establish baseline concentrations of VOCs and the eight RCRA metals plus manganese and iron in the test area. Samples were evaluated via EPA Methods 8260B and 6010/7470 by an ADHS-licensed laboratory (SGS Analytical). Water quality parameters and permanganate concentration (evaluated with field test strips) were monitored in groundwater samples collected with HydraSleeve samplers after dispensing samples for laboratory analysis into appropriate containers. The analytical reports corresponding to samples collected during baseline sampling are presented in **Appendix B**.

3.5 Pilot Study Equipment Layout

A process flow diagram for the equipment that was used during the pilot study is shown in **Figure 4**. In general, pilot study equipment allowed for batch oxidant dosing into injection well BP-27 or recirculation of oxidant-amended groundwater between lateral well BP-29 and BP-27 or downgradient well WR-274A and BP-27. Safety controls were installed to shut the system down if any leaks or disruptions occurred. A Venturi-type flow-proportional metering pump (i.e., Dosatron pump) was used for oxidant amendment. Controls were interlocked with a variable frequency drive (VFD) that was used to modulate flow produced by these pumps. Temporary power was run to the process pumps and the VFD in the study test area from the existing power service at the BNL methane abatement system.

For safety and security purposes, the received 40 percent (%) by weight oxidant solution was diluted to a 2% solution following arrival on site and stored in a 6,500-gallon storage tank in the equipment storage area. Two 275-gallon totes were also used to provide a uniform delivery system and ensure that the Dosatron pump was elevated above the fluid level in the totes containing the oxidant solution. The study test area was surrounded with a temporary, lockable security fence and had signs posted detailing the potential hazards on site. The oxidant storage tanks and process piping downstream of oxidant amendment were double contained and discharged into either the oxidant containment area or BP-27 where interlocked level controls shut process operations off if there were to be an issue. No system disruption due to feeding of solution into the subsurface occurred. However, the system shut down twice due to disruptions in power, but no alarms were activated during the pilot study.

3.6 Permitting

Oxidant injection at the site was subject to the EPA Underground Injection Control Program and BP-27 was considered a Class V well; operation of this type of well is authorized by rule (no permit is required). Amec Foster Wheeler submitted inventory information (an online form) as part of the scope of work.

Other permits that may apply to groundwater extraction and injection well systems in Arizona include the Arizona Department of Environmental Quality's Aquifer Protection Permit (APP) and the Arizona Department of Water Resources' Poor Quality Groundwater Withdrawal Permit (PQGWWP). Response or remedial actions performed under Article 5 of Chapter 2 of Arizona Revised Statute (ARS) 49 are exempt from APP requirements pursuant to ARS 49-250 B.18(b). Further, a PQGWWP was not required for the pilot test due to short duration of the test and net zero extraction nature of operations (recirculation).

3.7 Pilot Study Field Testing

Three tests were conducted to evaluate alternative pumping and oxidant amendment strategies:

- Test 1 (Batch Injection): single batch injection of permanganate *[oxidant was added to groundwater extracted during well installation and development and injected into BP-27]*;
- Test 2 (Downgradient Recirculation): the downgradient circulation of permanganate to assist with the spreading of ISCO in the impacted study area as well as enhance the speed of delivery *[groundwater was continuously extracted at approximately 10 gpm from WR-274, circulated back to BP-27, amended with oxidant, and reinjected into BP-27]*; and
- Test 3 (Lateral Recirculation): the lateral circulation of permanganate that would potentially assist with the lateral distribution of ISCO in the study area reducing the number of lateral wells required to distribute oxidant in the study area [*groundwater was continuously extracted at approximately 10 gpm from BP-29, circulated back to BP-27, amended with oxidant, and reinjected into BP-27]*.

The operations conducted including the duration of the tests, the estimated volumes of water extracted from or injected into the various wells, and the mass and concentration of permanganate injected, are listed in **Table 2**. Between tests, groundwater was extracted from downgradient well WR-274A (Downgradient Sweeping) and sidegradient well BP-29 (Lateral Sweeping) and reinjected into BP-27 (without oxidant amendment) to dilute oxidant in the area prior to initiating the next test.

During and between operating test periods (i.e., Tests 1, 2, and 3), the test area was inspected and data were collected. Samples were initially collected more frequently (daily to every three days) but the collection frequency was reduced as the test duration was extended or during sweeping. The University of Arizona (UA) collected supplemental samples for VOC analysis from WR-274A while extraction occurred at this well to perform a contaminant mass discharge (CMD) analysis. Refer to **Tables 3.1** through **3.6** for collected field data. The analytical reports corresponding to samples collected during pilot study sampling are presented in **Appendix B.**

Samples were collected from BP-29 and WR-274A using the submersible pumps installed for recirculation while groundwater samples were collected from the other three wells (BP-26, BP-27 and BP-28) using weighted bailers or HydraSleeve samplers (depending on whether field or laboratory samples were collected). Initially, samples were collected at a consistent depth (333 ft bgs). However, due to differences in the vertical distribution of oxidant in the screened interval, multiple depth samples were collected. As discussed in **Section 4.0** (Results), vertical variation seemed to be limited to the beginning of injection and was less prevalent as the test periods progressed.

Process data were recorded in the field on data sheets (**Appendix D**). Process monitoring consisted of:

- **Oxidant Dosage Monitoring** – Samples were collected from the 6,500-gallon tank containing approximately 2% permanganate solution as well as the oxidant-amended solution injected into BP-27 (samples were collected from the sample port upstream of BP-27 or from within the well with a bailer). Depending on the desired injection concentration and injection volume, the Dosatron pump injected concentrate at a ratio between 1:100 (Test 2) or 1:200 (Test 3) of the recirculated groundwater volume. Injection concentrations achieved during the individual tests are listed in **Table 4**.
- **Injection/Recirculation Volumes** – Digital flow meters were installed in-line to measure the flow rates and total volumes injected into BP-27 and extracted from WR-274A and/or BP-29. Pressures were also monitored in the recirculated groundwater lines and injection well to assure there were no leaks or flow restrictions.
- **Oxidant Monitoring** – Samples were collected from the process flow and test wells (using a dedicated pump or bailer) as indicated in **Tables 3.1** through **3.6** and **Table 5**. Permanganate concentration analysis was initially conducted using test strips in the field. Due to the subjective nature of reading the test strips which limited reproducibility and consistency of analysis, the test strip method was replaced with a spectrophotometric method using a field colorimeter (HACH 900). Select samples were also submitted to the laboratory to evaluate manganese or permanganate for comparison purposes.
- **Oxidation Reduction Potential (ORP) Monitoring** – A handheld ORP meter was used to test oxidant monitoring samples throughout the study. Additionally, a downhole ORP probe was used to evaluate the vertical distribution of oxidant in test wells.
- **Aquifer Chemistry Monitoring** – VOCs and RCRA metals plus manganese and iron were monitored in each test well prior to, during, and after each operating test period.
- **Water Level Monitoring** – Water levels were monitored before and after the batch injection and during recirculation test periods. Monitoring was accomplished with either manual measurements and/or transducers.
- **Field Parameters Monitoring** – Additional field parameters were periodically collected. These included pH and both soluble and insoluble iron.

4.0 RESULTS

4.1 Lithology and Pumping Test Results

The boring logs presented in **Appendix A** indicate that the saturated interval up to 70 ft below the water table has minimal fines and is relatively homogenous (i.e., limited preferential paths). This can promote even distribution of oxidant in the target treatment area.

The pumping test results are presented in **Appendix C**. Using the Cooper-Jacob Method for evaluating pumping test data, the transmissivity ranged from 41,900 gallons per day per foot (gpd/ft) to 43,600 gpd/ft. This equates to an effective groundwater velocity of 0.61 to 0.68 feet per day (ft/day).

4.2 Baseline Conditions

Baseline samples were collected on February 29, 2016, for field and laboratory analysis. The results for ORP, pH and iron are listed in **Tables 3.1** through **3.6** and the laboratory results for VOCs and chromium and manganese are presented in **Table 5**. PCE and trichloroethene (TCE) exceeded their respective Aquifer Water Quality Standards (AWQS) in the baseline samples. The analytical results for RCRA 8 metals are provided in laboratory reports (**Appendix B**); however, chromium and manganese are presented in **Table 5** and discussed in this report. Manganese concentrations were converted to "as sodium permanganate (i.e., $NaMnO_4$) concentrations" in **Table 5** for comparability with oxidant monitoring data.

Samples were collected from the saturated zone of BP-27 (at 345 ft bgs) and BP-28 (at 320 and 350 ft bgs) using a split spoon sampler during drilling to collect samples for NOD analysis. The sample collected from BP-29 (at 300 ft bgs) was collected just above the water table. The report of analysis is presented in **Appendix B**; average demands ranged from 0 to 0.2 grams per kilogram (g/kg) and were calculated on a weight as $NaMnO_4$ per dry weight of soil.

4.3 ISCO Injection

The concentrations of permanganate injected and/or observed in injection well BP-27 for the Batch Injection, Downgradient Recirculation and Lateral Recirculation tests are summarized in **Table 4**. As indicated by this summary of results, there was significant variability in injected permanganate concentration data which is likely attributable to incomplete mixing of stock solutions and disparities in the results of manganese and permanganate analyses. Laboratory split and field versus laboratory data showed limited reproducibility between analyses. Professional judgement was required to estimate average permanganate injection concentrations used for analysis.

The cumulative injection/extraction volumes and oxidant mass injected are presented in **Figure 5**. Approximately 473 pounds (lbs) of permanganate were injected and 952,000 gallons of groundwater were recirculated during the pilot study.

4.4 Tetrachloroethene and Manganese

VOC, chromium and manganese results are summarized in **Table 5** for each well and sample depth; data collected by the UA are also presented. Plots of PCE and permanganate results for the duration of the pilot study are presented in **Figures E.1** through **E.5** in **Appendix E** for BP-26, BP-27, BP-28, BP-29, and WR-274A. The results were used to evaluate the declines in PCE concentrations as a function of test duration and $NaMnO_4$ concentration. During the Downgradient Recirculation test, declines in PCE concentrations were observed in all test wells with the exception of lateral well BP-29 located approximately 50 ft cross gradient of BP-29.

A plot of PCE and reductive dechlorination daughter products for BP-26 is presented in **Appendix E**, **Figure E.6**. The results show a decline in daughter product concentrations that mirrors the PCE concentration declines.

A round of field measurements was conducted on August 2, 2016, 68 days after the test was terminated. Residual permanganate concentrations ranged from 12 milligrams per liter (mg/L) in BP-28 to 42 mg/L in BP-26 (**Tables 3.1** through **3.6**). This corresponds to decreases in permanganate concentrations from May 26, 2016 in BP-27 and BP-28 on the order of 30 mg/L and slight increases in BP-26 and WR-274A.

4.5 Chromium

Chromium concentrations listed in **Table 5** were monitored during the pilot study to determine if the addition of permanganate causes chromium to be mobilized to a point where it exceeds its AWQS of 100 µg/L. As shown in **Appendix E**, **Figures E.7** through **E.11,** an increase in chromium concentrations was indicated but did not exceed 100 µg/L with the highest concentration (32.5 µg/L) observed in BP-26 on May 9, 2016. No other RCRA 8 metal was shown to change significantly due to oxidant injection.

4.6 ORP

ORP was monitored in the field using handheld and downhole meters to evaluate the relationship between permanganate concentrations and ORP as well as to assess the vertical distribution of oxidant in the screened interval of the wells. ORP data are presented in **Tables 3.1** through **3.6** for the handheld instrument measurements and **Appendix F** for the downhole measurements. **Figure F.1** in **Appendix F** presents the relationship between ORP and permanganate based on field data. The results indicate that ORP increases with increases in permanganate concentration until ORP is between 650 and 700 millivolts (mV) where the readings plateau. Plots of the vertical profile are shown in **Appendix F, Figure F.2** in well BP-26 over time. The results show a significant increase in ORP values after permanganate was added. It also shows a slight downward vertical gradient (increase in ORP levels) especially in the upper 5 to 10 ft of the water table. The vertical gradient appears to be less pronounced as the test progresses. In general, there were limited differences in vertical profile a few days after permanganate was reported in the well.

5.0 INTERPRETATION

5.1 Longitudinal Oxidant Travel Times

Based on field measurements of permanganate concentrations in WR-274A, the first arrival of oxidant at this well occurred on April 20, 2016, nine days following the start of injections for the downgradient recirculation phase of the test (**Table 3.6** and **Appendix E, Figure E.5**). Based on field measurements of permanganate concentrations, peak arrival of oxidant occurred May 4, 2017, approximately 23 days from start of the downgradient recirculation phase of the test. This is in agreement with a travel time of 28 days estimated using 2-dimensional (2-D) modeling software AquiferWin32.

5.2 Downgradient PCE Degradation Rate

Although oxidation reactions are known to follow second order kinetics, when permanganate is present in excess, the reaction can be described as pseudo first order with respect to contaminant concentration. The calculated first order rate of PCE concentration decay in downgradient monitoring well BP-26 during the downgradient recirculation portion of the test is estimated in **Appendix G** for data collected at 333 and 355 ft bgs, respectively. The analysis uses the PCE concentration observed on March 28, 2016, as the initial concentration (i.e., Co) prior to downgradient recirculation and PCE concentration data collected from April 11, 2016 through May 9, 2016 (i.e., C) when recirculation introduced permanganate to the region monitored by BP-26 (see **Appendix F, Figure E.1**). As shown in **Appendix G**, **Figures G.1 and G.2**, the first order rate constant (the slope of the line when ln[C/Co] is graphed versus time) is estimated to range from 0.10 to 0.17 $days^{-1}$ using two sets of data (all the data and the last four data points). This rate constant corresponds to an observed PCE concentration half-life on the order 4 to 7 days when permanganate is introduced to the aquifer at BNL. Although it is difficult to separate the effects of PCE oxidation at the location monitored (i.e., BP-26) and recirculating treated groundwater to the location monitored (i.e., dilution with water that has already been exposed to permanganate), the results provide an estimated timeframe required to treat PCE concentrations after permanganate is effectively distributed in the BNL aquifer.

5.3 Contaminant Mass Discharge

Appendix H presents the CMD analysis conducted by the UA to evaluate ISCO performance at the Site. The analysis was conducted using concentration data collected from WR-274A during three stages of groundwater extraction from the well (at relatively consistent rates): prior to oxidant amendment, while permanganate was injected into BP-27, and post oxidant amendment. On the basis of this analysis, declines of approximately 65 to 68% were observed in TCE and PCE concentrations, respectively, during downgradient recirculation. Concentrations were still declining at WR-274A when downgradient recirculation was suspended.

5.4 Lateral Distribution

Lateral distribution of permanganate and destruction of PCE was assessed by evaluating data collected from BP-28 and BP-29. Lateral distribution of permanganate was not observed during the batch injection test. However, measurable levels of permanganate were observed on April

12, 2017 in BP-28 (located approximately 12.8 ft from BP-27) within one day of the start of the downgradient recirculation test based on field measurements of permanganate concentrations provided in **Table 3.4** and graphed in **Appendix E**, **Figure E.3**. As indicated in **Table 3.4**, permanganate concentrations in BP-28 were as high as 90% of the injection concentration by April 15, 2017. Based on field measurements of permanganate concentrations provided in **Table 3.5**, oxidant was not detected in BP-29 until May 9, 2016, seven days after the conclusion of the downgradient recirculation portion of the test. On May 13, 2016 extraction from BP-29 was initiated to supplement sweeping efforts prior to the lateral recirculation test. Even when oxidant amendment was initiated on May 17, 2016 and lateral recirculation was occurring between BP-29 and BP-27 at 10 gpm, the maximum concentration of oxidant detected in the well based on field readings (18.74 ppm on May 18, 2016; **Table 3.5**) was less than 25% of the average injection concentration measured during this 6-day test period (74.96 ppm; **Table 3.2**). These results suggest that lateral distribution of oxidant is limited to between 12 and 25 ft when recirculating longitudinally at 10 gpm and that more than six days would be required for effective lateral distribution with lateral recirculation.

5.5 Effective Permanganate Concentrations

To evaluate the oxidant dose required at the Site to effectively degrade PCE in the aquifer, **Table 6** compiles calculated permanganate concentrations (based on laboratory analyses) measured in BP-26, BP-28, BP-29 and WR-274 that correspond to PCE concentrations that were less than the AWQS during the pilot study. Permanganate concentrations greater than 100 mg/L were excluded from the analysis on the basis that oxidant is expected to be present in excess at this concentration. As indicated in **Table 6**, the minimum permanganate concentration observed when PCE complied with the AWQS was 28 mg/L. It is notable that there were instances where PCE concentrations exceeded the AWQS and oxidant concentrations were elevated. These data (corresponding to permanganate concentrations greater than 1 mg/L) are presented in **Table 7**. The maximum permanganate concentration observed when the PCE concentration exceeded the AWQS was 56 mg/L; however all remaining data corresponded to permanganate concentrations of 35 mg/L or less. Based on the range of effective permanganate concentrations indicated by pilot study data, a target permanganate concentration of 40 mg/L is anticipated to be required to effectively oxidize PCE in the Site aquifer.

Injected permanganate concentrations during the Downgradient Recirculation and Lateral Recirculation test periods were compared with peak concentrations that effectively oxidized VOCs in the test area. Based on this analysis summarized in **Table 8**, the estimated minimum permanganate concentration required to achieve a permanganate concentration of 40 mg/L at the observation wells used during the pilot study ranged from 42 and 61 mg/L.

5.6 Persistence of Permanganate in the Test Area

As of August 2, 2016 (71 days after the suspension of oxidant injection during Lateral Recirculation), residual permanganate concentrations in the test area were 42 mg/L in BP-26, 18 mg/L in BP-27, 12 mg/L in BP-28 and 42 mg/L in WR-274A. Oxidant concentrations in BP-29 were not measured on August 2, 2016 due to the inability to lower a bailer to groundwater. Due to the limited NOD in the aquifer, residual permanganate will continue to oxidize VOCs in the

study area for as long as it remains reactive and present at effective concentrations. In addition to decreases due to reactions with contaminants or natural organic matter, permanganate concentrations are expected to decrease due to dispersion and dilution. Residual levels of permanganate, chromium, and VOCs will continue to be monitored in the test area during routine groundwater monitoring until concentrations dissipate to pre-test conditions.

6.0 RESULTS AND IMPLICATIONS

6.1 Summary of Pilot Study Results

The information collected during the ISCO Pilot Study that will be used to develop a conceptual design for a full-scale oxidant injection system at the Site is summarized below:

- **Travel Times:** Travel times will determine the time period required to distribute oxidant in the target treatment area. Based on aquifer testing, the effective groundwater velocity is on the order of 0.6 to 0.7 ft/day. When pumping WR-274A at 10 gpm and reinjecting 50 ft upgradient in BP-27, the peak arrival of oxidant occurred 23 days after injection. This equates to a groundwater velocity of 2.1 ft/day which is in agreement with a 2-D groundwater model (AquiferWin32) run groundwater velocity of 1.7 ft/day.
- **Pumping Rate:** The recirculation pump installed in BP-29 for the ISCO pilot study achieved pumping rates of 16 gpm with only 1.5 ft of drawdown. Based on the specific capacity of the well of this well, a pumping rate of 40 gpm can be achieved in the study area with the current well design.
- **Natural Oxidant Demand:** The NOD of the aquifer is negligible. NOD results of soil in the saturated interval ranged from 0 to 0.2 g/kg. Based on these results, there appear to be limited natural sinks at the Site that will consume oxidant. This reduces the amount of oxidant that is required to oxidize the COCs.
- **Oxidant Delivery System:** Batch and recirculation oxidant delivery approaches were evaluated during the Pilot Study. Despite injected concentrations that were higher than those used during recirculation, no measurable amount of oxidant was detected and no associated decrease in COC concentrations was noted in observation wells located 12.8 and 24.8 ft from the injection well during the batch test period. During the recirculation test, declines in COC concentrations were observed in a downgradient recirculation well located 50 ft downgradient of the injection well. Based on these results, recirculation of oxidant appears to be a more effective approach to distributing oxidant at the Site.
- **Lateral Distribution of Oxidant:** Lateral distribution of oxidant was limited during the 6-day Lateral Recirculation Test period. Well BP-29 (located 25.4 ft sidegradient of the injection well) was pumped at 10 to 16 gpm but only 20% of the concentration injected at BP-27 was observed at BP-29 and destruction of PCE to less than the AWQS was not achieved. Based on the results of the pilot test, a lateral spacing of less than 25 ft was required for adequate distribution of oxidant at an extraction-injection rate of 16 gpm. It is anticipated that the required lateral spacing could increase at greater extraction and injection flowrates.

- **Oxidant Dosage Concentration:** ISCO is effective at treating PCE and TCE at the site to concentrations that are less than the AWQS. Based on Pilot Study results, oxidant concentrations in the aquifer on the order of 40 mg/L are anticipated to be required. To achieve this level of oxidant in the treatment area, injected concentrations will likely need to be greater. It is estimated that injected oxidant concentrations ranging from 45 to 65 mg/L were required to achieve effective treatment in the test area during the Pilot Study.
- **Oxidant Persistence:** Due to negligible NOD at the Site, permanganate persisted in the test zone for a date range of at least 71 days after ISCO injection was terminated. Persistence of the oxidant will need to be addressed in a full-scale system.
- **Oxidant Destruction Rates:** The rate of PCE destruction to concentrations less than the AWQS was relatively rapid during the Pilot Study. If the maximum PCE concentration observed prior to the Pilot Study (120 µg/L) is representative and the half-life of PCE is 4 to 7 days, the AWQS is estimated to be achieved 20 to 35 days after oxidant is effectively distributed to the target treatment area.
- **Changes in Aquifer Chemistry:** Changes in aquifer chemistry due to oxidant injection were monitored during the Pilot Study. Parameters monitored included pH, RCRA 8 metals plus manganese and iron. pH levels ranged from 7.3 to 8.4 during the test and remained near neutral or at pre-test levels. Chromium concentrations increased as a result of oxidant injection with a maximum observed concentration of 32.5 µg/L which is less than the AWQS for chromium (although not specifically tested for, it is anticipated that chromium would be present as hexavalent chromium). As expected, manganese concentrations increased due to the injection of permanganate ($NaMnO_4$) during the test. There is no AWQS for manganese but it does have a secondary drinking water Maximum Contaminant Level of 0.05 mg/L. Manganese concentrations in all of the pilot study wells exceeded this threshold with the maximum concentration detected in BP-26 at 51 mg/L. It is expected that manganese concentrations will return to background levels as the permanganate diffuses and disperses into the aquifer. Changes in iron and the RCRA 8 metals (excluding chromium) were negligible during the test.
- **ORP Monitoring:** ORP is a good indicator of the presence and strength of oxidant in the test area and downhole ORP monitoring may be a useful tool during full-scale implementation of ISCO to evaluate the vertical distribution of oxidant. It is notable that ORP values leveled off between 650 mV to 760 mV and did not correlate well with permanganate concentrations at higher concentrations of oxidant. For test evaluation purposes, this may not be critical because ORP levels greater than 650 mV show adequate oxidant is present.
- **Vertical Gradient:** Downhole vertical ORP profiles shown in **Figure F.2** indicate a slight downward vertical gradient (e.g., increase in permanganate concentrations) during the initial phase of oxidant injection. The vertical variation decreased as injection continued such that this is not expected to be a major concern with distributing oxidant in the impacted zone during full-scale remediation. Based on these results, the screened interval of the injection well may be modified (placed shallower) in a full-scale system to account for the downward migration of oxidant.

- **Field Monitoring of $NaMnO_4$:** Use of the HACH 900 colorimeter increased the consistency and reduced the subjectivity of field oxidant analysis when compared to use of permanganate test strips. This along with visual inspection of the groundwater color (pink to purple) and ORP are adequate for monitoring the presence of oxidant in the remediation zone.

6.2 Implications for Full-Scale Conceptual Design

Use of ISCO as a strategy to treat high concentrations of PCE in groundwater at the Site is advantageous for multiple reasons. The most significant of which is that the source area, particularly at BNL, has been contaminating groundwater at the Site for over 30 years and the duration that the source area will continue to contaminate groundwater in the future is difficult to predict. Although the SVE ERA conducted in September 2002 at BNL removed PCE-impacted soil vapor that served as a major source of groundwater contamination in the underlying GOU, groundwater PCE concentrations at source area wells R-068A and WR-274A increased after the cessation of SVE, concurrent with a rise in the groundwater table. This suggests that residual contamination present in the vadose zone was mobilized by groundwater that rose into previously unsaturated pore spaces. Residual contamination in the vadose zone often remains after SVE operations cease because these systems are not capable of removing all the contamination present in the treatment area. In addition to the inefficiencies of the systems themselves, there are mass transfer limitations of soils that result in diminishing returns of contaminant extraction with prolonged treatment system operation. Soil vapor contamination can sorb onto soil surfaces and/or diffuse over time into soil pores as impacted soil vapor or contaminated soil moisture. This contamination can be difficult to remove with an SVE system but can be addressed once submerged in the saturated zone with ISCO.

Based on the results of pilot study testing, ISCO is a viable technology for addressing residual Site contamination in the GOU underlying the LOU source area. Given the relatively homogenous and permeable lithology and negligible NOD of the aquifer, relatively little oxidant is necessary to treat a large volume of contaminated aquifer. The recommended remedial approach would involve extraction of groundwater at the downgradient edge of the source area, amendment with permanganate or another effective oxidant, and reinjection at the upgradient edge of the target treatment zone. This recirculation approach would continue until oxidant has been distributed throughout the treatment zone and PCE concentrations decline to less than the AWQS. Active recirculation would serve to both distribute the oxidant and increase advective flow in the area believed to be most impacted by residual contamination at the Site.

To scale the results from the pilot study to a larger area for conceptual evaluation during the Feasibility Study, the Site groundwater model was used to estimate capture zones, required process well placement/spacing, and treatment time frames. The process used to develop these estimates was as follows:

- **Development of the ISCO Target Treatment Area:** The intersection of the LOU with the extent of the GOU, as defined by the most recent comprehensive groundwater monitoring event (Amec Foster Wheeler, 2017), served as the initial basis for developing the target ISCO treatment area. **Figure 6** presents both the 2015 PCE plume map and

associated groundwater PCE concentrations for existing wells in this vicinity of the Site. Using groundwater PCE data collected in January/February 2015 at D-022A, WR-275A, R-068A, WR-273A, WR-353A, and R-069A, the target treatment area was refined to a 600 by 1300-ft region between WR-274A and R-068A oriented in the direction of groundwater flow. The basis for defining this region as the target treatment area is that WR-274A was the most impacted groundwater well at the site in 2015 (prior to the ISCO pilot study) and R-068A was one of the most impacted groundwater wells at the Site prior to the SVE ERA. Groundwater PCE concentrations at R-068A decreased from 290 µg/L in 2002 to 45 µg/L in 2005. Concentrations rebounded to 110 µg/L in 2008 and declined to approximately 25 µg/L in 2015. It is anticipated that groundwater previously located in the vicinity of R-068A has migrated downgradient towards WR-274A and has since been further impacted with residual contamination between the two wells. The lateral extent of the target treatment area was assumed to extend from the longitudinal centerline of the treatment area defined by WR-274A and R-068A to the southern extent of the GOU defined by D-022A and WR-275A. If ISCO is retained as part of the remedy for the site, expansion of the target treatment area to the north and east should be evaluated during remedy implementation.

- **Evaluation of Process Well Requirements:** Using the sustainable extraction rate derived from the pilot study (i.e., 40 gpm), the Site groundwater model was used to evaluate how many extraction/injection wells would be required to provide adequate coverage of the target treatment area. Based on this analysis, two extraction wells operating at 40 gpm should be capable of capturing the anticipated lateral width of the treatment region. Particle tracking analysis with the groundwater model was also performed to assess travel times between various configurations of extraction and injection wells located in the area to determine a recirculation system well configuration that minimized the number of new wells required (to control costs) and provided flexibility in operations. The retained configuration included the installation of one additional extraction well at the downgradient edge of the treatment area (EX-2 in **Figure 6**), two injection (or extraction) wells located in the middle of the treatment area (INJ-1 and INJ-2 in **Figure 6**), and one additional injection well located at the upgradient edge of the treatment area (INJ-3 in **Figure 6**). Existing wells BP-27 (for extraction) and R-068A (for injection) would be used to complete the recirculation well system. **Figure 6** presents the modeled capture zone of recirculation system operations using the retained well configuration. Existing wells WR-274A and D-022A would be used to monitor process operations.
- **Development of Operating Sequence:** Using the estimated travel times derived from particle tracking analysis, a conceptual operating sequence for recirculation well operations was developed for evaluation in the Feasibility Study. Startup of injection in the middle of the treatment area was assumed prior to initiating recirculation operations across the entire extent of the target treatment area. This would be conducted to promote assessment of whether the recirculation system is operating as anticipated. This interim scenario would be conducted by extracting approximately 80 gpm from BP-27 and EX-2, amending the extracted water with oxidant, and injecting the amended water into INJ-1 and INJ-2 for a minimum of one year. Recirculation across the entire extent of the target treatment area (i.e., extracting 80 gpm from BP-27 and EX-2 and

injecting oxidant amended water into INJ-3 and R-069A) would occur thereafter. For the purpose of the conceptual operating sequence, recirculation across the entire target treatment area was assumed to begin in year two. The estimated travel time between extraction at BP-27 and EX-2 and injection at INJ-3 and R-069A is approximately two years and increments of this travel time are noted on **Figure 6**. A six year duration of recirculation operations across the entire extent of the target treatment area was assumed to allow three circulations of groundwater to occur over the duration of ISCO treatment operations.

TABLES

Table 1 ISCO Well Construction Information

Well ID	Northing	Easting	Reference Elevation (ft amsl)	Depth Drilled (ft bgs)	Well Depth (ft bgs)	Well Diameter (inches)	Slot size (inch)	Screened Intervals (ft bgs)	Sump Length (ft)	Comments
BP- 26	448062.035	1033700.159	2567.43	367	365	6	0.04	305-365	0	
BP-27	448063.978	1033724.898	2567.69	367	365	6	0.04	285-365	0	2-inch injection stinger screened from 310 to 340 ft bgs
BP-28	448051.067	1033725.392	2568.07	367	365	6	0.04	305-365	0	
BP-29	448038.648	1033726.174	2568.08	380.9	380	6	0.04	305-375	5	pump installed; pump intake at 370 ft bgs
WR-274A	448059.914	1033675.334	2568.65	---	350	5	---	306-346	---	pump intake at 341 ft bgs

Notes:
Coordinate System is NAD83 HARN AZ State Plane Central Intl feet
ft = foot, feet
ft amsl = feet above mean sea level
ft bgs = feet below ground surface
ID = Identification

Distance Between Injection Well and Other Study Wells

Well	Distance from BP-27 (ft)	Well Purpose
BP-26	24.8	Downgradient Monitoring
BP-27	0.0	Injection
BP-28	12.9	Lateral Monitoring
BP-29	25.4	Lateral Recirculation
WR-274A	49.7	Downgradient Recirculation

Table 2 Summary of Operations and Operational Data

Operation	Start Date	End Date	Description	Total Volume Per Operation[1]				Cumulative Total Volume[1]				Oxidant Injection		
				BP-29	WR-274A	Combined[2]	BP-27[2]	BP-29[3]	WR-274A	Combined[2]	BP-27[2]	Target Oxidant Concentration in Injected Solution	Oxidant Mass	Oxidant Volume as 40% $NaMnO_4$ Solution
				Extraction	Extraction	Extraction	Injection	Extraction	Extraction	Extraction	Injection			
				(gallons)	(gallons)	(gallons)	(gallons)	(gallons)	(gallons)	(gallons)	(gallons)	(%)	(lbs)	(gallons)
Batch Injection (Test 1)	2/29/16	3/28/16	4,000 gallons of a 0.04% $NaMnO_4$ solution was gravity fed into BP-27 from 2/29/16 to 3/1/16; monitoring was conducted over the remaining duration of the test	0	0	0	4,000*	Not Recorded	Not Recorded	Not Recorded	4,000*	0.04	14	3
Batch Injection Sweeping	3/29/16	4/11/16	Groundwater was continuously extracted from WR-274A at approximately 13 gpm and reinjected (without $NaMnO_4$ amendment) into BP-27	0	247,230	247,230	253,989	Not Recorded	247,230	Not Recorded	253,989	-	-	-
Downgradient Recirculation (Test 2)	4/11/16	5/2/16	Groundwater was continuously extracted from WR-274A at approximately 10 gpm, amended with $NaMnO_4$ via proportional metering (1:100), and reinjected into BP-27	Not Recorded	263,475	Not Recorded	269,359	7,493	510,705	518,198	523,348	0.02	415	91
Downgradient Sweeping	5/2/16	5/13/16	Groundwater was continuously extracted from WR-274A at approximately 10 gpm and reinjected (without $NaMnO_4$ amendment) into BP-27	219**	172,667	172,886	186,682	7,712	683,372	691,084	710,030	-	-	-
Lateral Sweeping	5/13/16	5/17/16	Groundwater was continuously extracted from BP-29 at approximately 16 gpm and reinjected (without $NaMnO_4$ amendment) into BP-27	95,943	2,352	98,295	99,274	103,655	685,724	789,379	809,304	-	-	-
Lateral Recirculation (Test 3)	5/17/16	5/23/16	Groundwater was continuously extracted from BP-29 at approximately 10 gpm, amended with $NaMnO_4$ via proportional metering (1:200), and injected into BP-27	93,562	129**	93,691	95,430	197,217	685,853	883,070	904,734	0.01	44	10
Lateral Sweeping	5/23/16	5/27/16	Groundwater was continuously extracted from BP-29 at approximately 10 gpm and reinjected (without $NaMnO_4$ amendment) into BP-27	46,577	237**	46,814	46,964	243,794	686,090	929,884	951,698	-	-	-
												Total =	473	103

Notes:

% = percent

lbs = pounds

$NaMnO_4$ = sodium permanganate

[1] Volumes processed were estimated using flow meter totalizer data.

[2] Discrepancies between extraction and injection totals are likely due to poor flow meter accuracy (±3%); injection totals used in report.

[3] The volume extracted during the pumping test conducted at BP-29 was not recorded but contributes to the cumulative volume noted as extracted from BP-29 as of the end of Test 2.

* Batch injection not processed through BP-27 flow meter.

**Negligible volumes (less than 300 gallons) were extracted during sampling activities conducted at WR-274A and BP-29.

Table 3.1 Summary of Collected Field Data at BP-26

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Baseline	2/29/16	8:45	306.92	--	--	--	--	--	--	--	--	--	--
Baseline	2/29/16	14:40	--	320	--	--	--	181.1 [1]	6.93 [1]	--	--	Clear	--
Baseline	2/29/16	15:00	--	333	--	--	--	265.7 [1]	7.00 [1]	0	0	Clear	--
Baseline	2/29/16	15:10	--	345	--	--	--	259.5 [1]	6.50 [1]	--	--	Clear	--
Batch Injection	2/29/16	18:40	--	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	2/29/16	19:25	--	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	3/1/16	16:10	306.86	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	3/2/16	8:00	306.90	bailer	<0.05	--	--	216	--	--	--	Clear	--
Batch Injection	3/2/16	14:20	306.82	bailer	<0.05	--	--	220	--	--	--	Clear	--
Batch Injection	3/4/16	8:12	306.88	bailer	<0.05	--	--	98	--	--	--	Clear	--
Batch Injection	3/4/16	14:36	306.73	bailer	<0.05	--	--	--	7.20	--	--	Clear	--
Batch Injection	3/7/16	8:51	306.64	bailer	<0.05	--	--	--	7.20	--	--	Clear	--
Batch Injection	3/9/16	10:28	306.86	bailer	<0.05	--	--	188	7.42	--	--	Clear	--
Batch Injection	3/11/16	10:30	306.87	bailer	<0.05	--	--	240	7.29	--	--	Clear	--
Batch Injection	3/14/16	9:37	306.83	bailer	<0.05	--	--	207	7.38	--	--	Clear	--
Batch Injection	3/16/16	7:45	306.74	bailer	<0.05	--	--	200	7.6	--	--	Clear	--
Batch Injection	3/21/16	9:40	306.78	bailer	<0.05	--	--	202	7.59	--	--	Clear	--
Batch Injection	3/23/16	14:38	306.91	bailer	<0.05	--	--	228	7.55	--	--	Clear	--
Batch Injection	3/28/16	9:43	306.59	333	<0.05	--	--	197	7.51	--	--	Clear	--
Batch Injection	3/28/16	9:43	306.59	345	<0.05	--	--	198	7.41	--	--	Clear	--
Batch Injection Sweeping	3/29/16	9:50	--	bailer @ 333	<0.05	--	--	211	7.28	--	--	Clear	--
Batch Injection Sweeping	3/29/16	12:43	306.79	bailer @ 333	<0.05	--	--	190	7.34	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	14:52	306.75	bailer @ 333	<0.05	--	--	192	7.37	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	7:15	306.66	bailer @ 333	<0.05	--	--	144	7.41	--	--	Clear	--
Batch Injection Sweeping	3/30/16	9:11	306.9	bailer @ 333	<0.05	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	11:05	306.92	bailer @ 333	<0.05	--	--	147	7.40	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	13:30	306.9	bailer @ 333	<0.05	--	--	143	7.48	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	15:38	306.72	bailer @ 333	<0.05	--	--	146	7.44	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/31/16	5:52	306.65	bailer @ 333	<0.05	--	--	147	7.50	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/1/16	11:21	306.73	bailer @ 333	<0.05	--	--	154	7.51	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	8:43	306.9	bailer @ 333	<0.05	--	--	213	7.30	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	10:48	306.85	bailer @ 333	<0.05	--	--	213	7.35	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	11:25	--	bailer @ 333	0.01	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	8:27	306.82	bailer @ 333	0.15	--	--	419	7.45	--	--	Very Lt. Pink	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	11:20	--	HS @320	0.15	--	--	423	7.52	--	--	Very Lt. Pink	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	11:26	--	HS @333	0.15	--	--	428	7.51	--	--	Very Lt. Pink	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	11:33	--	HS @345	0.15	--	--	451	7.54	--	--	Very Lt. Pink	Pumping at WR-274A
Batch Injection Sweeping	4/11/16	7:06	306.97	bailer @ 333	0.2	--	--	388	7.02	--	--	Very Lt. Pink	Pumping at WR-274A (off at 8:00)
Batch Injection Sweeping	4/11/16	8:45	--	HS @333	0.3	--	--	275	7.24	0.1	0.3	Very Lt. Pink	Pump off
Batch Injection Sweeping	4/11/16	9:00	--	HS @345	0.2	--	--	479	7.52	0.1	0.4	Very Lt. Pink	Pump off
Batch Injection Sweeping	4/11/16	14:43	306.57	--	--	--	--	--	--	--	--	--	Pump off
Batch Injection Sweeping	4/11/16	15:27	--	bailer @ 333	0.5	--	--	456	7.39	--	--	Lt. Pink	Pump off
Downgradient Recirc.	4/11/16	17:57	--	HP @ 320	0.12	--	--	4520	7.57	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/11/16	17:57	--	HP @ 333	0.07	--	--	487	7.55	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/11/16	17:57	--	HP @ 345	0.15	--	--	490	7.5	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/12/16	10:50	--	HP @ 320	0.15	--	--	475	7.52	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/12/16	10:50	--	HP@ 333	0.15	--	--	481	7.5	--	--	Lt. Pink	Pumping / Injecting

Table 3.1 Summary of Collected Field Data at BP-26

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Downgradient Recirc.	4/12/16	10:50	--	HP @ 345	0.15	--	--	487	7.56	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/12/16	15:13	306.77	bailer @ 333	0.15	--	--	484	7.53	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/13/16	8:56	306.82	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/13/16	13:55	--	HP @ 320	0.15	--	--	503	7.46	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/13/16	13:55	--	HP@ 333	0.1	--	--	504	7.51	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/13/16	13:55	--	HP @ 345	0.15	--	--	512	7.42	--	--	Lt. Pink	Pumping / Injecting
Downgradient Recirc.	4/15/16	8:35	306.42	--	--	--	--	--	--	--	--	Purple	Pumping / Injecting
Downgradient Recirc.	4/15/16	--	--	HP @ 320	0.15	--	--	509	7.65	--	--	Purple	Pumping / Injecting
Downgradient Recirc.	4/15/16	--	--	HP@ 333	0.15	--	--	535	7.58	--	--	Purple	Pumping / Injecting
Downgradient Recirc.	4/15/16	--	--	HP @ 345	0.15	--	--	535	7.62	--	--	Purple	Pumping / Injecting
Downgradient Recirc.	4/18/16	12:15	306.76	bailer @ 333	5	1	--	565	7.64	--	--	Purple	Pumping / Injecting
Downgradient Recirc.	4/18/16	--	--	HP @ 320	7	1	--	577	7.77	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/18/16	--	--	HP@ 333	3	--	--	576	7.72	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/18/16	--	--	HP @ 345	3	--	--	584	7.73	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/18/16	--	--	HP@ 355	0.5	--	--	565	8.07	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/20/16	8:51	306.68	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc.	4/20/16	10:10	--	HP @ 320	1.5	--	--	598	7.58	--	--	Pink	Pumping / Injecting
Downgradient Recirc.	4/20/16	10:10	--	HP@ 333	5	1	--	613	7.53	--	--	Pink	Pumping / Injecting
Downgradient Recirc.	4/20/16	10:10	--	HP @ 345	5	1	--	606	7.63	--	--	Pink	Pumping / Injecting
Downgradient Recirc.	4/20/16	10:10	--	HP@ 355	5	1	--	608	7.65	--	--	Pink	Pumping / Injecting
Downgradient Recirc.	4/22/16	9:02	306.46	--	--	--	--	--	--	--	--	Purple Pink	System shutdown overnight
Downgradient Recirc.	4/22/16	--	--	HP @ 320	20	2	--	625	7.64	--	--	Purple Pink	Pumping / Injecting
Downgradient Recirc.	4/22/16	--	--	HP@ 333	15	2	--	620	7.68	--	--	Purple Pink	Pumping / Injecting
Downgradient Recirc.	4/22/16	--	--	HP @ 345	5	1	--	613	7.75	--	--	Purple Pink	Pumping / Injecting
Downgradient Recirc.	4/22/16	--	--	HP@ 355	5	1	--	620	7.67	--	--	Purple Pink	Pumping / Injecting
Downgradient Recirc.	4/25/16	9:08	306.5	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc.	4/25/16	11:06	--	HP @ 320	15	2	--	599	7.73	--	--	Purple	--
Downgradient Recirc.	4/25/16	11:06	--	HP@ 333	15	2	--	625	7.75	--	--	Purple	--
Downgradient Recirc.	4/25/16	11:06	--	HP @ 345	15	2	--	633	7.72	--	--	Purple	--
Downgradient Recirc.	4/25/16	11:06	--	HP@ 355	20	2	--	606	7.78	--	--	Purple	--
Downgradient Recirc.	4/27/16	7:59	306.6	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc.	4/27/16	12:10	--	HP @ 320	20	2	21.94	637	7.56	--	--	Purple	--
Downgradient Recirc.	4/27/16	12:22	--	HP@ 333	20	2	25.49	640	7.62	--	--	Purple	--
Downgradient Recirc.	4/27/16	12:28	--	HP @ 345	20	2	23.43	643	7.71	--	--	Purple	--
Downgradient Recirc.	4/27/16	12:37	--	HP@ 355	20	2	26.43	646	7.65	--	--	Purple	--
Downgradient Recirc.	5/2/16	8:35	306.77	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/2/16	13:59	--	HP @ 320	20	2	37.76	607	8.05	--	--	Purple	Switched to pumping from WR-274A and injecting into BP-27 without permanganate injection
Downgradient Sweeping	5/2/16	13:59	--	HP@ 333	20	2	50.02	633	8.04	--	--	Purple	--
Downgradient Sweeping	5/2/16	13:59	--	HP @ 345	20	2	49.33	634	8.16	--	--	Purple	--
Downgradient Sweeping	5/2/16	13:59	--	HP@ 355	20	2	49.96	638	8.09	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:40	306.52	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/3/16	7:40	--	HP @ 320	20	2	47.64	659	7.69	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:40	--	HP@ 333	20	2	59.73	666	7.7	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:40	--	HP @ 345	20	2	58.33	669	7.64	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:40	--	HP@ 355	20	2	62.56	673	7.64	--	--	Purple	--

Table 3.1 Summary of Collected Field Data at BP-26

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Downgradient Sweeping	5/4/16	6:59	306.51	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/4/16	8:35	--	HP @ 320	--	--	62.08	668	7.71	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:35	--	HP@ 333	--	--	62.21	671	7.73	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:35	--	HP @ 345	--	--	63.33	673	7.68	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:35	--	HP@ 355	--	--	63.38	674	7.7	--	--	Purple	--
Downgradient Sweeping	5/6/16	7:50	306.54	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/6/16	9:45	--	HP @ 320	--	--	55.3	627	7.63	--	--	Purple	--
Downgradient Sweeping	5/6/16	9:45	--	HP@ 333	--	--	49.42	651	7.65	--	--	Purple	--
Downgradient Sweeping	5/6/16	9:45	--	HP @ 345	--	--	49.37	649	7.66	--	--	Purple	--
Downgradient Sweeping	5/6/16	9:45	--	HP@ 355	--	--	50.88	645	7.64	--	--	Purple	--
Downgradient Sweeping	5/9/16	6:54	306.59	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	9:30	--	HP @ 320	--	--	64.01	665	7.7	--	0.2	Purple	--
Downgradient Sweeping	5/9/16	9:30	--	HP@ 333	--	--	82.81	674	7.69	--	--	Purple	--
Downgradient Sweeping	5/9/16	9:30	--	HP @ 345	--	--	84.34	675	7.7	--	0.1	Purple	--
Downgradient Sweeping	5/9/16	9:30	--	HP@ 355	--	--	82.51	680	7.7	--	--	Purple	--
Downgradient Sweeping	5/11/16	7:46	306.59	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	9:50	--	HP @ 320	--	--	57.56	646	7.85	--	--	Purple	--
Downgradient Sweeping	5/11/16	9:50	--	HP@ 333	--	--	71.5	652	7.75	--	--	Purple	--
Downgradient Sweeping	5/11/16	9:50	--	HP @ 345	--	--	72.01	653	7.7	--	--	Purple	--
Downgradient Sweeping	5/11/16	9:50	--	HP@ 355	--	--	74.84	653	7.89	--	--	Purple	--
Downgradient Sweeping	5/13/16	8:21	306.74	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/13/16	11:58	--	HP @ 320	--	--	62.47	674	7.18	--	--	--	Switched to pumping from BP-29
Lateral Sweeping	5/13/16	11:58	--	HP@ 333	--	--	69.02	677	7.19	--	--	--	--
Lateral Sweeping	5/13/16	11:58	--	HP @ 345	--	--	68.52	679	7.32	--	--	--	--
Lateral Sweeping	5/13/16	11:58	--	HP@ 355	--	--	74.14	682	7.32	--	--	--	--
Lateral Sweeping	5/16/16	9:13	306.07	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/16/16	14:15	--	HP @ 320	--	--	12.45	604	8.04	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:15	--	HP@ 333	--	--	18.3	611	8.05	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:15	--	HP @ 345	--	--	21.19	613	7.99	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:15	--	HP@ 355	--	--	19.75	613	8.02	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	6:51	306.06	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/17/16	11:00	--	HP @ 320	--	--	11.69	627	7.86	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:00	--	HP@ 333	--	--	11.57	626	8.01	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:00	--	HP @ 345	--	--	12.17	625	8.08	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:00	--	HP@ 355	--	--	15.26	626	8.14	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	15:56	306	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/17/16	18:35	--	HP @ 320	--	--	13.03	635	7.83	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:35	--	HP@ 333	--	--	14.33	634	7.89	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:35	--	HP @ 345	--	--	17.79	638	8	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:35	--	HP@ 355	--	--	17.37	644	8	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	6:12	306.16	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	9:32	--	HP @ 320	--	--	15.56	664	7.62	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:32	--	HP@ 333	--	--	15.81	657	7.7	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:32	--	HP @ 345	--	--	17.64	656	7.8	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:32	--	HP@ 355	--	--	18.7	655	7.87	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	14:26	306.12	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	16:40	--	HP @ 320	--	--	18.95	656	7.71	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	16:40	--	HP@ 333	--	--	20.81	655	7.77	--	--	Lt. Purple	--

Table 3.1 Summary of Collected Field Data at BP-26

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Lateral Recirculation	5/18/16	16:40	--	HP @ 345	--	--	--	--	--	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	16:40	--	HP@ 355	--	--	22.88	651	7.76	--	--	Lt. Purple	--
Lateral Recirculation	5/20/16	9:20	306.12	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	12:08	--	HP @ 320	--	--	22.09	649	7.88	--	--	Purple	--
Lateral Recirculation	5/20/16	12:08	--	HP@ 333	--	--	26.87	649	7.9	--	--	Purple	--
Lateral Recirculation	5/20/16	12:08	--	HP @ 345	--	--	25.07	648	7.9	--	--	Purple	--
Lateral Recirculation	5/20/16	12:08	--	HP@ 355	--	--	25.63	649	7.87	--	--	Purple	--
Lateral Recirculation	5/23/16	10:04	306.1	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/23/16	15:23	--	HP @ 320	--	--	30.47	667	7.75	--	--	Lt. Purple	--
Lateral Recirculation	5/23/16	15:23	--	HP@ 333	--	--	39.87	686	7.78	--	--	Lt. Purple	--
Lateral Recirculation	5/23/16	15:23	--	HP@ 355	--	--	38.16	682	7.81	--	--	Lt. Purple	--
Lateral Sweeping	5/24/16	7:10	306.14	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:35	--	HP @ 320	--	--	39.58	662	7.63	--	--	--	--
Lateral Sweeping	5/24/16	9:35	--	HP@ 333	--	--	53.2	664	7.85	--	--	--	--
Lateral Sweeping	5/24/16	9:35	--	HP @ 345	--	--	74.5	670	7.87	--	--	--	--
Lateral Sweeping	5/24/16	9:35	--	HP@ 355	--	--	73.6	669	7.99	--	--	--	--
Lateral Sweeping	5/24/16	12:52	--	HP @ 320	--	--	40.05	665	7.73	--	--	--	--
Lateral Sweeping	5/24/16	12:52	--	HP@ 333	--	--	55.5	676	7.75	--	--	--	--
Lateral Sweeping	5/24/16	12:52	--	HP @ 345	--	--	76.13	679	7.86	--	--	--	--
Lateral Sweeping	5/24/16	12:52	--	HP@ 355	--	--	73.48	672	7.84	--	--	--	--
Lateral Sweeping	5/25/16	6:09	306.11	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/25/16	8:19	--	HP @ 320	--	--	35.07	658	7.74	--	--	Lt. Purple	--
Lateral Sweeping	5/25/16	8:19	--	HP@ 333	--	--	42.07	661	7.77	--	--	Lt. Purple	--
Lateral Sweeping	5/25/16	8:19	--	HP @ 345	--	--	42.59	662	7.78	--	--	Lt. Purple	--
Lateral Sweeping	5/25/16	8:19	--	HP@ 355	--	--	41.6	662	7.78	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	7:23	306.12	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/27/16	13:10	--	HP @ 320	--	--	26.32	666	7.86	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	13:10	--	HP@ 333	--	--	19.47	654	7.89	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	13:10	--	HP @ 345	--	--	20.12	657	7.87	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	13:10	--	HP@ 355	--	--	20.38	661	7.85	--	--	Lt. Purple	--
Post-Test	8/2/16	--	305.98	--	--	--	42.14	542	7.25	--	--	--	--

Notes:

Batch injection started 2/29 at 17:10.

[1] Sample analyzed using a YSI with sample in a cup.

btoc = below top of casing

mV = millivolts

ORP = oxidation reduction potential

ppm = parts per million

SU = standard unit

Table 3.2 Summary of Collected Field Data at BP-27 (Injection Sample Port)

Test	Date	Time	Sample Depth	From Well Head			Dosatron Setting	Field Test Results							Water Color	Comments
				Flow Rate	Totalizer	Pressure		Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Batch Injection	2/29/16	17:20	Sample Port	--	--	--	--	--	--	--	241.9	6.89	--	--	--	--
Batch Injection	2/29/16	18:50	Sample Port	--	--	--	--	50	2	--	228.8	7.06	0	0	--	--
Downgradient Recirc	4/11/16	14:50	Sample Port	0	248536	0	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc	4/11/16	15:10	Sample Port	10.19	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc	4/11/16	15:33	Sample Port	10.18	248888	16	1:100	50	2	--	568	--	--	--	Purple	--
Downgradient Recirc	4/11/16	16:57	Sample Port	10.21	--	--	1:100	50	2	--	571	--	--	--	Purple	--
Downgradient Recirc	4/11/16	16:57	Sample Port	10.21	--	--	1:100	50	2	--	571	--	--	--	Purple	Split sample sent to Test America
Downgradient Recirc	4/12/16	9:55	Sample Port	10.08	260072	--	1:100	50	2	--	608	8.41	--	--	Purple	--
Downgradient Recirc	4/12/16	15:42	Sample Port	10.18	263554	16	1:100	50	2	--	626	8.23	--	--	Purple	--
Downgradient Recirc	4/13/16	12:45	Sample Port	10.13	276622	16	1:100	50	2	--	650	8.56	--	--	Purple	--
Downgradient Recirc	4/15/16	9:10	Sample Port	10.13	303962	16.5	1:100	50	2	--	636	8.46	--	--	Purple	--
Downgradient Recirc	4/15/16	15:35	--	10.12	307046	16.5	--	--		--	--	--	--	--	--	--
Downgradient Recirc	4/18/16	11:55	Sample Port	9.9	345829	16	1:100	--	--	--	540	8.17	--	--	Purple	--
Downgradient Recirc	4/20/16	8:47	Sample Port	10.08	375991	16	1:100	50	2	--	633	8.44	--	--	Purple	--
Downgradient Recirc	4/22/16	8:45	--	0	384513	0	--	--		--	--	--	--	--	Purple	System shutdown overnight
Downgradient Recirc	4/22/16	9:30	Sample Port	10.06	384685	16	1:100	50	2	--	656	7.63	--	--	Purple	--
Downgradient Recirc	4/25/16	9:00	Sample Port	10.68	415700	17	1:100	50	2	--	635	7.78	--	--	Purple	--
Downgradient Recirc	4/27/16	8:17	Sample Port	10.69	445920	17	1:100	100	3	122.9	608	8.1	--	--	Purple	--
Downgradient Recirc	4/27/16	12:46	Sample Port	--	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc	5/2/16	8:47	Sample Port	10.7	523348	17	1:100	100	3	118	639	8.14	--	--	Purple	--
Downgradient Sweeping	5/2/16	7:50	Sample Port	11.01	537803	16	0	--	--	42	635	8.08	--	--	--	--
Downgradient Sweeping	5/4/16	7:20	Sample Port	11.02	553903	16	0	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/6/16	8:12	Sample Port	11:02	586191	16	0	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	8:16	Sample Port	11.02	633744	16	0	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	8:02	Sample Port	10.96	664258	16	0	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/13/16	8:36	Sample Port	16.3	710030	24	0	--	--	--	--	--	--	--	--	Switched to pumping from BP-29
Lateral Sweeping	5/16/16	9:37	Sample Port	16.3	781046	24.3	0	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/17/16	7:09	Sample Port	16.32	802486	24.5	0	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/17/16	17:50	Sample Port	10.22	809304	17	1:200	--	--	83.83	641	8.08	--	--	Purple	--
Lateral Recirculation	5/18/16	6:26	Sample Port	10.03	816806	17	1:200	--	--	74.11	666	7.61	--	--	Purple	--
Lateral Recirculation	5/18/16	14:38	Sample Port	10.22	821752	17	1:200	--	--	72.22	648	7.69	--	--	Purple	--
Lateral Recirculation	5/20/16	9:35	Sample Port	10.24	847994	17	1:200	--	--	69.69	615	8.01			Purple	--
Lateral Recirculation	5/23/16	10:21	Sample Port	10.21	892653	17	1:200	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	7:00	Sample Port	10.26	904734	17	0	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:31	Sample Port	--	--	--	0	--	--	15.24	661	7.81	--	--	--	--
Lateral Sweeping	5/24/16	12:35	Sample Port	--	--	--	0	--	--	16.08	657	7.79	--	--	--	--
Lateral Sweeping	5/25/16	6:19	Sample Port	10.64	919656	15	0	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/25/16	8:05	Sample Port	--	--	--	0	--	--	16.06	606	7.53	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	8:43	Sample Port	10.7	951698	15	0	--	--	--	--	--	--	--	--	--

Notes:

Batch injection started 2/29 at 17:10. Two laboratory samples for manganese concentration were taken during injection.

% = percent

btoc = below top of casing

gpm = gallons per minute

mV = millivolts

ORP = oxidation reduction potential

ppm = parts per million

psi = pounds per square inch

SU = standard unit

VOC = volatile organic compound

Table 3.3 Summary of Collected Field Data at BP-27 (In-Well)

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Baseline	2/29/16	8:45	308.34	--	--	--	--	--	--	--	--	--	--
Baseline	2/29/16	11:10	--	320	--	--	--	241.9 [1]	6.89 [1]	--	--	Clear	--
Baseline	2/29/16	11:15	--	333	--	--	--	228.8 [1]	7.06 [1]	0	0	Clear	--
Batch Injection	2/29/16	17:40	304.68	--	--	--	--	--	--	--	--	--	--
Batch Injection	2/29/16	18:50	305.24	--	--	--	--	--	--	--	--	--	--
Batch Injection	3/1/16	16:10	307.38	bailer	--	--	--	--	--	--	--	Purple	This well level was taken after a drop pipe was placed in the well. This added ~ 3 inches of length above the original sampling port. All future depths will be taken from here.
Batch Injection	3/2/16	8:00	307.44	bailer	20	2	--	--	--	--	--	Purple	--
Batch Injection	3/2/16	14:20	307.39	bailer	20	2	--	481 [2]	--	--	--	Purple	--
Batch Injection	3/4/16	10:00	307.42	bailer	5	--	--	356 [2]	--	--	--	Purple	--
Batch Injection	3/4/16	14:58	307.37	bailer	5	--	--	--	8.40	--	--	Purple	--
Batch Injection	3/7/16	9:50	307.24	bailer	20	2	--	--	8.40	--	--	Purple	--
Batch Injection	3/9/16	13:01	307.33	bailer	20	2	--	546	7.33	--	--		ORP sample not diluted from here on
Batch Injection	3/11/16	11:00	307.39	bailer	5	--	--	477	7.64	--	--	Lt. Purple	--
Batch Injection	3/14/16	9:53	307.38	bailer	5	--	--	482	7.56	--	--	Lt. Purple	--
Batch Injection	3/16/16	8:07	307.88	bailer	5	--	--	520	7.98	--	--	Lt. Purple	--
Batch Injection	3/21/16	10:04	307.32	bailer	2	--	--	502	7.51	--	--	Pink	--
Batch Injection	3/23/16	15:15	307.41	bailer	2	--	--	496	7.56	--	--	Pink	--
Batch Injection	3/28/16	10:04	307.18	bailer	2	--	--	482	7.57	--	--	Lt. Pink	--
Batch Injection Sweeping	3/29/16	9:05	307.08	bailer @ 333	<0.05	--	--	146	7.41	--	--	Clear	--
Batch Injection Sweeping	3/29/16	9:12	306	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	9:18	304.98	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	9:30	304.73	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	11:25	304.67	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A @ 15.95 gpm
Batch Injection Sweeping	3/29/16	12:25	304.67	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	14:40	304.64	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	7:18	307.18	bailer @ 333	<0.05	--	--	132	7.56			Clear	--
Batch Injection Sweeping	3/30/16	9:15	304.78	bailer @ 333	--	--	--	--	--	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	11:08	304.87	bailer @ 333	--	--	--	146	7.49	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	13:37	304.86	bailer @ 333	<0.05	--	--	141	7.42			Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	15:55	304.87	bailer @ 333	<0.05	--	--	143	7.37			Clear	Pumping at WR-274A
Batch Injection Sweeping	3/31/16	9:45	307.18	bailer @ 333	<0.05	--	--	145	7.42			Clear	Pumping at WR-274A
Batch Injection Sweeping	4/1/16	11:43	304.08	bailer @ 333	<0.05	--	--	151	7.48	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	8:53	304.84	bailer @ 333	<0.05	--	--	210	7.38	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	11:18	307.89	bailer @ 333	<0.05	--	--	208	7.42	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	9:35	304.68	bailer @ 333	0.15	--	--	271	7.66	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/11/16	7:45	304.82	bailer @ 333	<0.05	--	--	92	8.35	--	--	Clear	Pumping at WR-274A (off at 8:00)
Batch Injection Sweeping	4/11/16	9:15	--	HS @ 320	0.05	--	--	116	7.7	0	0	Clear	Pump off
Batch Injection Sweeping	4/11/16	9:20	--	HS @ 333	0.05	--	--	164	7.56	0	0	Clear	Pump off
Batch Injection Sweeping	4/11/16	14:53	307.09	--	--	--	--	--	--	--	--	--	--

Table 3.3 Summary of Collected Field Data at BP-27 (In-Well)

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Downgradient Recirc	4/11/16	14:56	306	--	--	--	--	--	--	--	--	--	Started WR-274A pump
Downgradient Recirc	4/11/16	14:57	306.64	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	14:58	--	--	--	--	--	--	--	--	--	--	Pumped stopped
Downgradient Recirc	4/11/16	15:01	306.43	--	--	--	--	--	--	--	--	--	Started pump
Downgradient Recirc	4/11/16	15:02	306	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:03	305.24	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:04	305.02	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:05	305.58	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:06	305.62	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:07	305.79	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:08	305.81	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:10	305.76	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:16	305.74	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:20	305.74	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	15:40	305.75	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	16:00	305.72	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	16:18	305.72	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	16:30	305.72	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/11/16	17:23	305.72	bailer @ 333'	50	2	--	583	--	--	--	Pink	Pumping / Injecting
Downgradient Recirc	4/12/16	9:50	305.74	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/12/16	15:38	305.71	bailer @ 333'	50	2	--	612	7.58	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/13/16	9:10	305.73	bailer @ 333'	50	2	--	622	8.09	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/15/16	9:00	305.27	bailer @ 333'	50	2	--	618	7.98	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/18/16	12:30	305.49	bailer @ 333'	50	2	--	545	8.32	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/20/16	9:10	305.38	bailer @ 333'	10	2	--	591	7.8	--	--	Pink	Pumping / Injecting
Downgradient Recirc	4/22/16	9:15	306.96	--	--	--	--	--	--	--	--	--	System shutdown overnight
Downgradient Recirc	4/22/16	11:25	--	bailer @ 333'	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/22/16	11:15	--	bailer @ 333'	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/25/16	9:31	305.07	bailer @ 333'	10	2	--	612	7.76	--	--	Purple	--
Downgradient Recirc	4/27/16	8:15	305.06	bailer @ 333'	50	2	--	580	8.18	--	--	Purple	--
Downgradient Recirc	5/2/16	8:53	305.13	--	--	--	--	--	--	--	--	Purple	--
Downgradient Sweeping	5/2/16	13:25	--	bailer	100	3	110.5	644	8.09	--	--	--	Dosatron Off
Downgradient Sweeping	5/2/16	13:12	--	320	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/2/16	13:19	--	333	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/3/16	7:44	305.1	bailer @ 333'	--	--	102.2	639	7.98	--	--	--	--
Downgradient Sweeping	5/4/16	7:19	305.08	bailer @ 333'	--	--	98.37	648	7.91	--	--	Purple	--
Downgradient Sweeping	5/6/16	8:09	305.01	bailer @ 333'	--	--	43.9	643	7.73	--	--	Purple	--
Downgradient Sweeping	5/9/16	7:05	304.93	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	10:49	--	320	--	--	16.06	620	7.74	--	--	Purple	--
Downgradient Sweeping	5/9/16	10:49	--	333	--	--	13.4	639	7.78	--	0.1	Purple	--
Downgradient Sweeping	5/11/16	8:00	304.91	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	10:41	--	333	--	--	10.19	637	7.6	--	--	Lt. Purple	--
Downgradient Sweeping	5/13/16	8:24	307.03	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/13/16	11:15	--	bailer @ 333'	--	--	32.49	652	7.31	--	--	Purple	Switched to pumping from BP-29

Table 3.3 Summary of Collected Field Data at BP-27 (In-Well)

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Lateral Sweeping	5/16/16	9:35	303.58	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/16/16	13:58	--	bailer @ 333'	--	--	9.63	581	8.09	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	7:07	303.59	320	--	--	11.99	614	7.87	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	7:07	--	333	--	--	11.38	633	7.88	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	16:10	304.95	bailer @ 333'	--	--	84.71	647	8.03	--	--	Purple	--
Lateral Recirculation	5/18/16	6:24	304.94	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	9:20	--	bailer @ 333'	--	--	74.31	670	7.72	--	--	Purple	--
Lateral Recirculation	5/18/16	14:37	304.98	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	9:32	304.93	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	12:07	--	bailer @ 333'	--	--	75.39	652	7.9			Purple	--
Lateral Recirculation	5/23/16	10:19	304.84	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/23/16	14:59	--	320	--	--	115.1	587	7.95	--	--	Purple	--
Lateral Recirculation	5/23/16	14:59	--	333	--	--	118.8	1000	2.25	--	--	Purple	--
Lateral Sweeping	5/24/16	7:26	304.89	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:23	--	bailer @ 333'	--	--	15.24	661	7.81	--	--	--	--
Lateral Sweeping	5/24/16	12:38	--	bailer @ 333'	--	--	16.08	657	7.79	--	--	--	--
Lateral Sweeping	5/25/16	6:18	304.86	--	--	--	--	--	--	--	--	Lt. Purple	--
Lateral Sweeping	5/25/16	8:40	--	bailer @ 333'	--	--	15.83	646	7.7	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	7:33	304.8	--	--	--	--	--	--	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	12:46	--	bailer @ 333'	--	--	18.89	560	8.02	--	--	Lt. Purple	--
Post-Test	8/2/16	--	306.52	--	--	--	17.87	539	7.82	--	--	--	--

Notes:

Batch injection started 2/29 at 17:10.

[1] Sample analyzed using a YSI with sample in a cup.

[2] ORP test conducted on sample at a 100:1 ratio.

btoc = below top of casing

mV = millivolts

ORP = oxidation reduction potential

ppm = parts per million

SU = standard units

Table 3.4 Summary of Collected Field Data at BP-28

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Baseline	2/29/16	8:45	307.61	--	--	--	--	--	--	--	--	--	--
Baseline	2/29/16	12:20	--	320	--	--	--	196.3 [1]	6.82 [1]	--	--	Clear	--
Baseline	2/29/16	12:25	--	333	--	--	--	236.2 [1]	6.74 [1]	0.05	0.2	Clear	--
Baseline	2/29/16	12:30	--	345	--	--	--	75.1 [1]	7.00 [1]	--	--	Clear	--
Batch Injection	2/29/16	18:40	--	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	2/29/16	19:25	--	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	3/1/16	16:10	307.51	bailer	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	3/2/16	8:00	307.52	bailer	<0.05	--	--	252	--	--	--	Clear	--
Batch Injection	3/2/16	14:20	307.44	bailer	<0.05	--	--	243	--	--	--	Clear	--
Batch Injection	3/4/16	9:40	307.41	bailer	<0.05	--	--	228	--	--	--	Clear	--
Batch Injection	3/4/16	14:27	307.34	bailer	<0.05	--	--	--	7.20	--	--	Clear	--
Batch Injection	3/7/16	9:48	307.29	bailer	<0.05	--	--	--	7.20	--	--	Clear	--
Batch Injection	3/9/16	12:32	307.48	bailer	<0.05	--	--	180	7.36	--	--	Clear	--
Batch Injection	3/11/16	10:50	307.54	bailer	<0.05	--	--	189	7.47	--	--	Clear	--
Batch Injection	3/14/16	9:45	307.45	bailer	<0.05	--	--	202	7.33	--	--	Clear	--
Batch Injection	3/16/16	8:02	307.39	bailer	<0.05	--	--	111	7.74	--	--	Clear	--
Batch Injection	3/21/16	9:56	307.44	bailer	<0.05	--	--	117	7.43	--	--	Clear	--
Batch Injection	3/23/16	15:06	307.56	bailer	<0.05	--	--	224	7.37	--	--	Clear	--
Batch Injection	3/28/16	10:00	307.25	333	<0.05	--	--	180	7.35	--	--	Clear	--
Batch Injection	3/28/16	10:00	307.25	345	<0.05	--	--	181	7.3	--	--	Clear	--
Batch Injection Sweeping	3/29/16	12:57	306.83	bailer @ 333	<0.05	--	--	188	7.42	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/29/16	14:58	306.82	bailer @ 333	<0.05	--	--	189	7.39	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	7:23	307.28	bailer @ 333	<0.05	--	--	148	7.42	--	--	Clear	--
Batch Injection Sweeping	3/30/16	11:14	307.27	bailer @ 333	<0.05	--	--	147	7.41	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	13:40	307.27	bailer @ 333	<0.05	--	--	142	7.43	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	15:43	307.28	bailer @ 333	<0.05	--	--	147	7.43	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	3/31/16	9:36	308.28	bailer @ 333	<0.05	--	--	146	7.44	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/1/16	11:37	307.29	bailer @ 333	<0.05	--	--	149	7.45	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	8:50	307.08	bailer @ 333	<0.05	--	--	215	7.39	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	10:53	307.13	bailer @ 333	<0.05	--	--	215	7.47	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	9:04	306.89	bailer @ 333	<0.05	--	--	218	7.56	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/11/16	7:15	306.94	bailer @ 333	<0.05	--	--	238	7.58	--	--	Clear	Pumping at WR-274A (off at 8:00)
Batch Injection Sweeping	4/11/16	9:45	--	HS @ 333	<0.05	--	--	234	7.46	0.1	0.3	Clear	Pump off
Batch Injection Sweeping	4/11/16	9:30	--	HS @ 345	<0.05	--	--	235	7.77	0	0.1	Clear	Pump off
Batch Injection Sweeping	4/11/16	14:50	307.17	--	--	--	--	--	--	--	--	--	Pump off
Batch Injection Sweeping	4/11/16	15:29	--	bailer @ 333	<0.05	--	--	418	7.5	--	--	Clear	Pump off
Downgradient Recirc	4/11/16	17:37	--	HP @ 320	<0.05	--	--	119	7.58	--	--	Clear	Pump off
Downgradient Recirc	4/11/16	17:38	--	HP @ 333	<0.05	--	--	136	7.58	--	--	Clear	Pump off
Downgradient Recirc	4/11/16	17:39	--	HP @ 345	0.05	--	--	132	7.56	--	--	--	Pump off
Downgradient Recirc	4/12/16	9:37	307.09	bailer @ 333	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/12/16	11:15	--	HP @ 320	0.5	--	--	491	7.56	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/12/16	11:15	--	HP @ 333	0.8	--	--	518	7.64	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/12/16	11:15	--	HP @ 345	10	2	--	555	7.58	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/12/16	15:31	307.01	bailer @ 333	10	2	--	527	7.62	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/13/16	9:06	307.06	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/13/16	13:15	--	HP @ 320	5	1	--	617	7.85	--	--	Purple	Pumping / Injecting

Table 3.4 Summary of Collected Field Data at BP-28

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Downgradient Recirc	4/13/16	13:15	--	HP @ 333	10	2	--	632	8.03	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/13/16	13:15	--	HP @ 345	10	2	--	633	8.35	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/13/16	13:15	--	HP @ 355	10	2	--	632	8.15	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/15/16	8:52	306.7	--	--		--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/15/16	--	--	HP @ 320	20	2	--	620	8.22	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/15/16	--	--	HP @ 333	50	2	--	627	8.16	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/15/16	--	--	HP @ 345	50	2	--	638	7.86	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/15/16	--	--	HP @ 355	50	2	--	595	7.73	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/18/16	13:10	307	bailer @ 333	10	2	--	531	7.59	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/18/16	--	--	HP @ 320	10	2	--	521	8.16	--	--	--	Pumping / Injecting
Downgradient Recirc	4/18/16	--	--	HP @ 333	5	1	--	551	8	--	--	--	Pumping / Injecting
Downgradient Recirc	4/18/16	--	--	HP @ 345	10	2	--	539	8.01	--	--	--	Pumping / Injecting
Downgradient Recirc	4/18/16	--	--	HP @ 355	10	2	--	509	7.89	--	--	--	Pumping / Injecting
Downgradient Recirc	4/20/16	8:56	306.95	--	--	--	--	--	--	--	--	--	Pumping / Injecting
Downgradient Recirc	4/20/16	9:45	--	HP @ 320	20	2	--	643	7.31	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/20/16	9:45	--	HP @ 333	50	2	--	637	7.48	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/20/16	9:45	--	HP @ 345	50	2	--	599	7.82	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/20/16	9:45	--	HP @ 355	50	2	--	616	7.79	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/22/16	9:11	307.09	--	--	--	--	--	--	--	--	Purple	System shutdown overnight
Downgradient Recirc	4/22/16	--	--	HP @ 320	50	2	--	636	7.24	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/22/16	--	--	HP @ 333	50	2	--	633	7.76	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/22/16	13:20	--	HP @ 345	50	2	--	646	7.68	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/22/16	13:28	--	HP @ 355	50	2	--	652	7.73	--	--	Purple	Pumping / Injecting
Downgradient Recirc	4/25/16	9:22	306.75	--	50	--	--	--	--	--	--	--	--
Downgradient Recirc	4/25/16	11:41	--	HP @ 320	50	2	--	628	7.75	--	--	Lt Purple	--
Downgradient Recirc	4/25/16	11:41	--	HP @ 333	50	2	--	632	7.71	--	--	Lt Purple	--
Downgradient Recirc	4/25/16	11:41	--	HP @ 345	50	2	--	634	7.69	--	--	Lt Purple	--
Downgradient Recirc	4/25/16	11:41	--	HP @ 355	50	2	--	634	7.7	--	--	Lt Purple	--
Downgradient Recirc	4/27/16	8:11	306.81	--	--	--	--	--	--	--	--	--	--
Downgradient Recirc	4/27/16	10:27	--	HP @ 320	50	2	72	646	7.68	--	--	Purple	--
Downgradient Recirc	4/27/16	10:38	--	HP @ 333	100	3	97.7	648	7.73	--	--	Purple	--
Downgradient Recirc	4/27/16	10:50	--	HP @ 345	100	3	101.4	652	7.75	--	--	Purple	--
Downgradient Recirc	4/27/16	10:58	--	HP @ 355	100	3	103.6	656	7.73	--	--	Purple	--
Downgradient Recirc	5/2/16	8:45	306.98	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/2/16	14:23	--	HP @ 320	100	3	120.8	636	7.85	--	--	Purple	Switched to pumping from WR-274A and injecting into BP-27 without permanganate injection
Downgradient Sweeping	5/2/16	14:23	--	HP @ 333	100	3	116.4	639	7.9	--	--	Purple	--
Downgradient Sweeping	5/2/16	14:23	--	HP @ 345	100	3	111.7	637	7.98	--	--	Purple	--
Downgradient Sweeping	5/2/16	14:23	--	HP @ 355	100	3	113.1	641	8.08	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:25	306.8	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/3/16	7:25	--	HP @ 320	--	--	96.87	655	7.7	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:25	--	HP @ 333	--	--	97.19	659	7.71	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:25	--	HP @ 345	--	--	94.16	670	7.71	--	--	Purple	--
Downgradient Sweeping	5/3/16	7:25	--	HP @ 355	--	--	95.56	669	7.6	--	--	Purple	--
Downgradient Sweeping	5/4/16	7:13	306.7	--	--	--	--	--	--	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:51	--	HP @ 320	--	--	61.82	671	7.76	--	--	Purple	--

Table 3.4 Summary of Collected Field Data at BP-28

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Downgradient Sweeping	5/4/16	8:51	--	HP @ 333	--	--	61.92	673	7.77	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:51	--	HP @ 345	--	--	66.35	669	7.77	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:51	--	HP @ 355	--	--	67	672	7.78	--	--	Purple	--
Downgradient Sweeping	5/6/16	8:04	306.73	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/6/16	10:07	--	HP @ 320	--	--	61.82	671	7.76	--	--	Purple	--
Downgradient Sweeping	5/6/16	10:07	--	HP @ 333	--	--	61.92	673	7.77	--	--	Purple	--
Downgradient Sweeping	5/6/16	10:07	--	HP @ 345	--	--	66.35	669	7.77	--	--	Purple	--
Downgradient Sweeping	5/6/16	10:07	--	HP @ 355	--	--	67	672	7.78	--	--	Purple	--
Downgradient Sweeping	5/9/16	7:02	306.79	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	9:13	--	HP @ 320	--	--	54.06	651	7.73	--	--	Purple	--
Downgradient Sweeping	5/9/16	9:13	--	HP @ 333	--	--	44.15	665	7.66	--	--	Purple	--
Downgradient Sweeping	5/9/16	9:13	--	HP @ 345	--	--	46.51	669	7.73	--	0	Purple	--
Downgradient Sweeping	5/9/16	9:13	--	HP @ 355	--	--	47.49	671	7.72	--	--	Purple	--
Downgradient Sweeping	5/11/16	7:56	306.78	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	10:07	--	HP @ 320	--	--	42.74	647	7.81	--	--	Purple	--
Downgradient Sweeping	5/11/16	10:07	--	HP @ 333	--	--	39.58	647	7.86	--	--	Purple	--
Downgradient Sweeping	5/11/16	10:07	--	HP @ 345	--	--	39.63	648	7.89	--	--	Purple	--
Downgradient Sweeping	5/11/16	10:07	--	HP @ 355	--	--	36.54	647	7.99	--	--	Purple	--
Downgradient Sweeping	5/13/16	8:28	306.73	--	--	--	--	--	--	--	--	--	
Lateral Sweeping	5/13/16	12:13	--	HP @ 320	--	--	38.96	671	7.31	--	--	--	Switched to pumping from BP-29
Lateral Sweeping	5/13/16	12:13	--	HP @ 333	--	--	38.99	672	7.34	--	--	--	--
Lateral Sweeping	5/13/16	12:13	--	HP @ 345	--	--	35.49	673	7.46	--	--	--	--
Lateral Sweeping	5/13/16	12:13	--	HP @ 355	--	--	35.48	672	7.48	--	--	--	--
Lateral Sweeping	5/16/16	9:23	306.72	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/16/16	14:45	--	HP @ 320	--	--	18.35	611	8.07	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:45	--	HP @ 333	--	--	18.4	612	8.09	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:45	--	HP @ 345	--	--	14.94	620	8.09	--	--	Lt. Purple	--
Lateral Sweeping	5/16/16	14:45	--	HP @ 355	--	--	9.87	619	8.09	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	7:00	306.73	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/17/16	11:25	--	HP @ 320	--	--	17.32	636	8.1	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:25	--	HP @ 333	--	--	15.52	637	8.12	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:25	--	HP @ 345	--	--	12.53	638	8.15	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	11:25	--	HP @ 355	--	--	13.12	636	8.04	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	16:05	306.6	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/17/16	18:55	--	HP @ 320	--	--	18.3	643	8.16	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:55	--	HP @ 333	--	--	16.27	651	8.14	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:55	--	HP @ 345	--	--	12.94	655	8.05	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	18:55	--	HP @ 355	--	--	13.52	660	7.98	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	6:20	306.75	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	9:45	--	HP @ 320	--	--	18.63	662	7.75	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:45	--	HP @ 333	--	--	21.5	658	7.82	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:45	--	HP @ 345	--	--	32.95	658	7.85	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	9:45	--	HP @ 355	--	--	32.09	661	7.87	--	--	Lt. Purple	--
Lateral Recirculation	5/20/16	9:29	306.71	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	12:28	--	HP @ 320	--	--	37.8	651	7.88	--	--	Purple	--
Lateral Recirculation	5/20/16	12:28	--	HP @ 333	--	--	53.33	657	7.98	--	--	Purple	--
Lateral Recirculation	5/20/16	12:28	--	HP @ 345	--	--	58.76	656	7.99	--	--	Purple	--

Table 3.4 Summary of Collected Field Data at BP-28

Test	Date	Time	Water Level	Sample Depth	Field Test Results							Water Color	Comments
					Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(ppm)	--	(ppm)	(mV)	(SU)	(ppm)	(ppm)		
Lateral Recirculation	5/20/16	12:28	--	HP @ 355	--	--	63.54	653	7.99	--	--	Purple	--
Lateral Recirculation	5/23/16	10:16	306.69	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/23/16	15:35	--	HP @ 320	--	--	37.31	680	7.9	--	--	Lt. Purple	--
Lateral Recirculation	5/23/16	15:35	--	HP @ 333	--	--	43.13	678	7.91	--	--	Lt. Purple	--
Lateral Recirculation	5/23/16	15:35	--	HP @ 355	--	--	43.89	677	7.66	--	--	Lt. Purple	--
Lateral Sweeping	5/24/16	7:22	306.74	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:55	--	HP @ 320	--	--	37.29	671	7.99	--	--	--	--
Lateral Sweeping	5/24/16	9:55	--	HP @ 333	--	--	45.23	673	7.95	--	--	--	--
Lateral Sweeping	5/24/16	9:55	--	HP @ 345	--	--	40.66	672	7.96	--	--	--	--
Lateral Sweeping	5/24/16	9:55	--	HP @ 355	--	--	39.78	672	7.97	--	--	--	--
Lateral Sweeping	5/24/16	13:05	--	HP @ 320	--	--	54.21	659	8.02	--	--	--	--
Lateral Sweeping	5/24/16	13:05	--	HP @ 333	--	--	65.29	661	7.98	--	--	--	--
Lateral Sweeping	5/24/16	13:05	--	HP @ 345	--	--	69.17	664	7.98	--	--	--	--
Lateral Sweeping	5/24/16	13:05	--	HP @ 355	--	--	71.03	665	7.81	--	--	--	--
Lateral Sweeping	5/25/16	6:15	306.72	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/25/16	8:34	--	HP @ 320	--	--	53.01	656	7.78	--	--	Purple	--
Lateral Sweeping	5/25/16	8:34	--	HP @ 333	--	--	54.18	663	7.79	--	--	Purple	--
Lateral Sweeping	5/25/16	8:34	--	HP @ 345	--	--	51.02	665	7.79	--	--	Purple	--
Lateral Sweeping	5/25/16	8:34	--	HP @ 355	--	--	54.72	667	7.78	--	--	Purple	--
Lateral Sweeping	5/27/16	7:30	306.74	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/27/16	13:30	--	HP @ 320	--	--	26.32	666	7.86	--	--	Purple	--
Lateral Sweeping	5/27/16	13:30	--	HP @ 333	--	--	19.47	654	7.89	--	--	Purple	--
Lateral Sweeping	5/27/16	13:30	--	HP @ 345	--	--	20.12	657	7.87	--	--	Purple	--
Lateral Sweeping	5/27/16	13:30	--	HP @ 355	--	--	20.38	661	7.85	--	--	Purple	--
Post-Test	8/2/16	--	306.45	--	--	--	12.07	7.78	536	--	--	--	--

Notes:

Batch injection started 2/29 at 17:10.

SU = standard units

[1] Sample analyzed using a YSI with sample in a cup.

btoc = below top of casing

mV = millivolts

ORP = oxidation reduction potential

ppm = parts per million

Table 3.5 Summary of Collected Field Data at BP-29

Test	Date	Time	Water Level	Sample Depth	From Well Head			Field Test Results						Water Color	Comments
					Flow Rate	Totalizer	Pressure	Oxidant Conc. via Test Strips	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(gpm)	(gallons)	(psi)	(ppm)	(ppm)	(mV)	(SU)	ppm	ppm		
Baseline	2/29/16	8:45	307.62	--	0	0	0	--	--	--	--	--	--	--	--
Baseline	2/29/16	16:25	--	SP-370	5.16	--	--	--	--	147.6 [1]	6.62 [1]	0	0	Clear	--
Batch Injection	2/29/16	16:10	307.57	bailer	--	--	--	<0.05	--	--	--	--	--	Clear	--
Batch Injection	3/2/16	8:00	307.58	bailer	--	--	--	<0.05	--	231	--	--	--	Clear	--
Batch Injection	3/2/16	14:20	307.52	bailer	--	--	--	<0.05	--	233	--	--	--	Clear	--
Batch Injection	3/4/16	8:45	307.57	bailer	--	--	--	<0.05	--	183	--	--	--	Clear	--
Batch Injection	3/4/16	13:55	307.44	bailer	--	--	--	<0.05	--	--	7.80	--	--	Clear	--
Batch Injection	3/7/16	9:15	307.38	bailer	--	--	--	<0.05	--	--	7.80	--	--	Clear	--
Batch Injection	3/9/16	12:20	307.53	bailer	--	--	--	<0.05	--	180	7.45	--	--	Clear	--
Batch Injection	3/11/16	10:45	307.55	bailer	--	--	--	<0.05	--	157	7.42	--	--	Clear	--
Batch Injection	3/14/16	9:22	307.54	bailer	--	--	--	<0.05	--	180	7.6	--	--	Clear	--
Batch Injection	3/16/16	7:52	307.48	bailer	--	--	--	<0.05	--	43	7.64	--	--	Clear	--
Batch Injection	3/21/16	9:47	307.49	bailer	--	--	--	<0.05	--	34	7.45	--	--	Clear	--
Batch Injection	3/23/16	14:50	307.59	bailer	--	--	--	<0.05	--	238	7.33	--	--	Clear	--
Batch Injection	3/28/16	9:48	307.34	SP-370	--	--	--	<0.05	--	227	7.30	--	--	Clear	--
Batch Injection Sweeping	3/29/16	7:30	307.29	bailer	--	--	--	<0.05	--	146	7.40	--	--	--	--
Batch Injection Sweeping	3/30/16	11:20	307.28	bailer	--	--	--	<0.05	--	145	7.46	--	--	--	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	13:56	307.29	bailer	--	--	--	<0.05	--	143	7.41	--	--	--	Pumping at WR-274A
Batch Injection Sweeping	3/30/16	15:49	307.3	bailer	--	--	--	<0.05	--	145	7.42	--	--	--	Pumping at WR-274A
Batch Injection Sweeping	3/31/16	8:57	307.3	bailer	--	--	--	<0.05	--	145	7.43	--	--	--	Pumping at WR-274A
Batch Injection Sweeping	4/1/16	11:28	307.29	bailer	--	--	--	<0.05	--	148	7.43	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	8:46	307.36	bailer	--	--	--	<0.05	--	214	7.41	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/5/16	11:00	307.37	bailer	--	--	--	<0.05	--	138	7.58	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/8/16	9:22	307.23	bailer	--	--	--	<0.05	--	101	7.76	--	--	Clear	Pumping at WR-274A
Batch Injection Sweeping	4/11/16	7:28	307.28	bailer	--	--	--	<0.05	--	-41	7.57	--	--	Clear	Pumping at WR-274A (off at 8:00)
Batch Injection Sweeping	4/11/16	10:50	--	SP-370	--	--	--	<0.05	--	206	7.34	0	0	Clear	Pumped 10:46 to 11:06
Downgradient Recirc	4/11/16	14:46	307.25	--	0	7054.79	--	--	--	--	--	--	--	--	Pumping at WR-274A
Downgradient Recirc	4/11/16	15:31	--	bailer	--	--	--	<0.05	--	304	7.44	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/11/16	17:20	307.11	bailer	--	--	--	<0.05	--	-16	7.56	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/12/16	9:06	307.21	bailer	0	7054.79	0	<0.05	--	129	7.64	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/12/16	15:21	307.11	bailer	0	7054.79	0	<0.05	--	96	7.47	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/13/16	9:00	307.29	bailer	--	--	--	0.03	--	291	7.52	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/15/16	8:42	307.67	bailer	--	--	--	<0.05	--	431	7.52	--	--	Clear	--
Downgradient Recirc	4/18/16	12:45	307.21	bailer	--	--	--	0.05	--	271	7.58	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/20/16	9:01	307.13	bailer	--	--	--	<0.05	--	461	7.56	--	--	Clear	Pumping at WR-274A
Downgradient Recirc	4/22/16	9:06	307.14	--	--	--	--	--	--	--	--	--	--	--	System shutdown overnight
Downgradient Recirc	4/25/16	9:14	306.94	bailer	--	--	--	<0.05	--	386	7.48	--	--	Clear	--
Downgradient Recirc	4/27/16	8:05	307.08	bailer	--	--	--	<0.05	0	--	--	--	--	Clear	--
Downgradient Recirc	4/27/16	13:06	--	bailer	--	--	--	<0.05	0	533	7.65	--	--	Clear	--
Downgradient Recirc	5/2/16	8:40	307.23	--	--	--	--	--	--	--	--	--	--	Clear	--
Downgradient Sweeping	5/2/16	13:40	--	bailer	--	--	--	<0.05	0	331	7.72	--	--	Clear	Switched to pumping from WR-274A and injecting into BP-27 without permanganate injection
Downgradient Sweeping	5/3/16	7:32	307.21	bailer	--	--	--	--	--	327	7.5	--	--	Clear	--
Downgradient Sweeping	5/4/16	7:05	307.01	bailer	--	--	--	--	--	306	7.48	--	--	Clear	--
Downgradient Sweeping	5/6/16	7:55	306.94	--	--	--	--	--	--	--	--	--	--	--	--

Table 3.5 Summary of Collected Field Data at BP-29

Test	Date	Time	Water Level	Sample Depth	From Well Head			Field Test Results						Water Color	Comments
					Flow Rate	Totalizer	Pressure	Oxidant Conc. via Test Strips	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(gpm)	(gallons)	(psi)	(ppm)	(ppm)	(mV)	(SU)	ppm	ppm		
Downgradient Sweeping	5/6/16	10:22	--	bailer	--	--	--	--	0.16	626	7.84	--	--	Clear	--
Downgradient Sweeping	5/9/16	6:57	307	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	10:47	--	SP-370	--	--	--	--	10.2	631	7.76	--	0	Purple	--
Downgradient Sweeping	5/11/16	7:49	306.98	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	9:40	--	SP-370	10.72	7696.76	16.5	--	8.06	659	7.75	--	--	Lt. Purple	Turned on pump for 30 min
Downgradient Sweeping	5/13/16	8:24	307.03	--	--	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/13/16	11:15	--	SP-370	16.14	7711.58	25	--	10.53	634	7.3	--	--	Purple	Switched to pumping from BP-29
Lateral Sweeping	5/16/16	9:17	308.09	--	16.21	75520.3	24.3	--	--	--	--	--	--	--	--
Lateral Sweeping	5/16/16	14:05	--	SP-370	--	--	--	--	11.79	594	7.98	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	6:54	308.07	SP-370	16.21	97011.2	24.5	--	15.47	612	7.9	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	10:01	307.58	SP-370	10.06	103655	17	--	18.12	628	7.86	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	6:14	307.68	--	10.23	111021	17	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	9:24	--	SP-370	--	--	--	--	16.8	675	7.69	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	14:30	307.66	--	10.03	115884	17	--	--	--	--	--	--	--	--
Lateral Recirculation	5/18/16	16:35	--	SP-370	--	--	--	--	18.74	653	7.67	--	--	Lt. Purple	--
Lateral Recirculation	5/20/16	9:25	307.65	--	10.09	141682	17	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	11:59	--	SP-370	--	--	--	--	12.56	617	8.03	--	--	Lt. Purple	--
Lateral Recirculation	5/23/16	10:07	307.63	--	10.06	185580	17	--	--	--	--	--	--	--	--
Lateral Recirculation	5/23/16	15:10	--	SP-370	--	--	--	--	14.93	685	7.61	--	--	Lt. Purple	--
Lateral Sweeping	5/24/16	7:14	307.63	--	10	197217	17	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:28	--	SP-370	--	--	--	--	14.11	655	7.65	--	--	--	--
Lateral Sweeping	5/24/16	12:47	--	SP-370	--	--	--	--	14.91	638	7.6	--	--	--	--
Lateral Sweeping	5/25/16	6:12	307.65	--	10.57	212001	15	--	--	--	--	--	--	--	--
Lateral Sweeping	5/25/16	8:09	--	SP-370	--	--	--	--	15.83	646	7.7	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	7:26	307.64	--	10.6	243794	15	--	--	--	--	--	--	--	--
Lateral Sweeping	5/27/16	12:37	--	SP-370	--	--	--	--	14.15	655	7.93	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	13:35	--	--	10.58	245	15	--	--	--	--	--	--	--	--
Post-Test	8/2/16	--	306.66	--	--	--	--	--	--	--	--	--	--	--	Unable to lower bailer to collect sample

Notes:

Batch injection started 2/29 at 17:10.

SU = standard units

[1] Sample analyzed using a YSI with a flow through cell.

btoc = below top of casing

gpm = gallons per minute

mV = millivolts

ORP = oxidation reduction potential

PCE = tetrachloroethene

ppm = parts per million

psi = pounds per square inch

Table 3.6 Summary of Collected Field Data at W-274A

Test	Date	Time	Water Level	Sample Depth	From Well Head			Field Test Results							Water Color	Comments
					Flow Rate	Totalizer	Pressure	Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(gpm)	(gallons)	(psi)	(ppm)	--	(ppm)	(mV)	(SU)	ppm	ppm		
Baseline	2/29/16	8:45	308.34	--	0	-	0	--	--	--	--	--	--	--	--	--
Baseline	2/29/16	16:25	308.34	SP-341'	5.12	34.58	--	--	--	--	164.8 [1]	623 [1]	0	0	Clear	--
Batch Injection	2/29/16	16:10	308.27	bailer	--	--	--	<0.05	--	--	--	--	--	--	Clear	--
Batch Injection	3/2/16	8:00	308.27	bailer	--	--	--	<0.05	--	--	246	--	--	--	Clear	--
Batch Injection	3/2/16	14:20	308.23	bailer	--	--	--	<0.05	--	--	242	--	--	--	Clear	--
Batch Injection	3/4/16	8:00	307.57	bailer	--	--	--	<0.05	--	--	183	--	--	--	Clear	--
Batch Injection	3/4/16	14:45	307.44	bailer	--	--	--	<0.05	--	--	--	7.80	--	--	Clear	--
Batch Injection	3/7/16	8:37	308.06	bailer	--	--	--	<0.05	--	--	--	7.20	--	--	Clear	--
Batch Injection	3/9/16	9:35	308.26	bailer	--	--	--	<0.05	--	--	163	7.21	--	--	Clear	--
Batch Injection	3/11/16	9:40	308.29	bailer	--	--	--	<0.05	--	--	234	7.39	--	--	Clear	--
Batch Injection	3/14/16	9:05	308.24	bailer	--	--	--	<0.05	--	--	228	7.21	--	--	Clear	--
Batch Injection	3/16/16	7:34	308.18	bailer	--	--	--	<0.05	--	--	206	7.64	--	--	Clear	--
Batch Injection	3/21/16	9:30	308.19	bailer	--	--	--	<0.05	--	--	205	7.75	--	--	Clear	--
Batch Injection	3/23/16	14:30	308.28	bailer	--	--	--	<0.05	--	--	218	7.25	--	--	Clear	--
Batch Injection	3/28/16	9:37	308	SP-341'	--	--	--	--	--	--	--	--	--	--	Clear	--
Batch Injection Sweeping	3/29/16	9:00	307.92	SP-341'	16	352.8	24	<0.05	--	--	198	7.92	--	--	Clear	Started WR-274A Pump at 9:12
Batch Injection Sweeping	3/29/16	10:09	304.67	bailer	--	--	--	--	--	--	--	--	--	--	Clear	Pumping
Batch Injection Sweeping	3/29/16	10:16	304.13	bailer	--	--	--	--	--	--	--	--	--	--	Clear	Pumping
Batch Injection Sweeping	3/29/16	11:02	312.89	bailer	16	--	--	--	--	--	--	--	--	--	Clear	Pumping @ 16 gpm
Batch Injection Sweeping	3/29/16	12:30	312.94	bailer	--	--	24	<0.05	--	--	176		--	--	Clear	Pumping
Batch Injection Sweeping	3/29/16	14:45	312.96	bailer	--	--	22	<0.05	--	--	181		--	--	Clear	Pumping
Batch Injection Sweeping	3/30/16	7:10	308.08	bailer	16	6,640.65	--	--	--	--	--	--	--	--	Clear	--
Batch Injection Sweeping	3/30/16	9:06	313.09	bailer	--	--	--	--	--	--	--	--	--	--	Clear	Pumping @ 16.16 gpm
Batch Injection Sweeping	3/30/16	10:50	313.14	bailer	16	9,794.58	24.5	--	--	--	131	7.45	--	--	Clear	Pumping @ 15.99 gpm
Batch Injection Sweeping	3/30/16	14:02	313.15	bailer	--	--	--	--	--	--	108	7.48	--	--	Clear	Pumping
Batch Injection Sweeping	3/30/16	15:30	313.14	bailer	16.02	14,197.70	24	--	--	--	142	7.38	--	--	Clear	Pumping
Batch Injection Sweeping	3/31/16	8:45	308.09	bailer	16.18	14,211.30	24.5	<0.05	--	--	139	7.42	--	--	Clear	Pumping
Batch Injection Sweeping	4/1/16	11:15	313.15	SP-341'	15.98	21,003.80	24	<0.05	--	--	167	7.66	--	--	Clear	Pumping
Batch Injection Sweeping	4/5/16	8:38	313.52	SP-341'	15.98	111,422.00	24	<0.05	--	--	220	7.36	--	--	Clear	Pumping
Batch Injection Sweeping	4/5/16	10:44	311.36	SP-341'	10.12	112,394.00	18	0.07	--	--	387	7.72	--	--	Lt. Pink	Pumping
Batch Injection Sweeping	4/8/16	8:15	313.33	SP-341'	16.17	179,346.00	24.5		--	--	216	7.43	--	--	Clear	Pumping
Batch Injection Sweeping	4/11/16	7:00	313.45	bailer	16.18	246,052.00	24.5	<0.05	--	--	398	7.79	--	--	Clear	Pumping (off at 8:00)
Batch Injection Sweeping	4/11/16	10:20	--	SP-341'	--	--	--	<0.05	--	--	357	7.4	0	0	Clear	Pumped 10:20 to 10:38
Batch Injection Sweeping	4/11/16	14:42	309	SP-341'	0	247,230.00	16	--	--	--		--	--	--	--	Began pumping at 14:55
Batch Injection Sweeping	4/11/16	15:10	--	SP-341'	10.03	--	16	--	--	--	--	--	--	--	--	Pump off
Batch Injection Sweeping	4/11/16	15:23	--	SP-341'	10.04	247,507.00	16	<0.05	--	--	145	7.65	--	--	Clear	Pump off

Table 3.6 Summary of Collected Field Data at W-274A

Test	Date	Time	Water Level	Sample Depth	From Well Head			Field Test Results							Water Color	Comments
					Flow Rate	Totalizer	Pressure	Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(gpm)	(gallons)	(psi)	(ppm)	--	(ppm)	(mV)	(SU)	ppm	ppm		
Batch Injection Sweeping	4/11/16	17:20	311.11	SP-341'	10.06	--	16	<0.05	--	--	256	7.47	--	--	Clear	Pump off
Downgradient Recirc	4/11/16	18:30	--	SP-341'	10.06	249,285 (1st flow meter)	16	--	--	--	--	--	--	--	--	Approx. 16 gallons of permanganate has been injected into BP-27
Downgradient Recirc	4/11/16	--	--	--	10.2	250,624 (2nd flow meter)	--	--	--	--	--	--	--	--	--	Pumping
Downgradient Recirc	4/12/16	8:35	311.35	SP-341'	10.06	257,922.00	16	<0.05	--	--	241	7.54	--	--	Clear	Pumping
Downgradient Recirc	4/12/16	15:08	311.24	SP-341'	10.04	261,867.00	16	0.01	--	--	417	7.4	--	--	Clear	Pumping
Downgradient Recirc	4/13/16	8:50	311.31	SP-341'	9.98	274,975.00	16	0.05	--	--	389	7.44	--	--	Clear	Pumping
Downgradient Recirc	4/15/16	8:25	310.87	SP-341'	9.96	301,868.00	16.5	0.2	--	--	543	7.74	--	--	Lt. Pink	Pumping
Downgradient Recirc	4/15/16	12:30	--	SP-341'	--	--	--	1	--	--	--	--	--	--	--	Pumping
Downgradient Recirc	4/15/16	15:37	--	--	9.93	304,915.00	16.5	--	--	--	--	--	--	--		--
Downgradient Recirc	4/18/16	13:00	311.09	SP-341'	9.88	346,395.00	16	0.07	--	--	451	7.61	--	--	Clear	Pumping
Downgradient Recirc	4/20/16	8:45	311.16	SP-341'	9.76	372,296.00	16	10	2	--	618	7.67	--	--	Pink	Pumping
Downgradient Recirc	4/22/16	8:57	307.87	--	0	380,528.00	0	--		--	--	--	--	--	--	System shutdown overnight
Downgradient Recirc	4/22/16	9:30	--	SP-341'	9.78	380,686.00	16	20	2	--	617	7.73	--	--	Purple	Pumping
Downgradient Recirc	4/25/16	8:30	310.89	SP-341'	10.22	410,331.00	17	20	2	--	622	7.71	--	--	Lt Purple	--
Downgradient Recirc	4/27/16	7:50	311.07	SP-341'	10.08	439,014.00	17	1		--	--	--	--	--	Lt Purple	--
Downgradient Recirc	4/27/16	12:40	--	SP-341'	--	--	--	--	--	--	--	--	--	--	Lt Purple	--
Downgradient Recirc	5/2/16	8:28	311.2	--	9.88	510,705.00	17	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/2/16	13:52	--	SP-341'	--	--	--	20	2	38.83	619	7.65	--	--	Purple	Switched to pumping from WR-274A and injecting into BP-27 without permanganate injection
Downgradient Sweeping	5/3/16	7:15	311.16	SP-341'	10.18	523,854.00	16	20	2	41	633	7.88	--	--	Purple	--
Downgradient Sweeping	5/4/16	6:52	311.6	SP-341'	10.23	538,863.00	16	--	--	--	--	--	--	--	Purple	--
Downgradient Sweeping	5/4/16	8:27	--	SP-341'	--	--	--	--	--	45.05	641	7.9	--	--	Purple	--
Downgradient Sweeping	5/6/16	7:40	311.04	--	10.06	568,563.00	16	--	--	41.76	617	7.67	--	--	Purple	--
Downgradient Sweeping	5/9/16	6:50	311.09	--	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/9/16	11:15	--	SP-341'	10.18	612,281.00	16	--	--	35.13	678	7.25	--	0	Purple	--
Downgradient Sweeping	5/11/16	7:39	311.08	--	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient Sweeping	5/11/16	9:30	--	SP-341'	10.08	640,225.00	16	--	--	32.22	634	8			Purple	--
Downgradient Sweeping	5/13/16	8:18	312.71	--	15.48	683,372.00	24	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/13/16	11:27	--	SP-341'	--	--	--	--	--	10.53	634	7.3			Purple	Switched to pumping from BP-29
Lateral Sweeping	5/16/16	9:09	307.5	--	0	685,602.00	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/16/16	13:53	--	SP-341'	--	--	--	--	--	6.02	480	7.96	--	--	Lt. Purple	--
Lateral Sweeping	5/17/16	6:46	307.51	SP-341'	0	--	0	--	--	7.01	630	7.92	--	--	Lt. Purple	--
Lateral Recirculation	5/17/16	15:53	307.41	SP-341'	0	685,724.00	0	--	--	7.2	632	7.94	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	6:04	307.6	--	0	685,724.00	0	--	--	--	--	--	--	--	--	--

Table 3.6 Summary of Collected Field Data at W-274A

Test	Date	Time	Water Level	Sample Depth	From Well Head			Field Test Results							Water Color	Comments
					Flow Rate	Totalizer	Pressure	Oxidant Conc. via Test Strips	Dilution Factor	Oxidant Conc. via Colorimeter	ORP	pH	Iron Soluble	Iron Total		
			(btoc)	(btoc)	(gpm)	(gallons)	(psi)	(ppm)	--	(ppm)	(mV)	(SU)	ppm	ppm		
Lateral Recirculation	5/18/16	9:28	--	SP-341'	--	--	--	--	--	25.75	668	7.79	--	--	Lt. Purple	--
Lateral Recirculation	5/18/16	14:23	307.57	--	--	--	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	9:17	307.55	--	--	--	--	--	--	--	--	--	--	--	--	--
Lateral Recirculation	5/20/16	11:55	--	SP-341'	0	--	0	--	--	32.26	632	7.81			Purple	--
Lateral Recirculation	5/23/16	9:45	307.53	SP-341'	9.54	685,853.00	19	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	7:05	307.58	--	--	--	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/24/16	9:20	--	SP-341'	--	--	--	--	--	24.77	691	7.46	--	--	--	--
Lateral Sweeping	5/24/16	12:47	--	SP-341'	--	--	--	--	--	25.43	680	7.7	--	--	--	--
Lateral Sweeping	5/25/16	6:05	307.55	--	--	--	--	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/25/16	8:16	--	SP-341'	--	--	--	--	--	22.86	642	7.66	--	--	Lt. Purple	--
Lateral Sweeping	5/27/16	7:19	307.57	--	--	685,995.00	15	--	--	--	--	--	--	--	--	--
Lateral Sweeping	5/27/16	12:30	341	SP-341'	--	--	--	--	--	21.71	583	8.07	--	--	Lt. Purple	--
Post-Test	8/2/16	--	307.12	--	--	--	--	--	--	41.79	7.76	544	--	--	--	--

Notes:

Batch injection started 2/29 at 17:10.

SU = standard units

[1] Sample analyzed using a YSI with a flow through cell.

btoc = below top of casing

gpm = gallons per minute

mV = millivolts

ORP = oxidation reduction potential

ppm = parts per million

psi = pounds per square inch

Table 4 Process Analytical Data (Injection Concentrations)

Summary of Analytical Results Evaluating Permanganate Concentrations in Process Samples

Location	Sample ID	Laboratory	Method	Date Sampled	Metals Analysis	
					Total Manganese µg/L	Manganese as $NaMnO_4$ mg/L
BP-27 Inlet	BP-BATCH INJECTION-01	SGS ACCUTEST	ICP-AES	2/29/2016	272,000	703
BP-27 Inlet	BP-BATCH INJECTION-02	SGS ACCUTEST	ICP-AES	2/29/2016	35,900	93
ISCO Tank	BP-ISCO-TANK	SGS ACCUTEST	ICP-AES	3/11/2016	3,560,000	9,197
ISCO Tank	BP-ISCO 6.5K TANK	SGS ACCUTEST	ICP-AES	4/1/2016	1,060,000	2,738
BP-27 Inlet	BP-27-INJECTION-1	SGS ACCUTEST	ICP-AES	4/11/2016	33,600	87
BP-27 Inlet	BP-27-INJECTION-2	SGS ACCUTEST	ICP-AES	4/11/2016	33,100	86
BP-27 Inlet	BP-27-INJECTION-2	TestAmerica	ICP-AES	4/11/2016	76,000	196
BP-27 Inlet	BP-27-INJECTION	SGS ACCUTEST	ICP-AES	5/17/2016	54,800	142
BP-27 Inlet	BP-27-INJECTION	SGS ACCUTEST	ICP-AES	5/23/2016	25,400	66
BP-27 Inlet	BP-27-INJECTION	Carus	Spectrophotmetry	5/23/2016	108,700	281

Estimate of Injected Permanganate Concentration by Test Period

Test	Source of Data	Date		$NaMnO_4$ (mg/L)
Batch Injection (Test 1)	Analytical Result - Injection SP	2/29/2016	ICP-AES	703
	Analytical Result - Injection SP	2/29/2016	ICP-AES	93
	---	***Average***		***398***
Downgradient Recirculation (Test 2)	Analytical Result - Injection SP	4/11/2016	ICP-AES	87
	Analytical Result - Injection SP	4/11/2016	ICP-AES	86
	Analytical Result - Injection SP	4/11/2016	ICP-AES	196
	Field Reading- Injection SP	4/27/2016	Spectrophotmetry	123
	Field Reading- Injection SP	5/2/2016	Spectrophotmetry	118
	---	***Average***		***122***
Lateral Recirculation (Test 3)	Field Reading- Injection SP	5/17/2016	Spectrophotmetry	83.8
	Field Reading- Injection SP	5/17/2016	Spectrophotmetry	74.1
	Field Reading- Injection SP	5/17/2016	Spectrophotmetry	72.2
	Field Reading- Injection SP	5/20/2016	Spectrophotmetry	69.7
	Field Reading - In Well	5/23/2016	Spectrophotmetry	84.7
	Field Reading- Injection SP	5/23/2016	Spectrophotmetry	74.3
	Field Reading- Injection SP	5/23/2016	Spectrophotmetry	75.4
	---	***Average***		***76.3***

Notes:

µg/L = micrograms per liter

mg/L = milligrams per liter

ICP-AES = inductively coupled plasma-atomic emission spectrometry

$NaMnO_4$ = sodium permanganate

SP = sample port

Table 5 Summary of Groundwater Analytical Data

Location	Sample ID	Depth (ft bgs)	Date Sampled	GC/MS Volatiles (SW846 8260B)						Metals Analysis		
				Tetrachloroethene (µg/L)	Trichloroethylene (µg/L)	1,1-Dichloroethene (µg/L)	cis-1,2-Dichloroethene (µg/L)	trans-1,2-Dichloroethene (µg/L)	Vinyl chloride (µg/L)	Chromium (µg/L)	Manganese (µg/L)	Manganese as $NaMnO_4$ mg/L
BP-26	BP-26-320-GW	320	2/29/2016	55.6	14.3	ND (0.50)	15.3	0.76	ND (0.50)	ND (10)	202	0.52
BP-26	BP-26-320-GW	320	4/8/2016	-	-	-	-	-	-	-	270	0.70
BP-26	BP-26-320-GW	320	5/17/2016	8.7	0.38 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	9,540	25
BP-26	BP-26-320-GW	320	5/23/2016	3.1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	11,000	28
BP-26	BP-26-333-GW	333	2/29/2016	48.7	12.6	ND (0.50)	14.7	0.61	ND (0.50)	ND (10)	186	0.48
BP-26	BP.26.333.GW	333	3/28/2016	69	16.9	ND (0.20)	16.6	0.30 J	ND (0.20)	ND (10)	98.2	0.25
BP-26	BP-26-333-GW	333	4/8/2016	-	-	-	-	-	-	-	303	0.78
BP-26	BP-26-333-GW	333	4/11/2016	65.3	13.3	ND (0.20)	12.7	ND (0.20)	ND (0.20)	ND (10)	402	1.0
BP-26	BP.26.333.GW	333	4/22/2016	46.6	2.8	ND (0.20)	1.5	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP.26.333.GW	333	4/27/2016	22.5	0.46 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP.26.333.GW	333	5/2/2016	11.1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP-26-333-GW	333	5/9/2016	3.3	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	32.5	47,400	122
BP-26	BP-26-333-GW	333	5/17/2016	9.8	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	9,750	25
BP-26	BP-26-333-GW	333	5/23/2016	0.77	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	13,800	36
BP-26	BP-26-333-GW	333	5/27/2016	0.58	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	20.6	21,900	57
BP-26	BP-26-333-GW	333	8/2/2016	-	-	-	-	-	-	-	-	42
BP-26	BP-26-345-GW	345	2/29/2016	54.5	13.2	ND (0.50)	14.5	0.55	ND (0.50)	ND (10)	227	0.59
BP-26	BP.26.345.GW	345	3/28/2016	62.5	15.9	ND (0.20)	16.7	0.34 J	ND (0.20)	ND (10)	123	0.32
BP-26	BP-26-345-GW	345	4/8/2016	-	-	-	-	-	-	-	295	0.76
BP-26	BP-26-345-GW	345	4/11/2016	57.1	12.8	ND (0.20)	12	ND (0.20)	ND (0.20)	ND (10)	340	0.88
BP-26	BP.26.345.GW	345	4/22/2016	48.6	4.6	ND (0.20)	3	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP.26.345.GW	345	4/27/2016	25.2	1.7	ND (0.20)	0.88	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP.26.345.GW	345	5/2/2016	12.6	0.37 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-26	BP-26-355-GW	355	5/9/2016	2.9	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	31.5	51,100	132
BP-26	BP-26-355-GW	355	5/17/2016	4.4	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	14,200	37
BP-26	BP-26-355-GW	355	5/23/2016	0.53	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	11,500	30
BP-27	BP.27.INJECTION	SP	4/22/2016	81.3	16.7	ND (0.20)	16.8	ND (0.20)	ND (0.20)	-	-	
BP-27	BP.27.INJECTION	SP	4/27/2016	69.5	13.9	ND (0.20)	13.9	ND (0.20)	ND (0.20)	-	-	
BP-27	BP-27-320-GW	320	2/29/2016	78.1	17.6	ND (0.50)	17.6	0.69	ND (0.50)	ND (10)	124	0.32
BP-27	BP-27-GW	333	3/1/2016	-	-	-	-	-	-	-	42,200	109
BP-27	BP-27-320-GW	320	4/11/2016	69.8	20	ND (0.20)	25.4	0.49 J	ND (0.20)	ND (10)	106	0.27
BP-27	BP.27.320.GW	320	5/2/2016	51	1.9	ND (0.20)	0.46 J	ND (0.20)	ND (0.20)	-	-	-
BP-27	BP-27-320-GW	320	5/9/2016	33.6	3.3	ND (0.20)	2.5	ND (0.20)	ND (0.20)	13.2	11,400	29
BP-27	BP-27-320-GW	320	5/17/2016	30.8	1.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	11,500	30
BP-27	BP-27-320-GW	320	5/23/2016	2.7	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	24,600	64
BP-27	BP-27-333-GW	333	2/29/2016	69.6	16.5	ND (0.50)	17.5	0.61	ND (0.50)	ND (10)	119	0.31
BP-27	BP.27.333.GW	333	3/28/2016	77	8.5	ND (0.20)	5.9	ND (0.20)	ND (0.20)	ND (10)	1,390	3.6
BP-27	BP-27-333-GW	333	4/11/2016	70.4	20	ND (0.20)	25.6	0.48 J	ND (0.20)	ND (10)	112	0.29
BP-27	BP.27.333.GW	333	5/2/2016	48.3	1.7	ND (0.20)	0.46 J	ND (0.20)	ND (0.20)	-	-	-
BP-27	BP-27-333-GW	333	5/9/2016	33.1	3.2	ND (0.20)	2.6	ND (0.20)	ND (0.20)	12.9	10,200	26
BP-27	BP-27-333-GW	333	5/17/2016	34.3	1.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	10,900	28
BP-27	BP-27-333-GW	333	5/23/2016	2.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	25,400	66
BP-27	BP-27-333-GW	333	5/27/2016	5.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	23	18,500	48
BP-27	BP-27-GW	333	8/2/2016	-	-	-	-	-	-	-	-	18
BP-28	BP-28-320-GW	320	2/29/2016	77.3	19.4	ND (0.50)	26	0.58	ND (0.50)	ND (10)	93.6	0.24
BP-28	BP-28-320-GW	320	5/17/2016	8.8	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	13,400	35
BP-28	BP-28-320-GW	320	5/23/2016	0.96	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	11,900	31
BP-28	BP-28-333-GW	333	2/29/2016	67.4	17.8	ND (0.50)	24.7	ND (0.50)	ND (0.50)	ND (10)	89.9	0.23
BP-28	BP.28.333.GW	333	3/28/2016	78.7	25.9	ND (0.20)	30.5	0.74	ND (0.20)	ND (10)	53.6	0.14
BP-28	BP-28-333-GW	333	4/11/2016	72.4	19.8	ND (0.20)	20.2	ND (0.20)	ND (0.20)	ND (10)	49.4	0.13
BP-28	BP.28.333.GW	333	5/2/2016	0.32 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP-28-333-GW	333	5/9/2016	2.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	22.1	23,900	62

Table 5 Summary of Groundwater Analytical Data

Location	Sample ID	Depth (ft bgs)	Date Sampled	GC/MS Volatiles (SW846 8260B)						Metals Analysis		
				Tetrachloroethene (µg/L)	Trichloroethylene (µg/L)	1,1-Dichloroethene (µg/L)	cis-1,2-Dichloroethene (µg/L)	trans-1,2-Dichloroethene (µg/L)	Vinyl chloride (µg/L)	Chromium (µg/L)	Manganese (µg/L)	Manganese as $NaMnO_4$ mg/L
BP-28	BP-28-333-GW	333	5/17/2016	12.9	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	10,900	28
BP-28	BP-28-333-GW	333	5/23/2016	1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	12,000	31
BP-28	BP-28-333-GW	333	5/27/2016	4.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	15.1	15,100	39
BP-28	BP-28-333-GW	333	8/2/2016	-	-	-	-	-	-	-	-	12
BP-28	BP-28-345-GW	345	2/29/2016	87.8	22.2	ND (0.50)	28.6	0.64	ND (0.50)	ND (10)	78.3	0.20
BP-28	BP.28.345.GW	345	3/28/2016	83.1	26.9	ND (0.20)	31.3	0.79	ND (0.20)	ND (10)	49.1	0.13
BP-28	BP-28-345-GW	345	4/11/2016	73.8	20.8	ND (0.20)	22.5	ND (0.20)	ND (0.20)	ND (10)	64.1	0.17
BP-28	BP.28.345.GW	345	4/22/2016	0.77	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP.28.345.GW	345	4/27/2016	0.35 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP.28.345.GW	345	5/2/2016	0.49 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP.28.355.GW	355	4/22/2016	0.46 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP.28.355.GW	355	4/27/2016	0.38 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	-	-
BP-28	BP-28-355-GW	355	5/9/2016	2.9	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	20.9	23,500	61
BP-28	BP-28-355-GW	355	5/17/2016	15.4	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	9,670	25
BP-28	BP-28-355-GW	355	5/23/2016	1.4	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	13,300	34
BP-29	BP-29-370-GW	370	2/29/2016	81	15.7	ND (0.50)	14.3	ND (0.50)	ND (0.50)	ND (10)	90.5	0.23
BP-29	BP-29-370-GW	370	4/11/2016	73.9	15.1	ND (0.20)	11.3	0.44 J	ND (0.20)	ND (10)	69.9	0.18
BP-29	BP.29.370.GW	370	4/22/2016	32	5.9	ND (0.20)	4.5	ND (0.20)	ND (0.20)	-	-	-
BP-29	BP.29.370.GW	370	4/27/2016	47	11.5	ND (0.20)	12.1	ND (0.20)	ND (0.20)	-	-	-
BP-29	BP.29.370.GW	370	5/2/2016	92.9	19.9	ND (0.20)	18.5	0.30 J	ND (0.20)	-	-	-
BP-29	BP-29-370-GW	370	5/9/2016	59.3	7.3	ND (0.20)	5.6	ND (0.20)	ND (0.20)	10.5	3,680	9.5
BP-29	BP-29-370-GW	370	5/17/2016	51.5	9.5	ND (0.20)	7.4	ND (0.20)	ND (0.20)	-	9,130	24
BP-29	BP-29-370-GW	370	5/23/2016	41.8	7.2	ND (0.20)	6.1	ND (0.20)	ND (0.20)	-	8,840	23
BP-29	BP-29-370-GW	370	5/27/2016	45.8	7.6	ND (0.20)	6.1	ND (0.20)	ND (0.20)	12.9	11,100	29
BP-29	BP.29.SP.GW	370	3/28/2016	67.1	13.6	ND (0.20)	13.2	0.31 J	ND (0.20)	ND (10)	95.1	0.25
WR-274	W-274A-341-GW	341	2/29/2016	104	30.4	ND (0.50)	36	0.59	ND (0.50)	ND (10)	ND (15)	NA
WR-274	BP.WR.274A.341.GW	341	3/28/2016	103	22.7	ND (0.40)	26.7	ND (0.40)	ND (0.40)	ND (10)	ND (15)	NA
WR-274	U of A Sample	341	4/1/2016	100	25	-	-	-	-	-	-	-
WR-274	U of A Sample	341	4/6/2016	110	19	-	-	-	-	-	-	-
WR-274	WR-274A-341-GW	341	4/8/2016	-	-	-	-	-	-	-	62.2	0.16
WR-274	WR-274A-341-GW	341	4/11/2016	111	25	ND (0.40)	25.7	0.54 J	ND (0.40)	ND (10)	26.5	0.07
WR-274	WR.274A.341.GW	341	4/22/2016	45.5	10.2	ND (0.20)	11.5	ND (0.20)	ND (0.20)	-	-	-
WR-274	WR.274A.341.GW	341	4/27/2016	69	13.9	ND (0.20)	13.9	ND (0.20)	ND (0.20)	-	-	-
WR-274	WR.274A.341.GW	341	5/2/2016	44.1	9.8	ND (0.20)	10.7	ND (0.20)	ND (0.20)	-	-	-
WR-274	U of A Sample	341	5/6/2016	50	10	-	-	-	-	-	-	-
WR-274	WR-274A-341-GW	341	5/9/2016	45.6	9.8	ND (0.20)	9.8	ND (0.20)	ND (0.20)	17.6	21,500	56
WR-274	U of A Sample	341	5/12/2016	34	7.5	-	-	-	-	-	-	-
WR-274	WP-274A-341-GW	341	5/17/2016	4.1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	22,100	57
WR-274	U of A Sample	341	5/20/2016	1.2	ND (Not Reported)	-	-	-	-	-	-	-
WR-274	WR-274A-341-GW	341	5/23/2016	1.6	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	-	12,600	33
WR-274	WR-274A-341-GW	341	5/27/2016	1.5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	23.4	15,400	40
WR-274	WR-274A-341-GW	341	8/2/2016	-	-	-	-	-	-	-	-	42

Notes:

- = Not Evaluated

µg/L = micrograms per liter

NA = Not Applicable

ND = Not Detected (Number in Parenthesis is the Reporting Limit)

SP = Sample Port

NaMnO4 = sodium permanganate

Table 6 Permanganate Concentrations Corresponding to PCE Concentrations less than the AWQS

Location	Sample ID	Depth (ft bgs)	Date Sampled	Tetrachloroethylene (µg/L)	Manganese (µg/L)	Manganese as NaMnO4 (mg/L)
BP-26	BP-26-320-GW	320	5/23/2016	3.1	11,000	28
BP-26	BP-26-333-GW	333	5/23/2016	0.77	13,800	36
BP-26	BP-26-333-GW	333	5/27/2016	0.58	21,900	57
BP-26	BP-26-355-GW	355	5/17/2016	4.4	14,200	37
BP-26	BP-26-355-GW	355	5/23/2016	0.53	11,500	30
BP-28	BP-28-320-GW	320	5/23/2016	0.96	11,900	31
BP-28	BP-28-333-GW	333	5/9/2016	2.6	23,900	62
BP-28	BP-28-333-GW	333	5/23/2016	1.0	12,000	31
BP-28	BP-28-333-GW	333	5/27/2016	4.6	15,100	39
BP-28	BP-28-355-GW	355	5/9/2016	2.9	23,500	61
BP-28	BP-28-355-GW	355	5/23/2016	1.4	13,300	34
WR-274	WP-274A-341-GW	341	5/17/2016	4.1	22,100	57
WR-274	WR-274A-341-GW	341	5/23/2016	1.6	12,600	33
WR-274	WR-274A-341-GW	341	5/27/2016	1.5	15,400	40
					Minimum	***28***
					Maximum	***62***
					Average	***41***

Notes:

AWQS = Arizona Aquifer Water Quality Standard
ID = identification
µg/L = micrograms per liter
ft bgs = feet bgs
mg/L = milligrams per liter
$NaMnO_4$ = sodium permanganate
PCE = tetrachloroethene

NaMnO4 concentrations greater than 100 mg/L are excluded from this analysis on the basis that oxidant is expected to be present in excess at this concentration.

Table 7 Elevated Permanganate Concentrations Corresponding to PCE Concentrations Greater than the AWQS

Location	Sample ID	Depth (ft bgs)	Date Sampled	Tetrachloroethylene (µg/L)	Manganese (µg/L)	Manganese as NaMnO4 (mg/L)
BP-26	BP-26-320-GW	320	5/17/2016	8.7	9,540	25
BP-26	BP-26-333-GW	333	5/17/2016	9.8	9,750	25
BP-28	BP-28-320-GW	320	5/17/2016	8.8	13,400	35
BP-28	BP-28-333-GW	333	5/17/2016	12.9	10,900	28
BP-28	BP-28-355-GW	355	5/17/2016	15.4	9,670	25
BP-29	BP-29-370-GW	370	5/9/2016	59.3	3,680	9.5
BP-29	BP-29-370-GW	370	5/17/2016	51.5	9,130	24
BP-29	BP-29-370-GW	370	5/23/2016	41.8	8,840	23
BP-29	BP-29-370-GW	370	5/27/2016	45.8	11,100	29
WR-274A	WR-274A-341-GW	341	5/9/2016	45.6	21,500	56
					Minimum	***9.5***
					Maximum	***56***
					Average	***28***

Notes:

AWQS = Arizona Aquifer Water Quality Standard
ID = identification
µg/L = micrograms per liter
ft bgs = feet bgs
mg/L = milligrams per liter
$NaMnO_4$ = sodium permanganate
PCE = tetrachloroethene

NaMnO4 concentrations less than or equal to 1 mg/L are excluded from this analysis.

Table 8 Injected Permanganate Concentration Analysis

Test	Well	Date When Peak Permanganate Concentration Observed[1]	Range of Peak Permanganate Concentrations[2] at Observation Well (mg/L)	Average Peak Permanganate Concentration at Observation Well (mg/L)	Average Injected Permanganate Concentration During Test[3] (mg/L)	Peak Concentration as a Percent of Injected Concentration	Estimated Injected Permanganate Concentration[4] (mg/L)
Downgradient Recirculation	BP-26	5/9/2016	64.0 - 84.3	78.4	121	65.1%	61
	BP-28	5/2/2016	112 - 121	115	121	95.8%	42
Lateral Recirculation	BP-26	5/24/2016	40.1 - 76.1	61.3	76.3	80.4%	50
	BP-28	5/24/2016	54.2 - 71.0	64.9	76.3	85.1%	47

Notes:

% = percent

mg/L = milligrams per liter

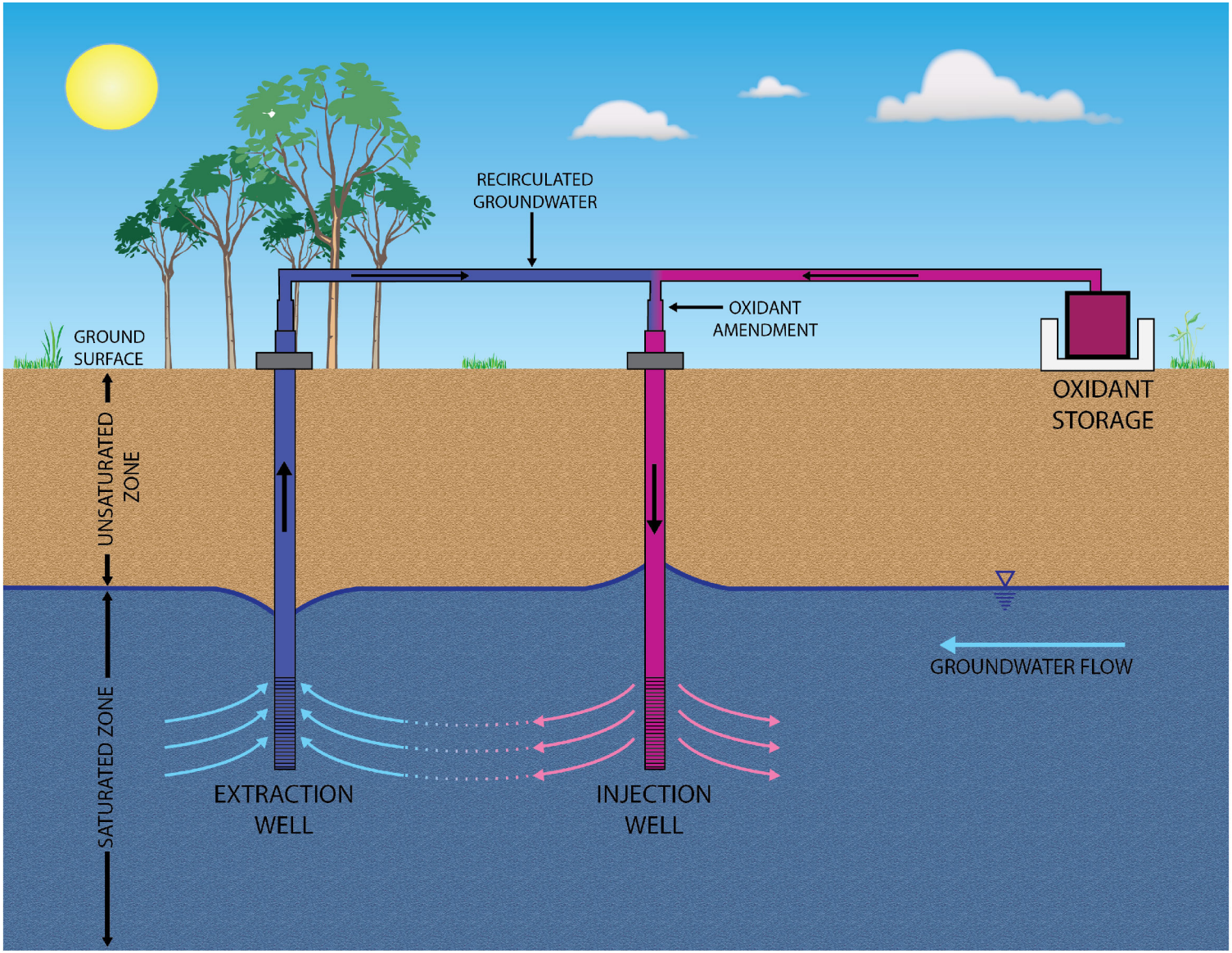
[1] In general, peak concentrations were observed during sweeping phases following completion of recirculation activities.

[2] Based on field readings (colorimeter) at each sample depth.

[3] Based on field readings (colorimeter).

[4] To achieve a permanganate concentration of 40 mg/L at the observation well based on the calculated ratio of peak to injected concentrations.

FIGURES



Job No.:	14-2016-2026
PM:	NC
Date:	1/26/2017
Scale:	NA

N

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Broadway Pantano WQARF Site
Tucson, Arizona

ISCO Pilot System Conceptual Design

FIGURE
1

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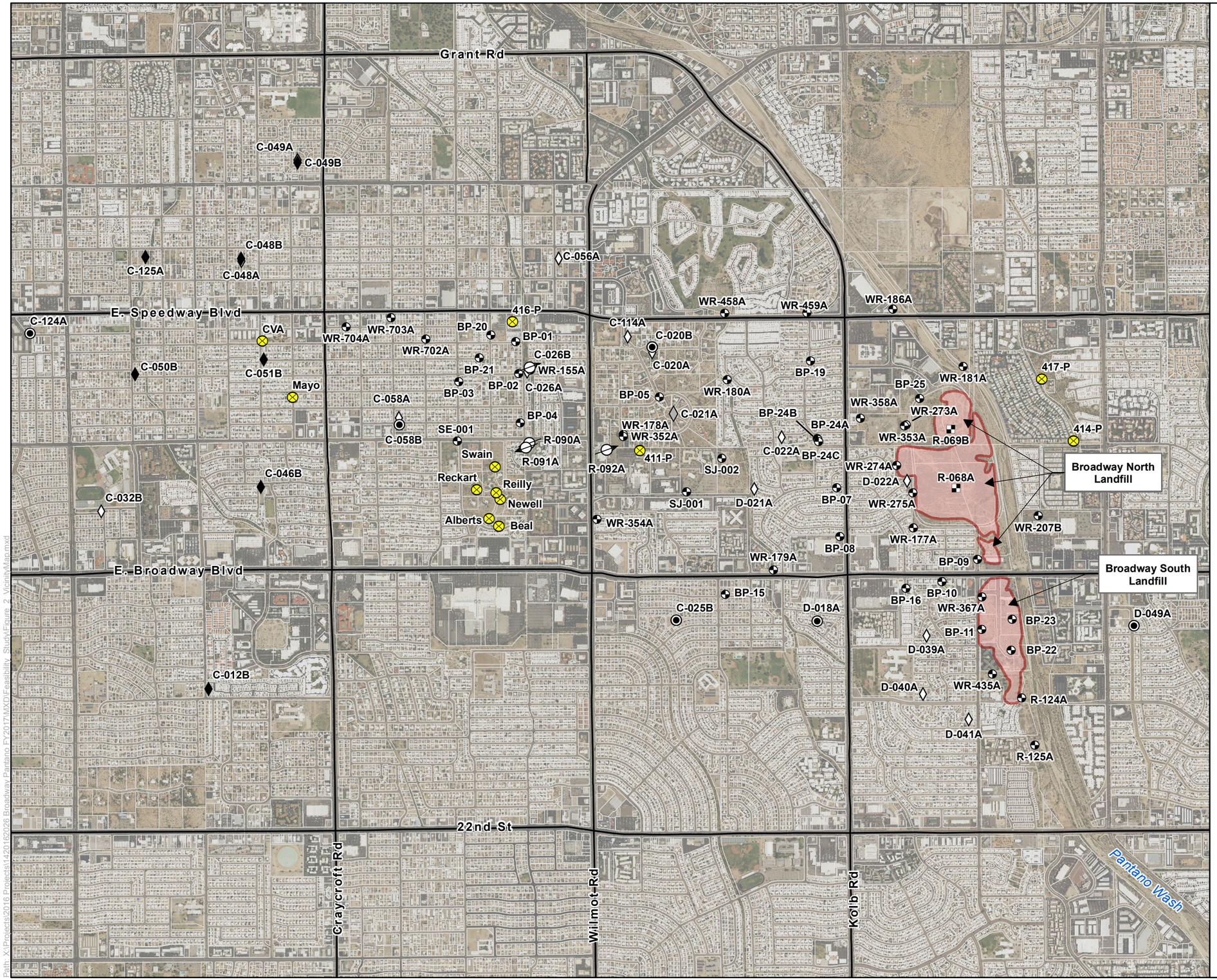
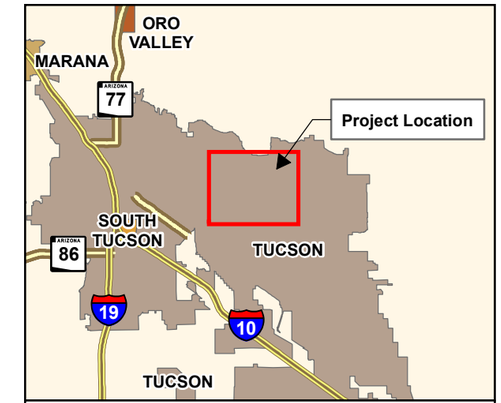
Path: X:\Projects\2016 Projects\14201620 26 Broadway Pantano FY2017\MXD\Report\Figure_1_ISCO_Conceptual_Design.mxd





Area of Detail

Legend

Key to Well Symbology

- Active Monitoring Well
- Active Production Well
- Inactive Production Well
- Abandoned Production Well
- Air Injection/Monitoring Well
- Western Containment Injection Well
- Western Containment Extraction Well
- Standby Well
- Private Well
- Parcel Boundary
- Landfill OU Boundaries

Notes:

WR-178A	Well Identification
OU	Operable Unit
	OU Extent from Clear Creek Associates, 2015
Aerial Imagery:	National Agriculture Imagery Program (NAIP), 2015

0 1,000 2,000 4,000 Feet

N

Broadway Pantano WQARF Site
Tucson, Arizona

Vicinity and Well Location Map

FIGURE **2**

Job No.:	14-2016-2026
PM:	NC
Date:	1/24/2017
Scale:	1" = 2000'

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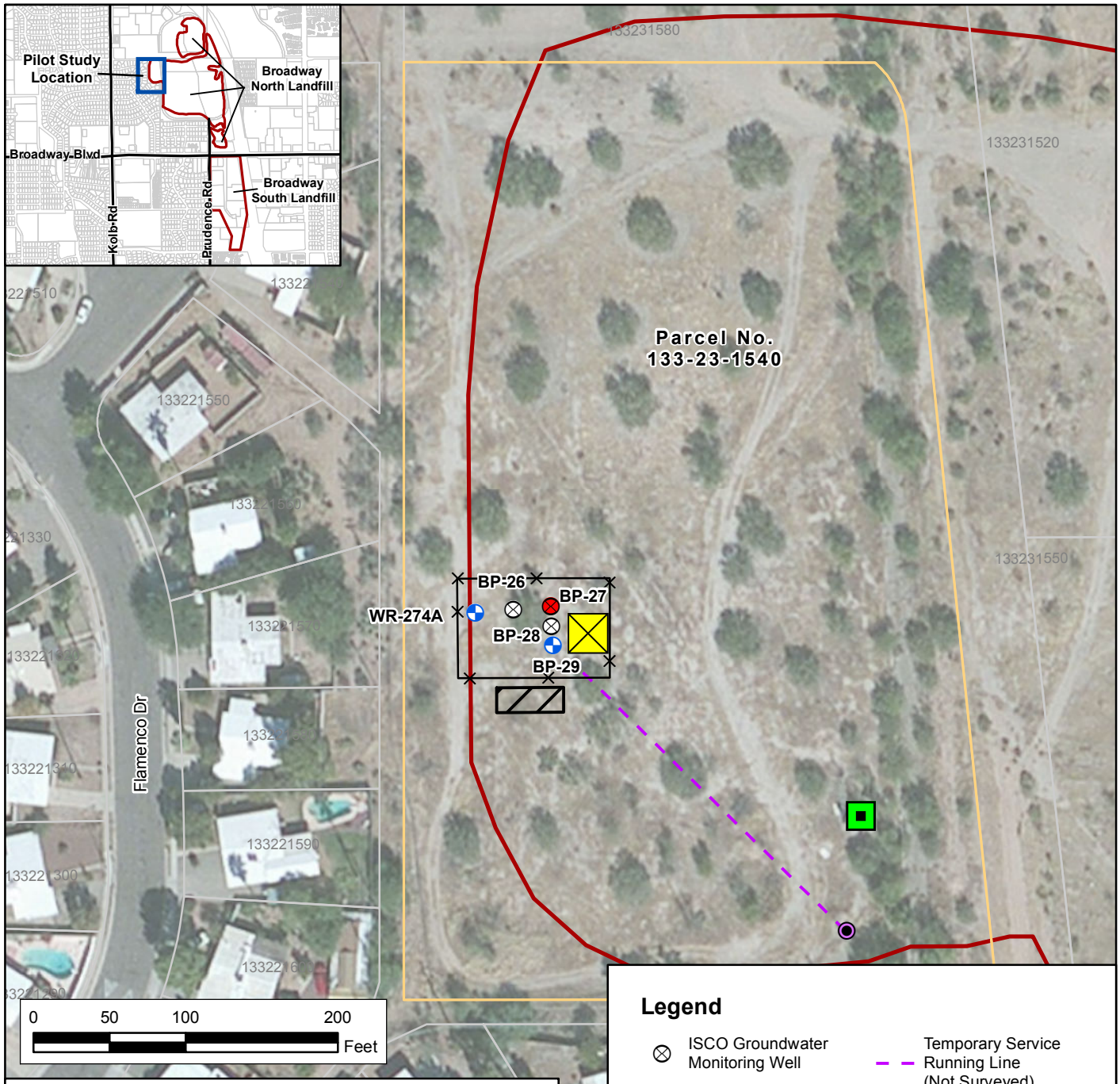
Path: X:\Projects\2016 Projects\142016026 Broadway Pantano FY2017\MXD\Feasibility Study\Figure 2_VicinityMap.mxd



Location of Pilot Study Wells*

Well ID	Latitude	Longitude
BP-26	32° 13' 37.92103"N	110° 50' 15.08491"W
BP-27	32° 13' 37.93780"N	110° 50' 14.79672"W
BP-28	32° 13' 37.81000"N	110° 50' 14.79248"W
BP-29	32° 13' 37.68704"N	110° 50' 14.78482"W
WR-274A	32° 13' 37.90251"N	110° 50' 15.37412"W

*Well Locations are in NAD83, UTM 12N

Legend

- ISCO Groundwater Monitoring Well
- ISCO Injection Well
- ISCO Recirculation Well
- Equipment Area
- Methane Abatement System
- Existing Power Pole
- Temporary Service Running Line (Not Surveyed)
- Frac Tank
- Compound Fenceline
- Parcel No. 133-23-1540
- Pinal County Parcels
- Broadway North Landfill Boundary

Notes:
WR274A - Well Identification
ISCO - In Situ Chemical Oxidation
Aerial Imagery: ESRI, 2010

Job No.:	14-2016-2026
PM:	NC
Date:	5/10/2017
Scale:	1" = 100'

N

Broadway Pantano WQARF Site
Tucson, Arizona

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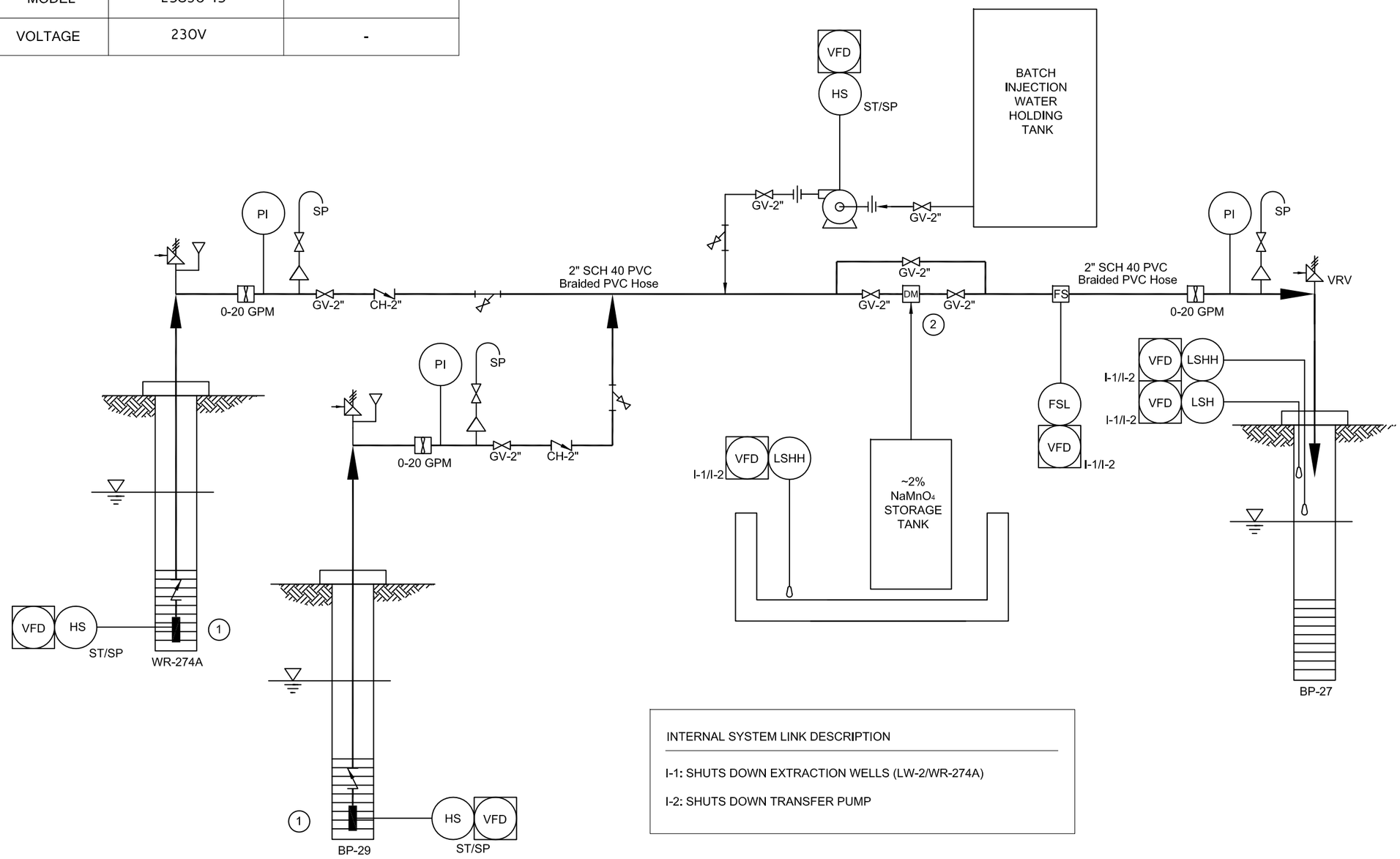
ISCO Pilot Study Well Locations

FIGURE 3

	EQUIPMENT SCHEDULE	
	(1)	(2)
	WELL PUMP	METERED DOSING PUMP
MANUFACTURE	Grundfos	Dosatron
MODEL	25S30-15	-
VOLTAGE	230V	-



INTERNAL SYSTEM LINK DESCRIPTION

I-1: SHUTS DOWN EXTRACTION WELLS (LW-2/WR-274A)

I-2: SHUTS DOWN TRANSFER PUMP

LEGEND

VFD	CONTROL TERMINAL ON VFD
LSH	CONTROL DEVICE
	FLOAT SWITCH
GV-2"	GATE VALVE
0-20 GPM	TURBINE FLOW METER
	Y - STRAINER
	VACUUM RELIEF VALVE
	COMBINATION AIR/VACUUM RELIEF VALVE
DM	METERED DOSING PUMP
SP	SAMPLE PORT
CH-2"	CHECK VALVE
	TRANSFER PUMP

ABBREVIATIONS

VFD	VARIABLE FREQUENCY DRIVE
PI	PRESSURE INDICATOR
SP	SAMPLE PORT
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH-HIGH
ST/SP	START/STOP
HS	HAND SWITCH
GPM	GALLONS PER MINUTE
FSL	LEVEL SWITCH LOW

CLIENT
ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
BROADWAY PANTANO WQARF SITE

TITLE
PILOT ISCO SYSTEM
PROCESS FLOW DIAGRAM

DESIGNED BY	AY	CHECKED BY	DF	DATE	ISSUED FOR
DRAWN BY	BN	APPROVED BY	NC	2/3/16	FINAL

FILENAME	FIGURE No.	REV	PROJECT NO.
FIGURE 4	3	0	14-2015-2042

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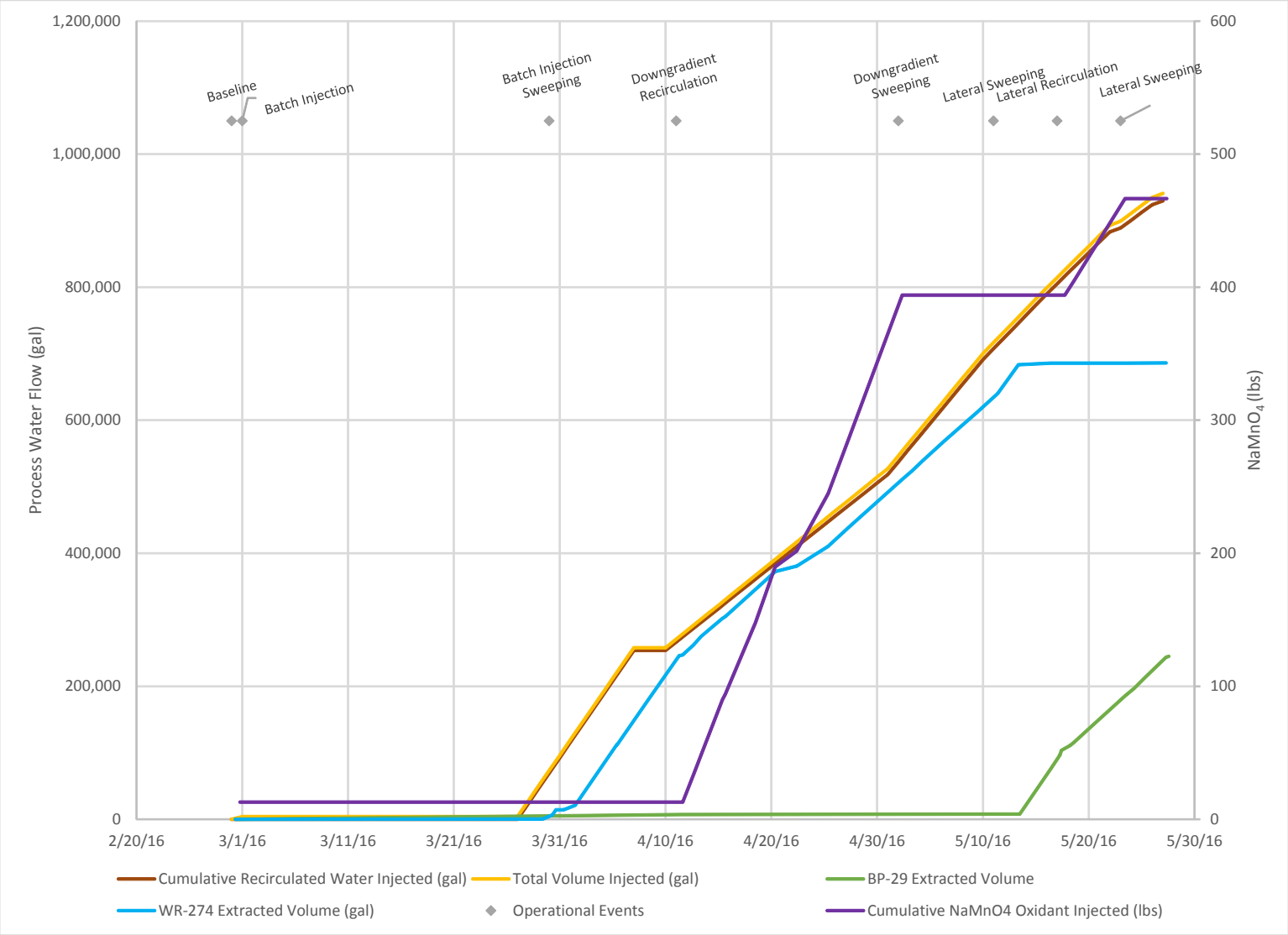
G:\Environmental-Development\2015 Projects\14-2015-2042 Broadway Pantano FY2016\5.0_Technical\5.6_GIS_CADD\ISCO Pilot Study Tech Memo-1/23/2017 2:44 PM



Job No.:	14-2016-2026
PM:	NC
Date:	1/26/2017
Scale:	NA

N

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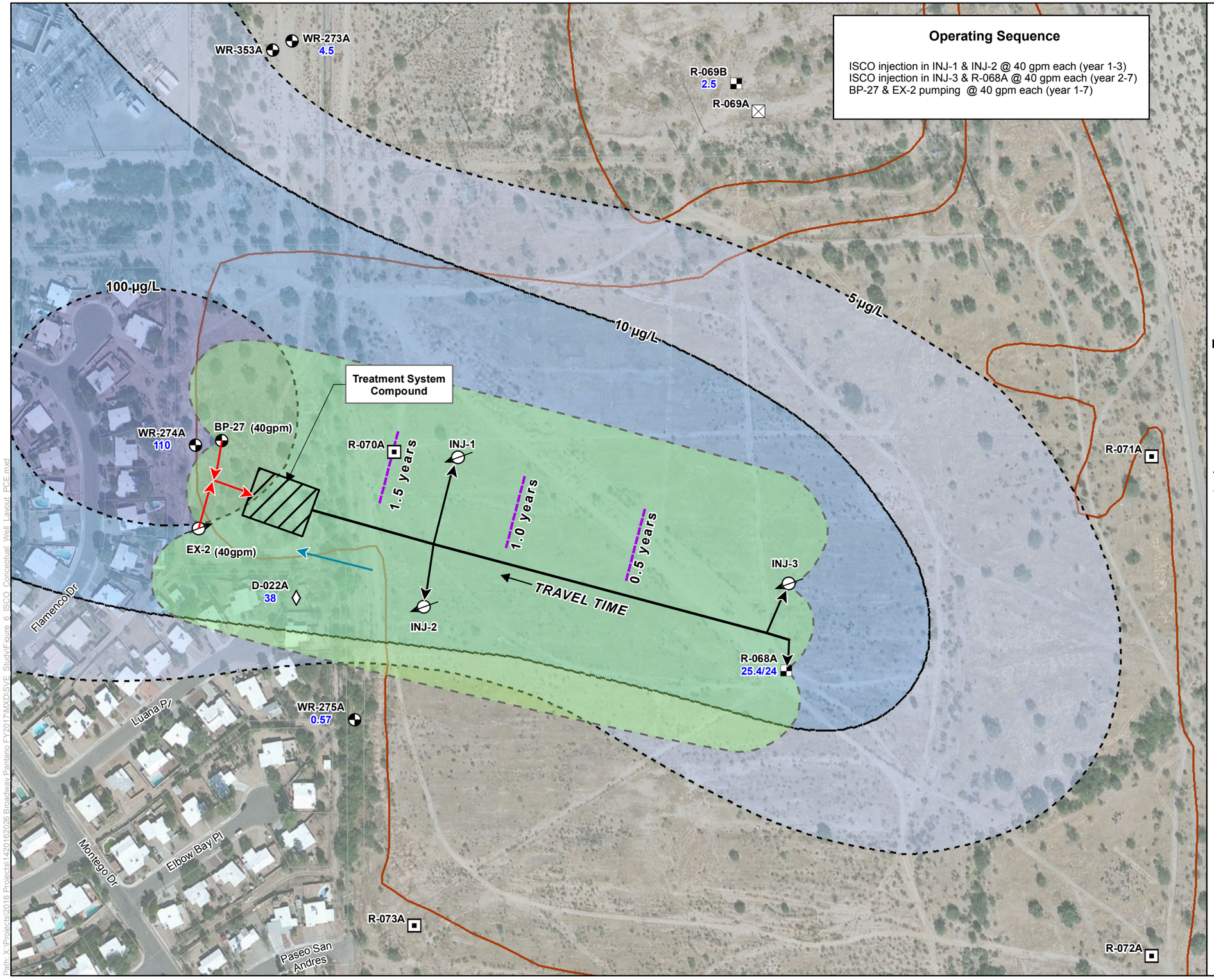
Broadway Pantano WQARF Site
Tucson, Arizona

Injection/Extraction Volume and Cumulative Oxidant Mass Injected

FIGURE
5

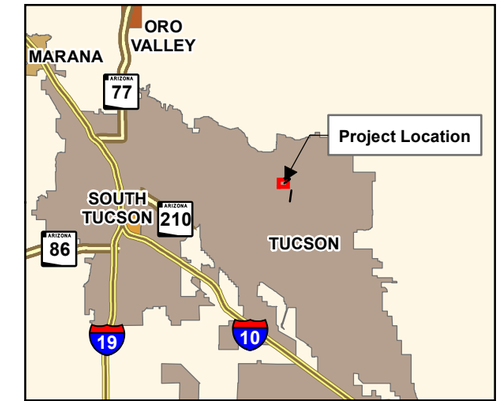
amec foster wheeler

Path: X:\Projects\2016 Projects\14201 62026 Broadway Pantano FY2017\MXD\Feasibility Study\Figure_5_Oxidant_Mass_Injected.mxd



Operating Sequence

ISCO injection in INJ-1 & INJ-2 @ 40 gpm each (year 1-3)
ISCO injection in INJ-3 & R-068A @ 40 gpm each (year 2-7)
BP-27 & EX-2 pumping @ 40 gpm each (year 1-7)



Area of Detail

Legend

Key to Well Symbology

- Active Monitoring Well
- Inactive Production Well
- Air Injection/Monitoring Well
- Air Extraction Well
- Air Injection Well
- Proposed Extraction Well
- Proposed Injection Well

- Groundwater Flow Direction
- Proposed Extraction Pipeline
- Proposed Injection Pipeline
- Treatment System Compound
- Capture Zone
- Landfill OU Boundary

2015 PCE Concentration (Dashed Where Inferred)

- 5µg/L
- 10µg/L
- 100µg/L

Notes:

WR-274A	Well Identification
110	PCE Concentration (µg/L) in groundwater collected in January/February 2015 at 25 ft btw
gpm	gallons per minute
OU	operable unit
PCE	Tetrachloroethene
µg/L	Micrograms per liter
ft bwt	feet below water table

0 100 200 400 Feet

N

Broadway Pantano WQARF Site
Tucson, Arizona

In Situ Chemical Oxidation (ISCO) Conceptual System Layout

FIGURE 6

Job No.:	14-2016-2026
PM:	NC
Date:	6/9/2017
Scale:	1" = 200'

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APPENDIX A

BORING LOGS AND WELL COMPLETION DIAGRAMS

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.43', N448062.0, E1033700.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-21-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-25-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	367	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
0					SM	**Landfill Cap** **SILTY SAND**
5			- - -	3.0		**Landfill Waste** **REFUSE**
10						
15						
			0.5	0.0	SM	**SILTY SAND,** 70% fine to medium grained, subrounded to subangular sand, 30% silt, uncemented, nonplastic, brown, slight moist, waste odor, no staining
20						
25						note: 24" diameter bucket auger drilled 24'6", a 12" low carbon steel conductor casing cemented in place to 24'
30			1.3	0.0	SM	**SILTY SAND,** 65% predominantly fine to medium grained, subrounded to subangular sand, 25% silt, 10% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slight moist, no odor, no staining
35						
40			1.0	0.0		note: coarse grained sand & gravel content increased at 40'
45						
50						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.43', N448062.0, E1033700.2	**Project Manager:**	Natalie Chrisman
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Drilling Completion Date:	1-25-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	367	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
50			0.4	0.0	SW	**WELL GRADED SAND WITH GRAVEL,** 75% fine to coarse grained, subrounded to subangular sand, 20% predominantly fine grained, subrounded to subangular gravel, 5% clay/silt, uncemented, nonplastic, reddish-brown, slightly moist, no odor, no staining
55						
60			0.6	0.0	SM	**SILTY SAND,** 80% fine to medium grained, subrounded to subangular sand, 20% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
65						
70			0.3	0.0		note: increase in fine grained gravel at 70'
75						
80			0.9	0.0	SW	**WELL GRADED SAND,** 55% fine to coarse grained, subrounded to subangular sand, 40% fine to coarse grained gravel (some cobbles), 5% silt, uncemented, nonplastic, brown, moist, no odor, no staining
85						
90			0.7	0.0	SM	**SILTY SAND,** 75% fine to coarse grained, subrounded to subangular sand, 20% silt, 5% fine gravel, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
95						
100						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

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Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
100			0.8	0.0	SM	**SILTY SAND,** continued note: fines are predominantly clay at 100'
105						
110			1.0	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 85% fine to coarse grained, subrounded to subangular sand, 10% silt, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
115						
120						note: silt content decreased, gravel content decreased at 120'
125						
130			1.7	0.0	SM	**SILTY SAND,** 80% fine to coarse grained, subrounded to subangular sand, 15% silt, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
135						
140			1.4	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
145						
150						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
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Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
150			1.5	0.0	SP	**POORLY GRADED SAND,** 95% medium to coarse grained, subrounded to subangular sand, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, moist, no odor, no staining
155						
160			1.4	0.0	SM	**SILTY SAND WITH GRAVEL,** 65% fine to coarse grained, subrounded to subangular sand, 20% fine to coarse grained, angular to subangular gravel, 15% silt/clay, uncemented, nonplastic, brown, slightly moist, no odor, no staining
165						
170			2.3	0.0	SW	**WELL GRADED SAND WITH GRAVEL,** 85% fine to coarse grained, subrounded to subangular sand, 15% fine to coarse grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
175						
180			2.0	0.0		note: gravel content decreased (0%), silt content increase (5% to 10%) at 180'
185						
190						
195						
200						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.43', N448062.0, E1033700.2	**Project Manager:**	Natalie Chrisman
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Total Depth (ft bgs):	367	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
200			1.5	0.0	SW	**WELL GRADED SAND WITH GRAVEL,** continued note: fine grained, subangular gravel increase at 200'
205						
210			1.9	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 85% predominantly fine to medium grained, subrounded to subangular sand, 10% silt, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
215						
220			1.7	0.0		note: pedominantly fine grained sand, few coarse grained, subrounded to subangular gravel at 220'
225						
230			1.2	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 85% fine to coarse grained, subrounded to subangular sand, 10% silt, 5% fine grained, subangular to subrounded gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
235						
240			1.4	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 85% fine to medium grained, subrounded to subangular sand, 10% silt, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
245						
250						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.43', N448062.0, E1033700.2	**Project Manager:**	Natalie Chrisman
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Drilling Completion Date:	1-25-16	**Drilling Method:**	Percussion Hammer
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Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
250			1.2	0.0	SM	**SILTY SAND,** 70% fine to coarse grained, subrounded to subangular sand, 30% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
255						
260			2.1	0.0		note: fine grained gravel content increased (5% to 10%) at 260'
265						
270			1.7	0.0		note: predominantly fine grained sand at 270'
275						
						note: encountered cemented zone at 279', decided to go deeper for sample
280			1.8	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 85% fine to coarse grained, subrounded to subangular sand, 10% silt, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
285						
						note: cobbles & coarse grained gravel predominate at 288', could not sample
290			1.9	0.0	SM	**SILTY SAND,** 70% fine to coarse grained sand, 30% silt, uncemented, nonplastic, brown, wet, no odor, no staining
295						
300						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

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Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
300		BP-26-300-SO	2.2	0.0	SM	**SILTY SAND,** continued note: coarse grained gravel & cobbles present at 300'
305						
310			1.0	0.0	SP	**POORLY GRADED SAND WITH GRAVEL,** 65% medium to coarse grained, subrounded to subangular sand, 30% fine to coarse grained, subrounded to subangular gravel, 5% silt, uncemented, nonplastic, brown, slightly moist to moist, no odor, no staining
315						
320		BP-26-320-SO	1.3	0.0		
325						
330			0.2	0.0	GW	**WELL GRADED GRAVEL WITH SAND,** 70% fine to coarse grained, angular to subrounded gravel, 30% predominantly coarse grained, subrounded to subangular sand, uncemented, nonplastic, brown, moist, no odor, no staining
335						
340		BP-26-340-AQ BP-26-340-SO	0.0	0.0	SC	**CLAYEY SAND,** 70% fine to coarse grained, subrounded to subangular sand, 30% clay, uncemented, nonplastic to low plasticity, brown to red, wet, no odor, no staining
345						
350						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-26

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.43', N448062.0, E1033700.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-21-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-25-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	367	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
350		BP-26-350-SO	0.0	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, wet, no odor, no staining
355						
360			0.2	0.0		note: gravel content increased (30%) at 360'
365						
						Total Depth = 367'
370						
375						
380						
385						
390						
395						
400						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
0						**Landfill Cap**
5						**Landfill Waste** **REFUSE**
10						
15						
20						**NATIVE SOIL**
25						note: 24" diameter bucket auger drilled 24'6", a 12" low carbon steel conductor casing cemented in place to 24'
30			0.8	0.0	SW-SM	**WELL GRADED SAND WITH GRAVEL & SILT,** 75% fine to coarse grained, subrounded to subangular sand, 15% fine grained, subangular to angular gravel, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
35						
40			0.3	0.0	ML	**SILT WITH SAND,** 55% silt, 45% predominantly fine grained sand, uncemented, low plasticity, brown, slightly moist, no odor, no staining
45						
50						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
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Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
50			0.7	0.0	SC	**CLAYEY SAND,** 85% fine to coarse grained, subrounded to subangular sand, 15% clay, uncemented, nonplastic, brown to red, no odor, no staining
55						
60			0.7	0.0	SM	**SILTY SAND,** 70% predominantly fine to medium grained, subrounded to subangular sand, 30% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
65						
70			0.6	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
75						
80			0.5	0.0	SW	**WELL GRADED SAND WITH GRAVEL,** 80% fine to coarse grained, subrounded to subangular sand, 15% fine to coarse grained, subangular to angular gravel, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
85						
90			0.6	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 85% fine to coarse grained, subrounded to subangular sand, 10% silt, 5% fine grained gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
95						
100						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
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Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
100			0.6	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** continued
105						
110			0.2	0.0	cobble	**COBBLES,** 95% subrounded to subangular cobbles (river rock), <5% fine to coarse grained, subrounded to subangular sand, <5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
115						
120					SW-SM	**WELL GRADED SAND WITH SILT,** 80% fine to coarse grained, subrounded to subangular sand, 10% silt, 10% coarse grained, subrounded gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
125						
130			0.5		SP-SM	**POORLY GRADED SAND WITH SILT,** 75% fine to medium grained, subrounded to subangular sand, 25% silt, uncemented, nonplastic, low plasticity, brown, slightly moist, no odor, no staining
135						
140			0.8	0.0	SC	**CLAYEY SAND,** 70% fine to coarse grained, subrounded to subangular sand, 30% clay, uncemented, nonplastic to low plasticity, brown, wet, no odor, no staining
145						
150						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
150			0.7	0.0	SM	**SILTY SAND,** 85% fine to medium grained, subrounded to subangular sand, 15% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
155						
160			0.5	0.0		note: silt content increased (20%) at 160'
165						
170			0.8	0.0	GW	**WELL GRADED GRAVEL,** 95% fine to coarse grained, angular to subrounded, 5% coarse grained, subrounded to subangular sand, uncemented, nonplastic, parent rock color, slightly moist, no odor, no staining, gravel may be broken cobbles or boulders
175						
180			0.0	0.0	SM	**SILTY SAND,** 55% fine to coarse grained, subrounded to subangular sand, 35% silt, 10% fine to coarse grained, subangular gravel, uncemented, nonplastic, light brown, slightly moist, no odor, no staining
185						
190			1.5	0.0	SP	**POORLY GRADED SAND,** 100% medium to coarse grained, angular to subrounded sand, uncemented, nonplastic, brown, slightly moist, no odor, no staining
195						
200						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
200			0.7	0.0	GW	**WELL GRADED GRAVEL,** 85% fine to coarse grained, subrounded to subangular gravel, 10 to 15% fine to coarse grained sand, < 5% silt, uncemented, nonplastic, brown, wet, no odor, no staining
205						
210			0.8	0.0	SM	**SILTY SAND WITH GRAVEL,** 45% fine to coarse grained, subrounded to subangular sand, 30% silt, 15% fine to coarse grained, subrounded to subangular gravel, uncemented to weakly cemented, nonplastic to low plasticity, light brown, slightly moist, no odor, no staining
215						
220				0.0	SC	**CLAYEY SAND WITH GRAVEL,** 65% fine to coarse grained, subrounded to subangular sand, 20% clay, 15% fine to coarse grained, subrounded to subangular gravel, uncemented, nonplastic, brown, wet, no odor, no staining
225						
230			0.2	0.0	GW	**WELL GRADED GRAVEL WITH SAND,** 80% fine to coarse grained, subrounded to subangular gravel, 10 to 15% fine to coarse grained, subrounded to subangular sand, < 5% silt, uncemented, nonplastic, brown, moist, no odor, no staining
235						
240			0.9	0.0	SM	**SILTY SAND WITH GRAVEL,** 70% fine to coarse grained, subrounded to subangular sand, 15% silt, 15% fine grained, subangular to angular gravel, uncemented, nonplastic, brown, wet, no odor, no staining
245						
250						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
250			0.9	0.0	GW	**WELL GRADED GRAVEL,** 85% predominantly coarse grained, subangular to angular gravel, 10 to 15% fine to coarse grained, subrounded to subangular sand, < 5% silt, uncemented, nonplastic, parent rock color, wet, no odor, no staining
255						
260			0.3	0.0	SM	**SILTY SAND WITH GRAVEL,** 65% fine to coarse grained, subrounded to subangular sand, 20% coarse grained, subrounded to subangular gravel, 15% silt, uncemented, nonplastic, brown, wet, no odor, no staining
265						
270			0.3			note: clay content increased at 270'
275						
280			0.0	0.0	SC	**CLAYEY SAND WITH GRAVEL,** 70% fine to coarse grained, subrounded to subangular sand, 15% fine to coarse grained, subrounded to subangular gravel, 15% clay, uncemented, nonplastic, brown, wet, no odor, no staining
285						
290		BP-27-290-SO	0.3	0.0		note: few small cobbles present in split spoon (SPT blow count of: 60-100/2") at 290'
295						
300						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
300			0.2	0.0	SM	**SILTY SAND,** 65% fine to medium grained, subrounded to subangular sand, 35% silt, uncemented, nonplastic to low plasticity, brown, slightly moist, no odor, no staining
305						
310			0.1	0.0	SC	**CLAYEY SAND,** 85% fine to coarse grained, subrounded to subangular sand, 15% clay, uncemented, nonplastic, brown to red, slightly moist, no odor, no staining
315						
320		BP-27-320-AQ	0.2	0.0	GP	**POORLY GRADED GRAVEL,** 85% predominantly fine grained, subrounded to subangular gravel, 10% fine to coarse grained, subrounded to subangular sand, 5% clay, uncemented, nonplastic, brown, wet, no odor, no staining
325						
330			0.6	0.0	SP	**POORLY GRADED SAND WITH GRAVEL,** 80% medium to coarse grained, subrounded to angular sand, 20% fine to coarse grained, subrounded to subangular gravel
335						
340			0.2	0.0	cobble	**COBBLES,** 80% angular to subangular cobbles, 10% fine to coarse grained, subangular to angular gravel, 10% medium to coarse grained, subangular to subrounded sand, uncemented, nonplastic, brown, wet, no odor, no staining note: too coarse for split spoon & hydropunch
345		BP-27-345-SO BP-27-345-SO BP-27-345-AQ	0.3	0.0	SW	**WELL GRADED SAND,** 85% fine to coarse grained, subrounded to subangular sand, 10% fine grained, subrounded to subangular gravel, 5% silt, uncemented, nonplastic, brown, wet, no odor, no staining note: SPT blow counts of: 17-50-50, & Hydropunch counts of: 55-100/2"
350						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-27

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2567.69', N448064.0, E1033724.9	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	2-3-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-8-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
350					SW	**WELL GRADED SAND,** continued
						note: decreased gravel content at 350'
355						
360		BP-27-360-AQ				
						note: Hydropunch blowcounts of: 100/3"
365						Total Depth = 365'
370						
375						
380						
385						
390						
395						
400						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
0				0.0		**Landfill Cap** **SILTY SAND**
5				0.0		**Landfill Waste** **REFUSE**
10				0.0		
15				0.0		
20				0.0		**NATIVE SOIL**
25						note: 24" diameter bucket auger drilled 24'6", a 12" low carbon steel conductor casing cemented in place to 24'
30			0.5	0.0	SP	**POORLY GRADED SAND WITH GRAVEL,** 60% predominantly coarse grained, subrounded to subangular sand, 40% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
35						
40			0.5	0.0	SM	**SILTY SAND WITH GRAVEL,** 70% fine to coarse grained, subrounded to subangular sand, 15% fine grained, subrounded to subangular gravel, 15% silt, uncemented, nonplastic, brown, wet, no odor, no staining
45						
50						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
50			0.4	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 80% fine to coarse grained, subrounded to subangular sand, 10% silt, 10% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, moist, no odor, no staining
55						
60			1.3	0.0	SM	**SILTY SAND,** 65% predominantly fine grained sand, 35% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
65						
70			1.3	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
75						
80			0.9	0.0		note: few fine grained gravels present at 80'
85						
90			1.4	0.0	SC	**CLAYEY SAND,** 65% fine to coarse grained, subrounded to subangular sand, 30% clay, 5% fine grained, subrounded to subangular gravel, uncemented, nonplastic to low plasticity, brown, moist to wet, no odor, no staining
95						
100						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
100			1.5	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 90% fine to medium grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, moist, no odor, no staining
105						
110			1.2	0.0	SC	**CLAYEY SAND WITH GRAVEL,** 55% fine to coarse grained, subrounded to subangular sand, 30% clay, 15% fine grained, subrounded to angular gravel, uncemented, nonplastic to low plasticity, brown, wet, no odor, no staining
115						
120						note: gravel content decreased, clay content decreased (20%) at 120'
125						
130			1.2	0.0		note: fine grained, subangular to angular gravel content increased (20%) at 130'
135						
140			1.4	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
145						
150						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
150			1.3	0.0		**WELL GRADED SAND WITH SILT,** continued note: silt content increased at 150'
155						
160			1.2	0.0		
165			1.5	0.0	GP	**POORLY GRADED GRAVEL,** 90% coarse grained, subangular to angular gravel, 10% predominantly coarse grained, subrounded to subangular sand, uncemented, nonplastic, brown, slightly moist, no odor, no staining
170						
175						
180			1.2	0.0	SM	**SILTY SAND WITH GRAVEL,** 65% fine to coarse grained, subrounded to subangular sand, 20% silt, 15% coarse grained, subangular gravel, uncemented, nonplastic, brown, wet, no odor, no staining
185						
190			1.3	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 90% fine to medium grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
195						
200						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
200			1.6	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** continued note: predominantly coarse grained, subrounded to subangular sand at 200'
205						
210			1.8	0.0	SM	**SILTY SAND,** 75% fine to medium grained, subrounded to subangular sand, 25% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
215						
220			1.1	0.0	GP	**POORLY GRADED GRAVEL WITH SAND,** 70% predominantly coarse grained, subrounded to subangular gravel, 30% fine to coarse grained, subrounded to subangular sand, uncemented, nonplastic, brown, slightly moist, no odor, no staining
225						
230			1.0	0.0	SM	**SILTY SAND,** 75% fine to coarse grained, subrounded to subangular sand, 25% silt, uncemented, nonplastic, brown, moist, no odor, no staining
235						
240			1.0	0.0		note: clay content increased at 240'
245						
250						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
250			1.3	0.0		**SILTY SAND,** continued note: predominantly fine grained sand, silt decreased (15%) at 250'
255						
260			1.2	0.0		
265						
270						note: increase in coarse grained sand at 270'
275						
280						note: fines increased (30%), few gravel present, predominantly coarse grained, subrounded to subangular at 280'
285						
290			1.5	0.0	SW-SM	**WELL GRADED SAND WITH SILT & GRAVEL,** 70% fine to coarse grained, subrounded to subangular sand, 20% fine to coarse grained, subrounded to subangular gravel, 10% silt, uncemented, nonplastic, brown, wet, no odor, no staining
295						
300						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
300			0.9	0.0	cobble	**COBBLES WITH SAND,** 65% subrounded to subangular cobbles, 30% fine to coarse grained, subrounded to subangular sand, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining note: SPT blow counts of: 30-100-refusal
305						
▽						
310			0.8	0.0	SC	**CLAYEY SAND WITH COBBLES,** 55% fine to coarse grained, subrounded to subangular sand, 30% subangular to angular cobbles, 15% clay, uncemented, nonplastic, brown, wet, no odor, no staining note: SPT blow counts of: 40-100-refusal
315						
320			0.8	0.0		note: cobbles decreased, fine to coarse grained, angular to subangular gravel increases at 320' note: SPT blow counts of: 250/6"
325						
330			1.0	0.0		note: cobbles increased at 330' note: SPT blow counts of: 16-23-100/5"
335						
340			0.8	0.0		note: clay content increased, cobbles still present at 340' note: SPT blow counts of: 16-16-22
345						
350						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-28

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.07', N448051.1, E1033725.4	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-28-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	2-1-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	365	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
350			0.4	0.0	SP	**POORLY GRADED SAND,** 95% medium to coarse grained, subrounded to subangular sand, 5% silt/fines, uncemented, nonplastic, brown, wet, no odor, no staining note: SPT blow counts of: 10-100/5"
355						
360			0.5	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 80% fine to coarse grained, subrounded to subangular sand, 10% silt, 10% predominantly fine grained, subangular to angular gravel, uncemented, nonplastic, brown, wet, no odor, no staining note: SPT blow counts of: 21-100/5"
365						Total Depth = 365'
370						
375						
380						
385						
390						
395						
400						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
0			0.0	0.0	SM	**Landfill Cap** **SILTY SAND**
5			5.0	0.0		**Landfill Waste** **REFUSE**
10			4.2	0.0		
15			0.0	0.0		
					SM	**NATIVE SOIL** **SILTY SAND,** 70% fine to medium grained sand, 30% silt, uncemented, nonplastic, light brown, slight landfill odor
20			0.0	0.0		
25						note: 24" diameter bucket auger drilled 24'6", a 12" low carbon steel conductor casing cemented in place to 24'
30			0.4	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 90% predominantly fine to medium grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, slightly moist to moist, no odor, no staining
35						
40			0.2	0.0	SM	**SILTY SAND WITH GRAVEL,** 70% predominantly fine grained sand, 15% silt, 15% fine grained, subrounded to subangular gravel, uncemented, nonplastic to low plasticity, brown, slightly moist, no odor, no staining
45						
50						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
50			0.8	0.0	SW	**WELL GRADED SAND WITH GRAVEL,** 60% fine to coarse grained, subrounded to subangular sand, 35% fine to coarse grained, subrounded to subangular gravel, 5% silt/fines, uncemented, nonplastic, brown, slightly moist, no odor, no staining
55						
60			0.9	0.0		note: fine grained gravel content increased at 60'
65						
70			1.6	0.0	SP-SM	**POORLY GRADED SAND WITH SILT,** 90% fine to medium grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, light brown, moist (driller added water), no odor, no staining
75						
80			0.1	8.0	SP	**POORLY GRADED SAND WITH GRAVEL,** 65% fine to medium grained, subrounded to subangular sand, 30% fine to coarse grained, subrounded to subangular gravel, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
85						
90			0.0	6.0		note: predominantly medium grained sand, silt content increased, gravel content decreased at 90'
95						
100						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
100			0.0	6.0	SP	**POORLY GRADED SAND WITH GRAVEL,** continued note: coarse grained gravel content increased at 100'
105						
110			0.0	4.0	GP	**POORLY GRADED GRAVEL WITH SAND,** 65% predominantly coarse grained, subangular to angular gravel, 30% fine to coarse grained, subrounded to subangular sand, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
115						
120						
125						
130			0.0	0.0	SP	**POORLY GRADED SAND,** 95% fine to medium grained, subrounded to subangular sand, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
135						
140			0.0	3.0	SW	**WELL GRADED SAND,** 85% fine to coarse grained, subrounded to subangular sand, 10% fine to coarse grained gravel, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
145						
150						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
150			0.0	0.0	SW	**WELL GRADED SAND,** continued note: gravel content decreased at 150'
155						
160			0.0	0.0		note: trace fine grained, subrounded to subangular gravel at 160'
165						
170					SC	**CLAYEY SAND WITH GRAVEL,** 70% fine to coarse grained, subrounded to subangular sand, 15% predominantly fine grained, subrounded to subangular gravel, 15% clay, uncemented, nonplastic to low plasticity, brown, moist, no odor, no staining
175						
180			0.6	0.0	SW	**WELL GRADED SAND,** 95% fine to coarse grained, subrounded to subangular sand, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
185						
190			0.5	0.0		note: fine grained, subrounded to subangular gravel content increased at 190'
195						
200						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
200			0.7	6.0	SW	**WELL GRADED SAND,** continued note: gravel content decreased, increase in fines at 200'
205						
210			0.5	0.0	SM	**SILTY SAND,** 75% fine to medium grained, subrounded to subangular sand, 25% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
215						
220			0.5			note: fine grained gravel content increased, silts are piling up in the shute at 220'
225						
230					SP	**POORLY GRADED SAND,** 95% fine to medium grained, subrounded to subangular sand, 5% silt, uncemented, nonplastic, brown, slightly moist, no odor, no staining
235			0.6			
240			0.0			note: coarse grained sand content increased, still predominantly fine to medium grained, subrounded to subangular sand at 240'
245						
250						

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	**Soil Classification, Description and Notes** Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
250			0.5	0.0	SM	**SILTY SAND,** 70% fine to medium grained, subrounded to subangular sand, 30% silt, uncemented, nonplastic to low plasticity, brown, slightly moist, no odor, no staining
255						
260			0.6	0.0	GP	**POORLY GRADED GRAVEL WITH SAND & SILT,** 60% coarse grained, subangular to angular gravel, 25% fine to coarse grained, subangular to subrounded sand, 15% silt, uncemented, nonplastic, brown, wet (driller added water), no odor, no staining
265						
270			0.9	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 80% fine to coarse grained, subrounded to subangular sand, 10% silt, 10% fine grained, subrounded to subangular gravel, uncemented, nonplastic, brown, slightly moist, no odor, no staining
275						
280					ML	**SANDY SILT,** 60% silt, 40% fine to medium grained, subrounded to subangular sand, uncemented, nonplastic, brown, dry, no odor, no staining note: bad return from the hopper at 280'
285						
						note: SPT blow counts of: 10-16-14 at 289'
290			0.0	0.0	GP	**POORLY GRADED GRAVEL WITH SAND,** 90% predominantly coarse grained, angular to subangular gravel, 10% coarse grained sand, uncemented, nonplastic, brown, slightly moist, no odor, no staining
295						
300						note: SPT blow counts of: 12-13-30 at 299'

Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
300		BP-29-300-SO	0.4	0.0	GM	**SILTY GRAVEL WITH SAND,** 65% predominantly coarse grained, subangular to subrounded gravel, 20% fine to coarse grained, subrounded to subangular, 15% silt, uncemented, nonplastic, brown, wet, no odor, no staining
305						
▽						
310			0.3	0.0		note: rock to coarse for spilt spoon at 310'
315		BP-29-315-SO	0.2	0.0	SW-SM	**WELL GRADED SAND WITH SILT,** 90% fine to coarse grained, subrounded to subangular sand, 10% silt, uncemented, nonplastic, brown, wet, no odor, no staining
		DUP-BP-29-315-SO				
320			0.0	0.0		note: soil color is dark brown at 320'
325						note: SPT blow counts of: 4-5-16 at 329', poor recovery, on granite cobble piece
330					SP	**POORLY GRADED SAND WITH GRAVEL,** 70% predominantly coarse grained, subrounded to subangular sand, 25% fine grained gravel, 5% silt, uncemented, nonplastic, brown, wet, no odor, no staining
335						
340			0.4	0.0		note: coarse grained gravel content increased at 340'
345						note: coarse grained gravel & cobbles at 345'
						note: coarse grained gravel & cobbles at 348'
350						

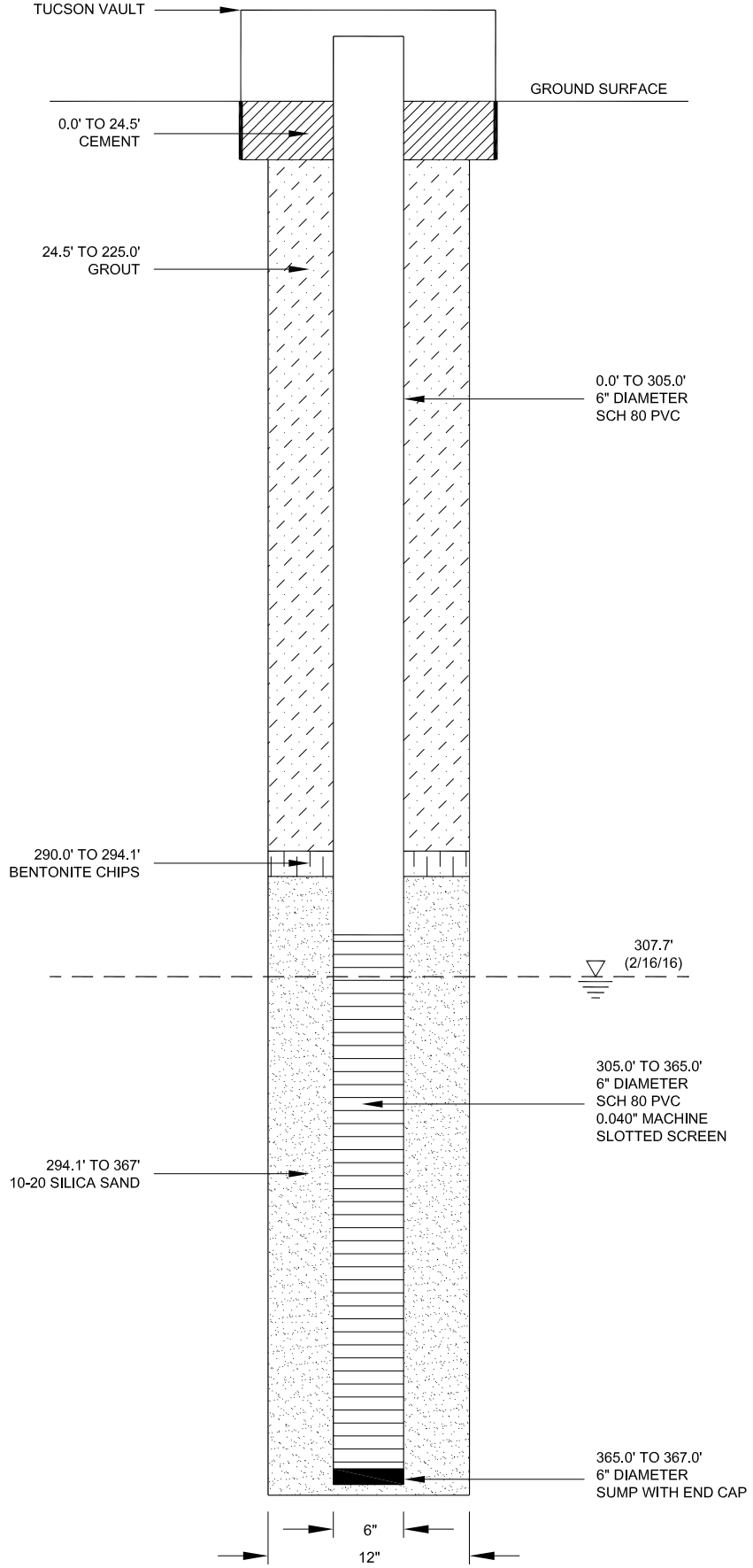
Project Name: Broadway Pantano 2016 Drilling Program

Boring ID: BP-29

Project Number: 14-2015-4042

Boring Location:	Broadway Pantano	**Logged By:**	Kyle Keegan
Elevation and Datum:	2568.08', N448038.7, E1033726.2	**Project Manager:**	Natalie Chrisman
Drilling Start Date:	1-11-16	**Drilling Contractor:**	Layne Christensen Company
Drilling Completion Date:	1-18-16	**Drilling Method:**	Percussion Hammer
Total Depth (ft bgs):	400	**Drilling Equipment:**	12" Casing
Depth to Water (ft bgs):	308'	**Sampling Method:**	Grab

Depth Below Ground Surface (feet)	Graphical Log	Sample ID	PID Meter Reading (ppm)	LF Gasses (%)	Unified Soil Classification System	Soil Classification, Description and Notes Name (USCS Symbol): material with description [i.e. % by weight, gradation, angularity] starting with largest percent, cementation, plasticity, color, moisture, staining, odor. Any additional descriptive information may be included in the soil description or notes.
350			0.2	0.0	SW	**POORLY GRADED SAND WITH GRAVEL,** continued note: predominantly fine grained gravel present at 350'
355						note: coarse grained gravel & cobbles blocked up split spoon, recovered 2 gravels, 14-15-19 blowcounts
360			0.4	0.0	SP	**POORLY GRADED SAND WITH GRAVEL,** 75% predominantly coarse grained sand, subrounded to subangular sand, 25% predominantly coarse grained, angular to subangular gravel, uncemented, nonplastic, light brown, wet, no odor, no staining
365						
370		BP-29-370-AQ		0.0	SW	**WELL GRADED SAND WITH GRAVEL & COBBLES,** 65% fine to coarse grained, subrounded to subangular sand, 20% fine to coarse grained, angular to subrounded gravel, 10% angular to subangular cobbles, 5% silt, uncemented, nonplastic, brown, no odor, no staining note: SPT blow counts of: 7-10-15 at 370', no recovery, blocked by gravel
375						
380		BP-29-380-AQ	0.3	0.0	GP	**POORLY GRADED GRAVEL WITH COBBLES,** 50% coarse grained, angular to subrounded gravel, 45% subrounded to subangular cobbles up to 4" in diameter, 5% coarse grained, subrounded to subangular sand, uncemented, nonplastic, parent rock color, wet, no odor, no staining
		DUP-BP-29-380-AQ				
385						Total Depth = 381'
390						
395						
400						



SURVEY DATA:

NORTHING	= N 448062.035
EASTING	= E 1033700.159
TOP OF CASING	= 2567.43 FT
TOP OF PAD	= 2567.09 FT

JOB NO.	14-2015-2042
DESIGN:	AY
DRAWN:	GWH
DATE:	2/2016
SCALE:	NOT TO SCALE

WELL CONSTRUCTION DIAGRAM
WELL ID: BP-26

BROADWAY PANTANO 2016 DRILLING PROGRAM

amec foster wheeler
4600 East Washington Street, Suite 600
Phoenix, Arizona

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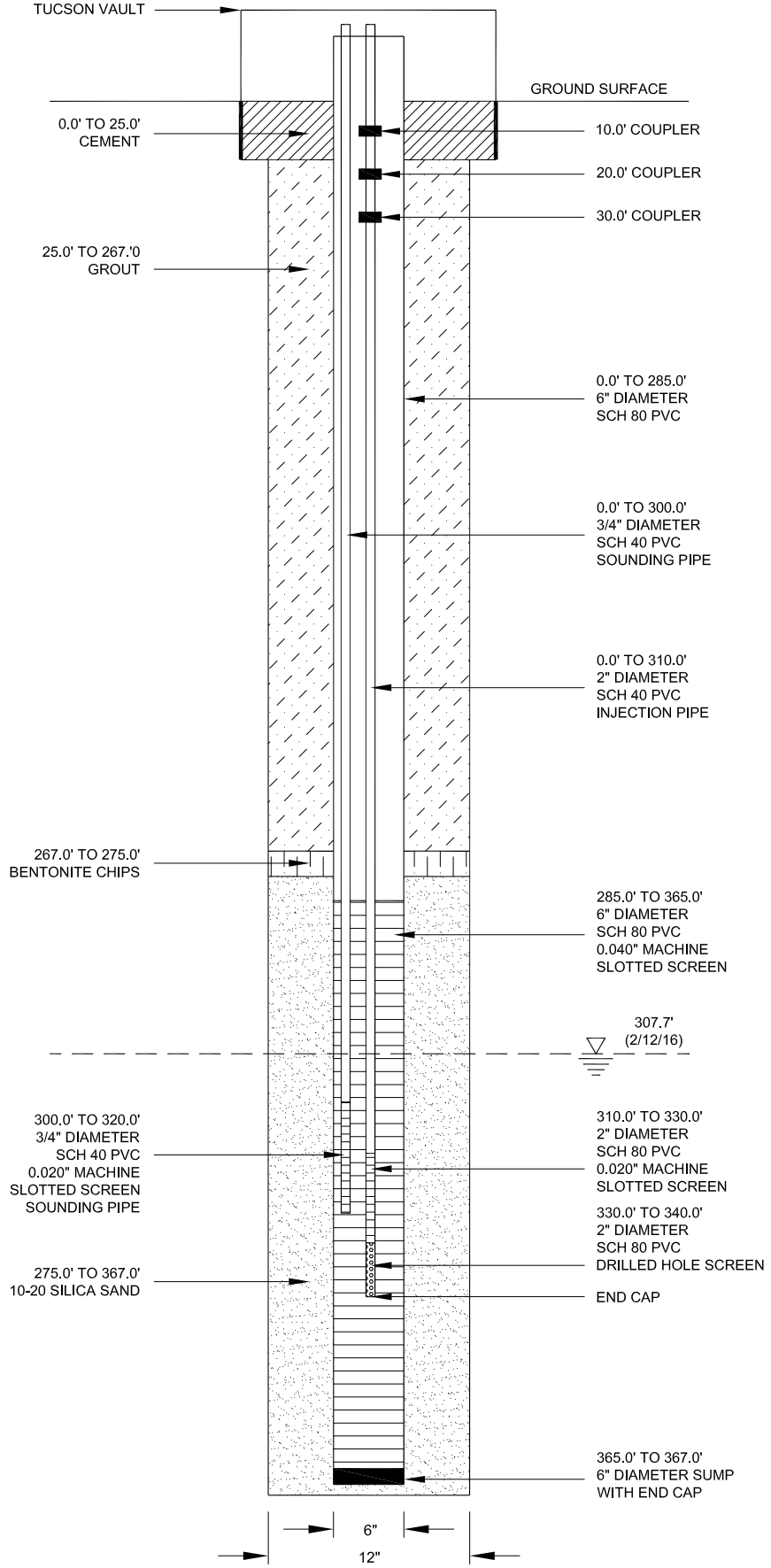

SURVEY DATA:

NORTHING	= N 448063.978
EASTING	= E 1033724.898
TOP OF CASING	= 2567.69 FT
TOP OF PAD	= 2567.30 FT

JOB NO.	14-2015-2042
DESIGN:	AY
DRAWN:	GWH
DATE:	2/2016
SCALE:	NOT TO SCALE

WELL CONSTRUCTION DIAGRAM
WELL ID: BP-27

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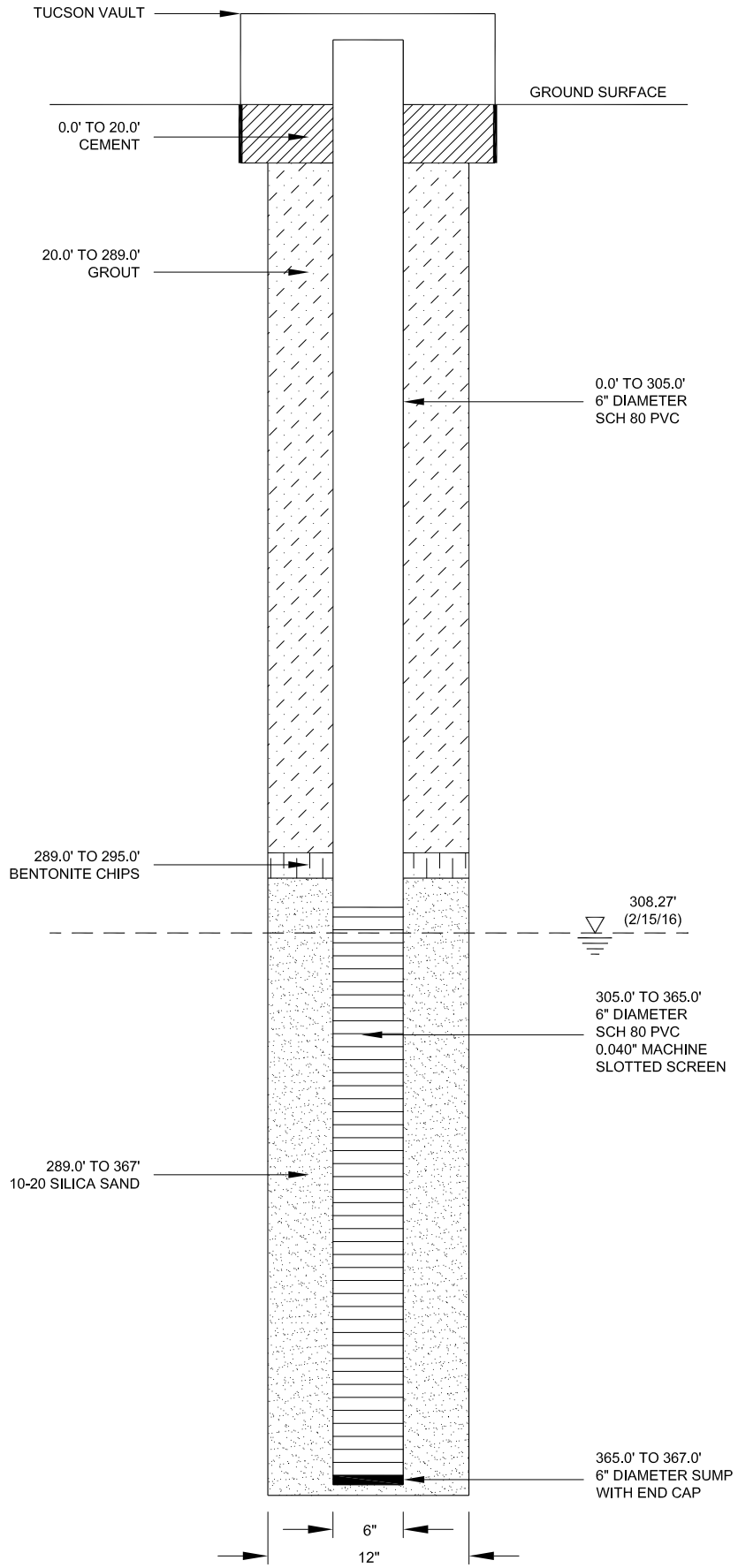

SURVEY DATA:
NORTHING = N 448051.067
EASTING = E 1033725.392
TOP OF CASING = 2568.07 FT
TOP OF PAD = 2567.72 FT

JOB NO.	14-2015-2042
DESIGN:	AY
DRAWN:	GWH
DATE:	2/2016
SCALE:	NOT TO SCALE

WELL CONSTRUCTION DIAGRAM
WELL ID: BP-28

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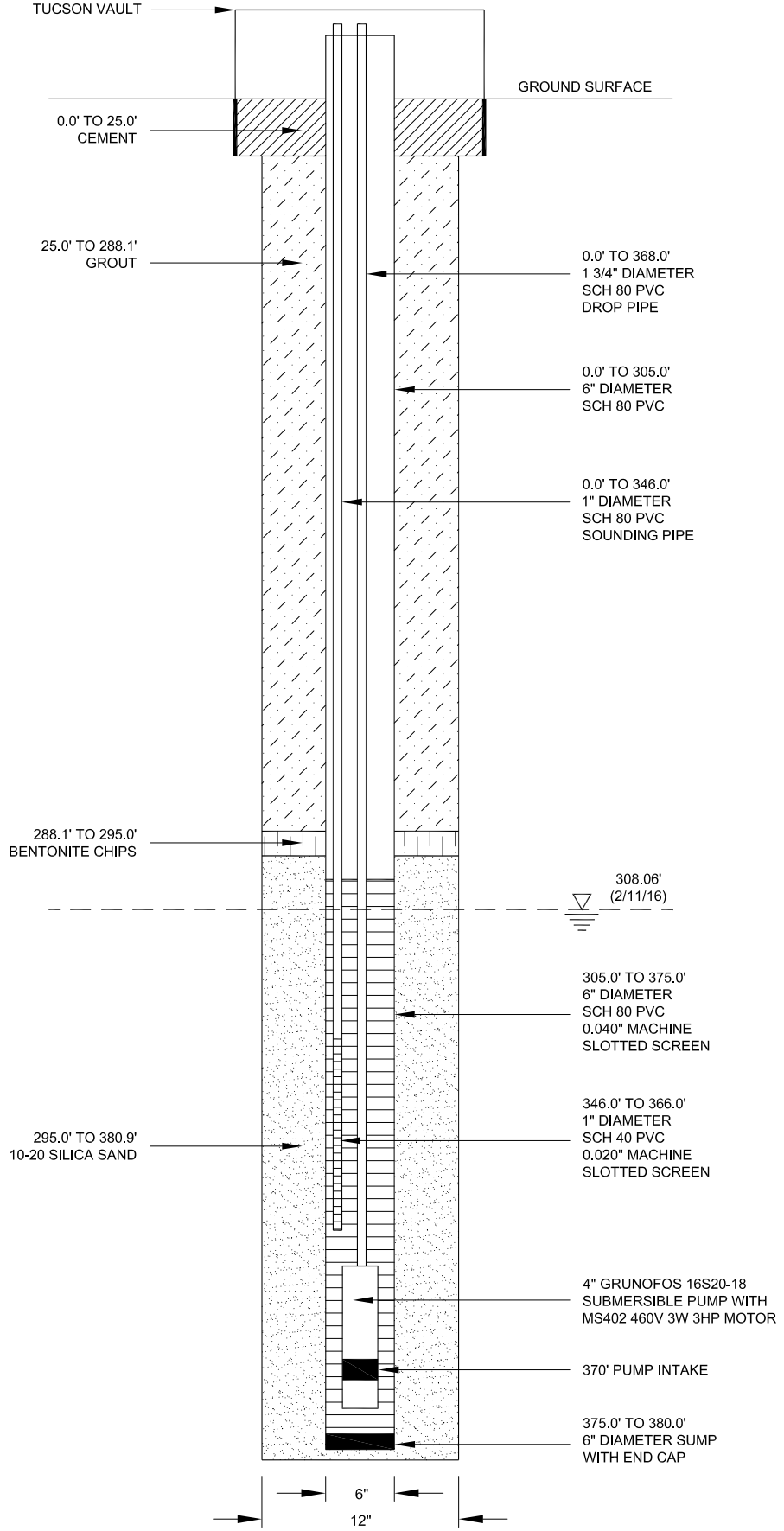

SURVEY DATA:

NORTHING	= N 448038.648
EASTING	= E 1033726.174
TOP OF CASING	= 2568.08 FT
TOP OF PAD	= 2567.77 FT

JOB NO.	14-2015-2042
DESIGN:	AY
DRAWN:	GWH
DATE:	2/2016
SCALE:	NOT TO SCALE

WELL CONSTRUCTION DIAGRAM
WELL ID: BP-29

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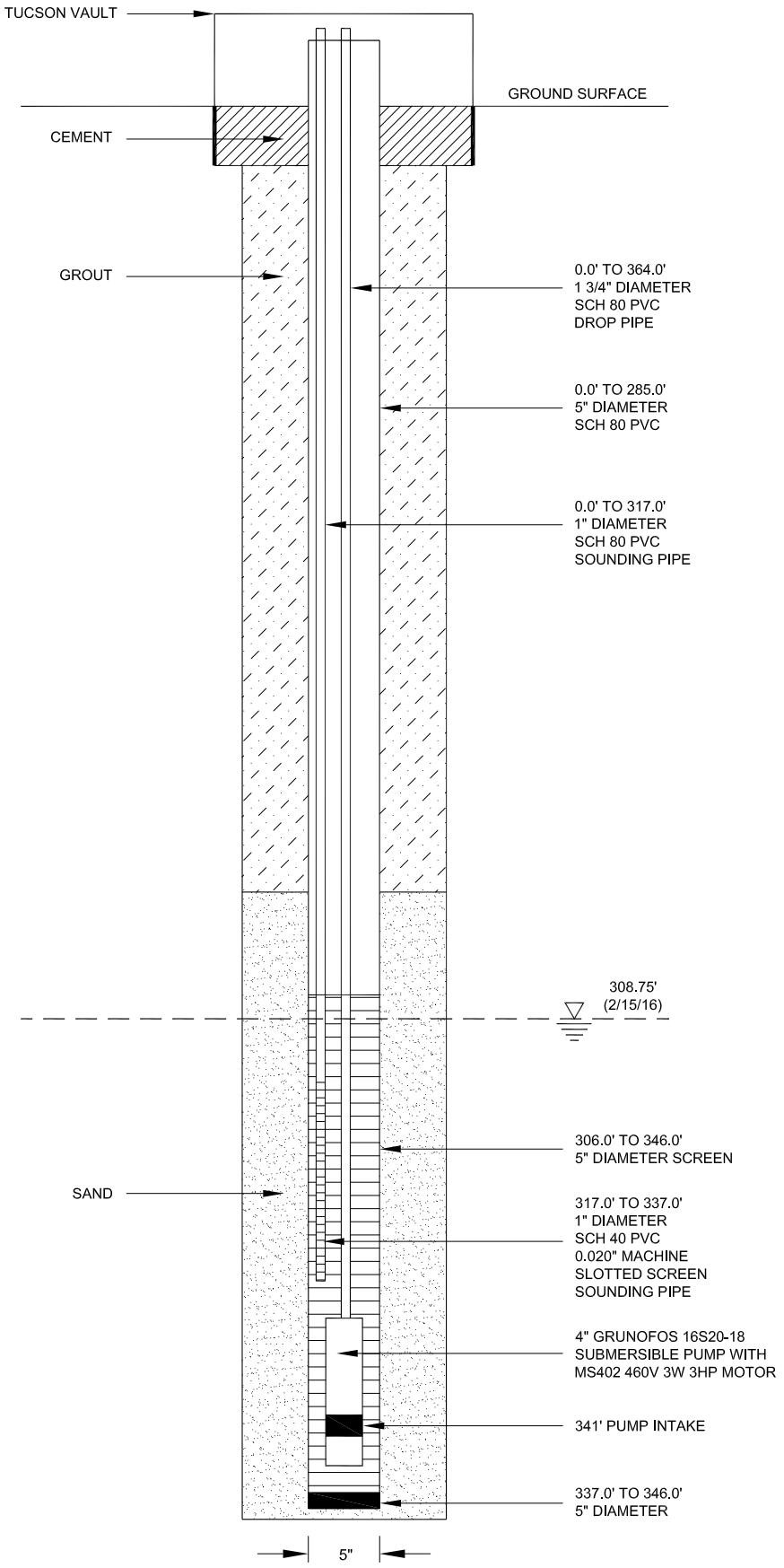

SURVEY DATA:
NORTHING = N 448059.914
EASTING = E 1033675.334
TOP OF CASING = 2568.65 FT
TOP OF PAD = 2568.09 FT

JOB NO.	14-2015-2042
DESIGN:	AY
DRAWN:	GWH
DATE:	2/2016
SCALE:	NOT TO SCALE

WELL CONSTRUCTION DIAGRAM
WELL ID: WR-274A

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APPENDIX B

LABORATORY REPORTS OF ANALYSIS

(Provided on CD)

Table B.1 Results of Depth-Specific Soil and Groundwater Sampling, ISCO Pilot Study Well Installation

SOIL

Location	Sample ID	Depth (ft bgs)	Date Sampled	GC/MS Volatiles (SW846 8260B)				Metals Analysis									
				Tetrachloroethylene mg/kg	Trichloroethylene mg/kg	cis-1,2-Dichloroethylene mg/kg	Vinyl chloride mg/kg	Arsenic mg/kg	Barium mg/kg	Cadmium mg/kg	Chromium mg/kg	Iron mg/kg	Lead mg/kg	Manganese mg/kg	Mercury mg/kg	Selenium mg/kg	Silver mg/kg
BP-29	BP-29-300-SO	300	1/14/2016	ND (0.022)	ND (0.018)	ND (0.039)	ND (0.036)	<1.9	37.9	<0.93	2.5	5050	18.2	128	<0.015	<1.9	<0.93
BP-29	BP-29-315-SO	315	1/14/2016	ND (0.024)	ND (0.020)	ND (0.044)	ND (0.040)	<1.9	29.8	<0.94	2.3	4570	2.2	90.3	<0.014	<1.9	<0.94
BP-29	DUP-BP-29-315	315	1/14/2016	ND (0.027)	ND (0.023)	ND (0.050)	ND (0.046)	<1.9	25.5	<0.95	2.3	4140	1.9	75.6	<0.016	<1.9	<0.95
BP-26	BP-26-300	300	1/22/2016	ND (0.027)	ND (0.022)	ND (0.049)	ND (0.044)	<1.8	63.1	<0.92	3	6050	5	218	<0.016	<1.8	<0.92
BP-26	BP-26-320-SO	320	1/22/2016	ND (0.028)	ND (0.023)	ND (0.050)	ND (0.046)	-	-	-	-	-	-	-	-	-	-
BP-26	BP-26-340-SO	340	1/22/2016	ND (0.024)	ND (0.020)	ND (0.044)	ND (0.040)	<1.9	36.9	<0.95	3.4	5630	2.7	148	<0.015	<1.9	<0.95
BP-26	BP-26-350-SO	350	1/25/2016	ND (0.24)	ND (0.020)	ND (0.045)	ND (0.041)	<1.6	39.5	<0.81	2.6	4210	2.4	127	<0.016	<1.6	<0.81
BP-27	BP-27-290-SO	290	2/4/2016	ND (0.027)	ND (0.023)	ND (0.050)	ND (0.045)	-	-	-	-	-	-	-	-	-	-
BP-27	BP-27-345-SO	345	2/5/2016	ND (0.027)	ND (0.022)	ND (0.049)	ND (0.045)	<1.8	<18	<0.88	1.1	2320	1.8	65.6	<0.015	<1.8	<0.88
BP-27	DUP-BP-27-345-SO	345	2/5/2016	ND (0.028)	ND (0.023)	ND (0.051)	ND (0.046)	-	-	-	-	-	-	-	-	-	-
	Arizona Residential Soil Remediation Levels:			*0.51*	*3.0*	*43*	*0.085*	*10*	*15,000*	*39*	*30*	*NA*	*400*	*3,300*	*23*	*390*	*390*

GROUNDWATER

Location	Sample ID	Depth (ft bgs)	Date Sampled	GC/MS Volatiles (SW846 8260B)				Metals Analysis									
				Tetrachloroethylene µg/L	Trichloroethylene µg/L	cis-1,2-Dichloroethylene µg/L	Vinyl chloride µg/L	Arsenic µg/L	Barium µg/L	Cadmium µg/L	Chromium µg/L	Iron µg/L	Lead µg/L	Manganese µg/L	Mercury µg/L	Selenium µg/L	Silver µg/L
BP-29	BP-29-370-AQ	370	1/18/2016	29.6	3.7	1.7	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-29	BP-29-380-AQ	380	1/18/2016	26.7	3.5	1.4	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-29	DUP-BP-29-380	380	1/18/2016	21.9	3	1.3	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-26	BP-26-340-AQ	340	1/25/2016	8.7	3.4	7.7	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-27	BP-27-320-AQ	320	2/5/2016	7.4	4.3	1.9	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-27	BP-27-345-AQ	345	2/5/2016	104	40.5	50.1	ND (0.20)	-	-	-	-	-	-	-	-	-	-
BP-27	BP-27-360-AQ	360	2/5/2016	53.6	11.7	9.5	ND (0.20)	-	-	-	-	-	-	-	-	-	-
	Arizona Aquifer Water Quality Standards:			*5*	*5*	*70*	*2*										

Northern California
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01/20/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

Accutest Job Number: C43713

Sampling Date: 01/14/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **40**

NELAP ACCREDITED TNI LABORATORY

James J. Rhudy
Lab Director

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Sample Summary

AMEC Foster Wheeler

Job No: C43713

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43713-1	01/14/16	11:30	KGK	01/16/16	SO	Soil	BP-29-300-SO
C43713-2	01/14/16	14:40	KGK	01/16/16	SO	Soil	BP-29-315-SO
C43713-3	01/14/16	14:40	KGK	01/16/16	SO	Soil	DUP-BP-29-315
C43713-4	01/14/16	13:20	KGK	01/16/16	SO	Soil	BP-29-SOIL BINS

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43713
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	1/20/2016 7:06:58 PM

4 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/14/2016 and were received at Accutest on 01/16/2016 properly preserved, at 4.9 Deg. C and intact. These Samples received an Accutest job number of C43713. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: SO **Batch ID:** VM1746

- Sample(s) C43713-1MS, C43713-1MSD were used as the QC samples indicated.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,2-Dibromo-3-chloropropane, Vinyl chloride are outside control limits. Probable cause due to matrix interference.

Metals By Method SW846 6010B

Matrix: SO **Batch ID:** MP10713

- Sample(s) C43660-1MS, C43660-1MSD, C43660-1SDL were used as the QC samples for metals.
- Matrix Spike Recovery(s) for Iron are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- RPD(s) for Serial Dilution for Cadmium, Silver are outside control limits for sample MP10713-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7471A

Matrix: SO **Batch ID:** MP10725

- Sample(s) C43660-1MS, C43660-1MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43713
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 01/14/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43713-1	**BP-29-300-SO**					
Barium		37.9	19		mg/kg	SW846 6010B
Chromium		2.5	0.93		mg/kg	SW846 6010B
Iron		5050	19		mg/kg	SW846 6010B
Lead		18.2	1.9		mg/kg	SW846 6010B
Manganese		128	1.4		mg/kg	SW846 6010B
C43713-2	**BP-29-315-SO**					
Barium		29.8	19		mg/kg	SW846 6010B
Chromium		2.3	0.94		mg/kg	SW846 6010B
Iron		4570	19		mg/kg	SW846 6010B
Lead		2.2	1.9		mg/kg	SW846 6010B
Manganese		90.3	1.4		mg/kg	SW846 6010B
C43713-3	**DUP-BP-29-315**					
Barium		25.5	19		mg/kg	SW846 6010B
Chromium		2.3	0.95		mg/kg	SW846 6010B
Iron		4140	19		mg/kg	SW846 6010B
Lead		1.9	1.9		mg/kg	SW846 6010B
Manganese		75.6	1.4		mg/kg	SW846 6010B
C43713-4	**BP-29-SOIL BINS**					
Barium		53.5	18		mg/kg	SW846 6010B
Chromium		4.1	0.88		mg/kg	SW846 6010B
Iron		6670	18		mg/kg	SW846 6010B
Lead		3.9	1.8		mg/kg	SW846 6010B
Manganese		189	1.3		mg/kg	SW846 6010B

Northern California ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-29-300-SO		
Lab Sample ID:	C43713-1	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58161.D	1	01/18/16	XB	n/a	n/a	VM1746
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.97 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.18	0.018	mg/kg	
108-86-1	Bromobenzene	ND	0.18	0.018	mg/kg	
74-97-5	Bromochloromethane	ND	0.18	0.018	mg/kg	
75-27-4	Bromodichloromethane	ND	0.18	0.018	mg/kg	
75-25-2	Bromoform	ND	0.18	0.018	mg/kg	
104-51-8	n-Butylbenzene	ND	0.18	0.018	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.18	0.018	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.18	0.018	mg/kg	
108-90-7	Chlorobenzene	ND	0.18	0.018	mg/kg	
75-00-3	Chloroethane	ND	0.18	0.036	mg/kg	
67-66-3	Chloroform	ND	0.18	0.018	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.18	0.018	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.18	0.018	mg/kg	
75-15-0	Carbon disulfide	ND	0.18	0.018	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.18	0.018	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.18	0.018	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.18	0.018	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.18	0.018	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.18	0.050	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.18	0.018	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.18	0.018	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.18	0.018	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.18	0.018	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.18	0.018	mg/kg	
124-48-1	Dibromochloromethane	ND	0.18	0.018	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.18	0.036	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.18	0.039	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.18	0.018	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.18	0.018	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.18	0.018	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.18	0.018	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.18	0.018	mg/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-300-SO		
Lab Sample ID:	C43713-1	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.18	0.018	mg/kg	
100-41-4	Ethylbenzene	ND	0.18	0.018	mg/kg	
591-78-6	2-Hexanone	ND	0.72	0.072	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.18	0.036	mg/kg	
98-82-8	Isopropylbenzene	ND	0.18	0.018	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.18	0.018	mg/kg	
74-83-9	Methyl bromide	ND	0.18	0.036	mg/kg	
74-87-3	Methyl chloride	ND	0.18	0.036	mg/kg	
74-95-3	Methylene bromide	ND	0.18	0.018	mg/kg	
75-09-2	Methylene chloride	ND	0.72	0.18	mg/kg	
91-20-3	Naphthalene	ND	0.18	0.036	mg/kg	
103-65-1	n-Propylbenzene	ND	0.18	0.018	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.18	0.018	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.18	0.018	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.18	0.018	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.18	0.018	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.18	0.018	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.18	0.036	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.18	0.018	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.18	0.036	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.18	0.036	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.18	0.022	mg/kg	
108-88-3	Toluene	ND	0.18	0.018	mg/kg	
79-01-6	Trichloroethylene	ND	0.18	0.018	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.18	0.036	mg/kg	
75-01-4	Vinyl chloride	ND	0.18	0.036	mg/kg	
1330-20-7	Xylene (total)	ND	0.36	0.036	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		70-130%
2037-26-5	Toluene-D8	92%		70-130%
460-00-4	4-Bromofluorobenzene	98%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-300-SO		
Lab Sample ID:	C43713-1	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	37.9	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.93	0.93	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	2.5	0.93	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	5050	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	18.2	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	128	1.4	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.015	0.015	mg/kg	1	01/18/16	01/19/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.93	0.93	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5538
(2) Instrument QC Batch: MA5543
(3) Prep QC Batch: MP10713
(4) Prep QC Batch: MP10725

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-315-SO		
Lab Sample ID:	C43713-2	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58162.D	1	01/18/16	XB	n/a	n/a	VM1746
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.25 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.20	0.020	mg/kg	
108-86-1	Bromobenzene	ND	0.20	0.020	mg/kg	
74-97-5	Bromochloromethane	ND	0.20	0.020	mg/kg	
75-27-4	Bromodichloromethane	ND	0.20	0.020	mg/kg	
75-25-2	Bromoform	ND	0.20	0.020	mg/kg	
104-51-8	n-Butylbenzene	ND	0.20	0.020	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.20	0.020	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.20	0.020	mg/kg	
108-90-7	Chlorobenzene	ND	0.20	0.020	mg/kg	
75-00-3	Chloroethane	ND	0.20	0.040	mg/kg	
67-66-3	Chloroform	ND	0.20	0.020	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.20	0.020	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.20	0.020	mg/kg	
75-15-0	Carbon disulfide	ND	0.20	0.020	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.20	0.020	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.20	0.020	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.20	0.020	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.20	0.020	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.20	0.056	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.20	0.020	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.20	0.020	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.20	0.020	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.20	0.020	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.20	0.020	mg/kg	
124-48-1	Dibromochloromethane	ND	0.20	0.020	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.20	0.040	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.044	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.20	0.020	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.20	0.020	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.20	0.020	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.020	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-315-SO		
Lab Sample ID:	C43713-2	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
100-41-4	Ethylbenzene	ND	0.20	0.020	mg/kg	
591-78-6	2-Hexanone	ND	0.80	0.080	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.20	0.040	mg/kg	
98-82-8	Isopropylbenzene	ND	0.20	0.020	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.20	0.020	mg/kg	
74-83-9	Methyl bromide	ND	0.20	0.040	mg/kg	
74-87-3	Methyl chloride	ND	0.20	0.040	mg/kg	
74-95-3	Methylene bromide	ND	0.20	0.020	mg/kg	
75-09-2	Methylene chloride	ND	0.80	0.20	mg/kg	
91-20-3	Naphthalene	ND	0.20	0.040	mg/kg	
103-65-1	n-Propylbenzene	ND	0.20	0.020	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.020	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.020	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.20	0.020	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.20	0.040	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.020	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.040	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.040	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.20	0.024	mg/kg	
108-88-3	Toluene	ND	0.20	0.020	mg/kg	
79-01-6	Trichloroethylene	ND	0.20	0.020	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.20	0.040	mg/kg	
75-01-4	Vinyl chloride	ND	0.20	0.040	mg/kg	
1330-20-7	Xylene (total)	ND	0.40	0.040	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		70-130%
2037-26-5	Toluene-D8	94%		70-130%
460-00-4	4-Bromofluorobenzene	97%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-315-SO		
Lab Sample ID:	C43713-2	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	29.8	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.94	0.94	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	2.3	0.94	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	4570	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	2.2	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	90.3	1.4	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.014	0.014	mg/kg	1	01/18/16	01/19/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.94	0.94	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5538
(2) Instrument QC Batch: MA5543
(3) Prep QC Batch: MP10713
(4) Prep QC Batch: MP10725

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	DUP-BP-29-315		
Lab Sample ID:	C43713-3	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58163.D	1	01/18/16	XB	n/a	n/a	VM1746
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.49 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.23	0.023	mg/kg	
108-86-1	Bromobenzene	ND	0.23	0.023	mg/kg	
74-97-5	Bromochloromethane	ND	0.23	0.023	mg/kg	
75-27-4	Bromodichloromethane	ND	0.23	0.023	mg/kg	
75-25-2	Bromoform	ND	0.23	0.023	mg/kg	
104-51-8	n-Butylbenzene	ND	0.23	0.023	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.23	0.023	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.23	0.023	mg/kg	
108-90-7	Chlorobenzene	ND	0.23	0.023	mg/kg	
75-00-3	Chloroethane	ND	0.23	0.046	mg/kg	
67-66-3	Chloroform	ND	0.23	0.023	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.23	0.023	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.23	0.023	mg/kg	
75-15-0	Carbon disulfide	ND	0.23	0.023	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.23	0.023	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.23	0.023	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.23	0.023	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.23	0.023	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.23	0.064	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.23	0.023	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.23	0.023	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.23	0.023	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.23	0.023	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.23	0.023	mg/kg	
124-48-1	Dibromochloromethane	ND	0.23	0.023	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.23	0.046	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.23	0.050	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.23	0.023	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.23	0.023	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.23	0.023	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.23	0.023	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-BP-29-315		
Lab Sample ID:	C43713-3	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
100-41-4	Ethylbenzene	ND	0.23	0.023	mg/kg	
591-78-6	2-Hexanone	ND	0.91	0.091	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.23	0.046	mg/kg	
98-82-8	Isopropylbenzene	ND	0.23	0.023	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.23	0.023	mg/kg	
74-83-9	Methyl bromide	ND	0.23	0.046	mg/kg	
74-87-3	Methyl chloride	ND	0.23	0.046	mg/kg	
74-95-3	Methylene bromide	ND	0.23	0.023	mg/kg	
75-09-2	Methylene chloride	ND	0.91	0.23	mg/kg	
91-20-3	Naphthalene	ND	0.23	0.046	mg/kg	
103-65-1	n-Propylbenzene	ND	0.23	0.023	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.23	0.023	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.23	0.023	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.23	0.023	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.23	0.046	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.23	0.023	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.23	0.046	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.23	0.046	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.23	0.027	mg/kg	
108-88-3	Toluene	ND	0.23	0.023	mg/kg	
79-01-6	Trichloroethylene	ND	0.23	0.023	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.23	0.046	mg/kg	
75-01-4	Vinyl chloride	ND	0.23	0.046	mg/kg	
1330-20-7	Xylene (total)	ND	0.46	0.046	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		70-130%
2037-26-5	Toluene-D8	95%		70-130%
460-00-4	4-Bromofluorobenzene	98%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-BP-29-315		
Lab Sample ID:	C43713-3	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	25.5	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.95	0.95	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	2.3	0.95	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	4140	19	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	75.6	1.4	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.016	0.016	mg/kg	1	01/18/16	01/19/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.9	1.9	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.95	0.95	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5538
(2) Instrument QC Batch: MA5543
(3) Prep QC Batch: MP10713
(4) Prep QC Batch: MP10725

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-SOIL BINS		
Lab Sample ID:	C43713-4	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58164.D	1	01/18/16	XB	n/a	n/a	VM1746
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.41 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.20	0.020	mg/kg	
108-86-1	Bromobenzene	ND	0.20	0.020	mg/kg	
74-97-5	Bromochloromethane	ND	0.20	0.020	mg/kg	
75-27-4	Bromodichloromethane	ND	0.20	0.020	mg/kg	
75-25-2	Bromoform	ND	0.20	0.020	mg/kg	
104-51-8	n-Butylbenzene	ND	0.20	0.020	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.20	0.020	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.20	0.020	mg/kg	
108-90-7	Chlorobenzene	ND	0.20	0.020	mg/kg	
75-00-3	Chloroethane	ND	0.20	0.039	mg/kg	
67-66-3	Chloroform	ND	0.20	0.020	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.20	0.020	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.20	0.020	mg/kg	
75-15-0	Carbon disulfide	ND	0.20	0.020	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.20	0.020	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.20	0.020	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.20	0.020	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.20	0.020	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.20	0.055	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.20	0.020	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.20	0.020	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.20	0.020	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.20	0.020	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.20	0.020	mg/kg	
124-48-1	Dibromochloromethane	ND	0.20	0.020	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.20	0.039	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.043	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.20	0.020	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.20	0.020	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.20	0.020	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.020	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-SOIL BINS		
Lab Sample ID:	C43713-4	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
100-41-4	Ethylbenzene	ND	0.20	0.020	mg/kg	
591-78-6	2-Hexanone	ND	0.78	0.078	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.20	0.039	mg/kg	
98-82-8	Isopropylbenzene	ND	0.20	0.020	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.20	0.020	mg/kg	
74-83-9	Methyl bromide	ND	0.20	0.039	mg/kg	
74-87-3	Methyl chloride	ND	0.20	0.039	mg/kg	
74-95-3	Methylene bromide	ND	0.20	0.020	mg/kg	
75-09-2	Methylene chloride	ND	0.78	0.20	mg/kg	
91-20-3	Naphthalene	ND	0.20	0.039	mg/kg	
103-65-1	n-Propylbenzene	ND	0.20	0.020	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.020	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.020	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.20	0.020	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.20	0.039	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.020	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.039	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.039	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.20	0.023	mg/kg	
108-88-3	Toluene	ND	0.20	0.020	mg/kg	
79-01-6	Trichloroethylene	ND	0.20	0.020	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.20	0.039	mg/kg	
75-01-4	Vinyl chloride	ND	0.20	0.039	mg/kg	
1330-20-7	Xylene (total)	ND	0.39	0.039	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		70-130%
2037-26-5	Toluene-D8	94%		70-130%
460-00-4	4-Bromofluorobenzene	97%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-SOIL BINS		
Lab Sample ID:	C43713-4	**Date Sampled:**	01/14/16
Matrix:	SO - Soil	**Date Received:**	01/16/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.8	1.8	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	53.5	18	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.88	0.88	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	4.1	0.88	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	6670	18	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	3.9	1.8	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	189	1.3	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.016	0.016	mg/kg	1	01/18/16	01/19/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.8	1.8	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.88	0.88	mg/kg	1	01/18/16	01/18/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5538
(2) Instrument QC Batch: MA5543
(3) Prep QC Batch: MP10713
(4) Prep QC Batch: MP10725

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Northern California ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.

CHAIN OF CUSTODY

PHOENIX ACCUTEST LABORATORIES

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 8016 3210 6140
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C43713

Client / Reporting Information

Company Name: Amec FW
Address: 4600 E Washington St.
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: Broadway Pantano ISCO STUDY
Street:
City: State:
Project #: 142015 2042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #:

Requested Analysis

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; Of-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	EnCORE	8260 B	Total RCRA 8 Metals + Cu & Manganese	LAB USE ONLY
1	BP-29-300-SO	1/14/16	1130	KGK	SO	3					1		2		✓	✓	
2	BP-29-315-SO	↓	1140	↓	SO	3					1		2		✓	✓	
3	DUP-BP-29-315	↓	↓	↓	SO	3					1		2		✓	✓	
4	BP-29-Soil Bins	1/15/16	1320	↓	SO	3					1		2		✓	✓	

3 DAYS

Turnaround Time (Business days)

Approved By:/ Date:

- [ ] 10 Day
- [x] 5 Day
- [x] 3 Day
- [ ] 2 Day
- [x] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULL1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	1/15/16 1520	[signature]	[signature]	1/15/16 1700	Fedex
2						
3	Fedex	1/16/16 10:15	Ali Zeghami			
4						
5						

Custody Seal #: Y
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 5.8/4.9 A2

5.2 5

C43713: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43713 **Client:** AMEC FW **Project:** BROADWAY PANTANO ISCO STUDY

Date / Time Received: 1/16/2016 10:15:00 AM **Delivery Method:** FedEx **Airbill #'s:** 706632106140

Cooler Temps (Initial/Adjusted): #1: (5.8/4.9);

Cooler Security	Y	or N		Y	or N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	or N
1. Temp criteria achieved:	☑	☐
2. Therm ID:	IR3;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

Quality Control Preservation	Y	or N	N/A
1. Trip Blank present / cooler:	☐	☐	☑
2. Trip Blank listed on COC:	☐	☐	☑
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☐	☐	☑

Sample Integrity - Documentation	Y	or N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	or N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	or N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments

Accutest Laboratories
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C43713: Chain of Custody
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Northern California ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1746-MB	M58157.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	0.50	ug/kg	
108-86-1	Bromobenzene	ND	5.0	0.50	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.50	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	0.50	ug/kg	
75-25-2	Bromoform	ND	5.0	0.50	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.50	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	0.50	ug/kg	
75-00-3	Chloroethane	ND	5.0	1.0	ug/kg	
67-66-3	Chloroform	ND	5.0	0.50	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/kg	
106-43-4	p-Chlorotoluene	ND	5.0	0.50	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	0.50	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	0.50	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	0.50	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	0.50	ug/kg	
563-58-6	1,1-Dichloropropene	ND	5.0	0.50	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	0.50	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	0.50	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	0.50	ug/kg	
142-28-9	1,3-Dichloropropane	ND	5.0	0.50	ug/kg	
594-20-7	2,2-Dichloropropane	ND	5.0	0.50	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	0.50	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	0.50	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	0.50	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	0.50	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	0.50	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	0.50	ug/kg	
591-78-6	2-Hexanone	ND	20	2.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1746-MB	M58157.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	5.0	0.50	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	1.0	ug/kg	
74-95-3	Methylene bromide	ND	5.0	0.50	ug/kg	
75-09-2	Methylene chloride	ND	20	5.0	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.0	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.50	ug/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	0.50	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/kg	
96-18-4	1,2,3-Trichloropropane	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	1.0	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	0.60	ug/kg	
108-88-3	Toluene	ND	5.0	0.50	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	0.50	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	10	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	70-130%
2037-26-5	Toluene-D8	92%	70-130%
460-00-4	4-Bromofluorobenzene	98%	70-130%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1746-BS	M58154.D	1	01/18/16	XB	n/a	n/a	VM1746
VM1746-BSD	M58155.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	40	37.2	93	36.8	92	1	70-130/30
108-86-1	Bromobenzene	40	34.3	86	34.2	86	0	70-130/30
74-97-5	Bromochloromethane	40	41.5	104	41.2	103	1	70-130/30
75-27-4	Bromodichloromethane	40	36.9	92	36.4	91	1	70-130/30
75-25-2	Bromoform	40	37.1	93	35.6	89	4	70-130/30
104-51-8	n-Butylbenzene	40	32.9	82	32.4	81	2	70-130/30
135-98-8	sec-Butylbenzene	40	33.4	84	33.1	83	1	70-130/30
98-06-6	tert-Butylbenzene	40	33.8	85	33.1	83	2	70-130/30
108-90-7	Chlorobenzene	40	34.5	86	33.5	84	3	70-130/30
75-00-3	Chloroethane	40	37.9	95	36.8	92	3	70-130/30
67-66-3	Chloroform	40	39.0	98	38.6	97	1	70-130/30
95-49-8	o-Chlorotoluene	40	34.3	86	35.7	89	4	70-130/30
106-43-4	p-Chlorotoluene	40	31.0	78	28.4	71	9	70-130/30
75-15-0	Carbon disulfide	40	32.1	80	32.3	81	1	70-130/30
56-23-5	Carbon tetrachloride	40	36.0	90	36.3	91	1	70-130/30
75-34-3	1,1-Dichloroethane	40	36.8	92	36.9	92	0	70-130/30
75-35-4	1,1-Dichloroethylene	40	34.9	87	35.2	88	1	70-130/30
563-58-6	1,1-Dichloropropene	40	31.9	80	31.5	79	1	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	40	32.2	81	31.0	78	4	70-130/30
106-93-4	1,2-Dibromoethane	40	35.6	89	33.8	85	5	70-130/30
107-06-2	1,2-Dichloroethane	40	36.3	91	35.6	89	2	70-130/30
78-87-5	1,2-Dichloropropane	40	37.8	95	36.8	92	3	70-130/30
142-28-9	1,3-Dichloropropane	40	37.3	93	35.2	88	6	70-130/30
594-20-7	2,2-Dichloropropane	40	37.5	94	38.1	95	2	70-130/30
124-48-1	Dibromochloromethane	40	35.5	89	33.7	84	5	70-130/30
75-71-8	Dichlorodifluoromethane	40	37.4	94	36.6	92	2	70-130/30
156-59-2	cis-1,2-Dichloroethylene	40	42.0	105	41.5	104	1	70-130/30
10061-01-5	cis-1,3-Dichloropropene	40	40.1	100	38.2	96	5	70-130/30
541-73-1	m-Dichlorobenzene	40	33.7	84	33.5	84	1	70-130/30
95-50-1	o-Dichlorobenzene	40	34.5	86	34.5	86	0	70-130/30
106-46-7	p-Dichlorobenzene	40	34.0	85	33.6	84	1	70-130/30
156-60-5	trans-1,2-Dichloroethylene	40	34.5	86	34.8	87	1	70-130/30
10061-02-6	trans-1,3-Dichloropropene	40	34.5	86	32.8	82	5	70-130/30
100-41-4	Ethylbenzene	40	34.0	85	33.5	84	1	70-130/30
591-78-6	2-Hexanone	160	146	91	129	81	12	60-140/30
87-68-3	Hexachlorobutadiene	40	35.5	89	35.4	89	0	70-130/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1746-BS	M58154.D	1	01/18/16	XB	n/a	n/a	VM1746
VM1746-BSD	M58155.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	40	34.7	87	33.9	85	2	70-130/30
99-87-6	p-Isopropyltoluene	40	33.2	83	32.8	82	1	70-130/30
74-83-9	Methyl bromide	40	42.8	107	42.2	106	1	70-130/30
74-87-3	Methyl chloride	40	40.2	101	38.9	97	3	70-130/30
74-95-3	Methylene bromide	40	38.8	97	38.3	96	1	70-130/30
75-09-2	Methylene chloride	40	37.6	94	38.2	96	2	70-130/30
91-20-3	Naphthalene	40	34.0	85	33.1	83	3	70-130/30
103-65-1	n-Propylbenzene	40	32.0	80	31.3	78	2	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	40	35.1	88	35.5	89	1	70-130/30
71-55-6	1,1,1-Trichloroethane	40	38.9	97	38.6	97	1	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	40	35.4	89	33.2	83	6	70-130/30
79-00-5	1,1,2-Trichloroethane	40	36.7	92	34.7	87	6	70-130/30
87-61-6	1,2,3-Trichlorobenzene	40	35.9	90	35.7	89	1	70-130/30
96-18-4	1,2,3-Trichloropropane	40	35.5	89	33.3	83	6	70-130/30
120-82-1	1,2,4-Trichlorobenzene	40	35.4	89	35.2	88	1	70-130/30
95-63-6	1,2,4-Trimethylbenzene	40	32.2	81	32.0	80	1	70-130/30
108-67-8	1,3,5-Trimethylbenzene	40	33.8	85	33.4	84	1	70-130/30
127-18-4	Tetrachloroethylene	40	34.2	86	34.1	85	0	70-130/30
108-88-3	Toluene	40	34.5	86	33.8	85	2	70-130/30
79-01-6	Trichloroethylene	40	37.1	93	37.0	93	0	70-130/30
75-69-4	Trichlorofluoromethane	40	41.4	104	40.3	101	3	70-130/30
75-01-4	Vinyl chloride	40	39.3	98	37.9	95	4	70-130/30
1330-20-7	Xylene (total)	120	102	85	99.9	83	2	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	103%	102%	70-130%
2037-26-5	Toluene-D8	92%	92%	70-130%
460-00-4	4-Bromofluorobenzene	99%	95%	70-130%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1746-LCS	M58156.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	Spike ug/kg	LCS ug/kg	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	107%	70-130%
2037-26-5	Toluene-D8	96%	70-130%
460-00-4	4-Bromofluorobenzene	98%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43713-1MS	M58167.D	1	01/18/16	XB	n/a	n/a	VM1746
C43713-1MSD	M58168.D	1	01/18/16	XB	n/a	n/a	VM1746
C43713-1	M58161.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	C43713-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		1430	1380	96	1430	1380	96	0	70-130/30
108-86-1	Bromobenzene	ND		1430	1260	88	1430	1290	90	2	70-130/30
74-97-5	Bromochloromethane	ND		1430	1450	101	1430	1480	103	2	70-130/30
75-27-4	Bromodichloromethane	ND		1430	1370	95	1430	1350	94	1	70-130/30
75-25-2	Bromoform	ND		1430	1260	88	1430	1260	88	0	70-130/30
104-51-8	n-Butylbenzene	ND		1430	1180	82	1430	1100	77	7	70-130/30
135-98-8	sec-Butylbenzene	ND		1430	1200	84	1430	1160	81	3	70-130/30
98-06-6	tert-Butylbenzene	ND		1430	1240	86	1430	1210	84	2	70-130/30
108-90-7	Chlorobenzene	ND		1430	1260	88	1430	1250	87	1	70-130/30
75-00-3	Chloroethane	ND		1430	1460	102	1430	1440	100	1	70-130/30
67-66-3	Chloroform	ND		1430	1410	98	1430	1400	98	1	70-130/30
95-49-8	o-Chlorotoluene	ND		1430	1270	89	1430	1260	88	1	70-130/30
106-43-4	p-Chlorotoluene	ND		1430	1130	79	1430	1110	77	2	70-130/30
75-15-0	Carbon disulfide	ND		1430	1130	79	1430	1120	78	1	70-130/30
56-23-5	Carbon tetrachloride	ND		1430	1320	92	1430	1320	92	0	70-130/30
75-34-3	1,1-Dichloroethane	ND		1430	1340	93	1430	1340	93	0	70-130/30
75-35-4	1,1-Dichloroethylene	ND		1430	1270	89	1430	1260	88	1	70-130/30
563-58-6	1,1-Dichloropropene	ND		1430	1170	82	1430	1160	81	1	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	ND		1430	1090	76	1430	997	69* [a]	9	70-130/30
106-93-4	1,2-Dibromoethane	ND		1430	1270	89	1430	1270	89	0	70-130/30
107-06-2	1,2-Dichloroethane	ND		1430	1360	95	1430	1350	94	1	70-130/30
78-87-5	1,2-Dichloropropane	ND		1430	1410	98	1430	1420	99	1	70-130/30
142-28-9	1,3-Dichloropropane	ND		1430	1380	96	1430	1360	95	1	70-130/30
594-20-7	2,2-Dichloropropane	ND		1430	1200	84	1430	1220	85	2	70-130/30
124-48-1	Dibromochloromethane	ND		1430	1270	89	1430	1260	88	1	70-130/30
75-71-8	Dichlorodifluoromethane	ND		1430	1420	99	1430	1400	98	1	70-130/30
156-59-2	cis-1,2-Dichloroethylene	ND		1430	1470	102	1430	1490	104	1	70-130/30
10061-01-5	cis-1,3-Dichloropropene	ND		1430	1460	102	1430	1470	102	1	70-130/30
541-73-1	m-Dichlorobenzene	ND		1430	1200	84	1430	1190	83	1	70-130/30
95-50-1	o-Dichlorobenzene	ND		1430	1240	86	1430	1190	83	4	70-130/30
106-46-7	p-Dichlorobenzene	ND		1430	1210	84	1430	1200	84	1	70-130/30
156-60-5	trans-1,2-Dichloroethylene	ND		1430	1210	84	1430	1240	86	2	70-130/30
10061-02-6	trans-1,3-Dichloropropene	ND		1430	1260	88	1430	1250	87	1	70-130/30
100-41-4	Ethylbenzene	ND		1430	1260	88	1430	1240	86	2	70-130/30
591-78-6	2-Hexanone	ND		5740	5020	87	5740	4930	86	2	60-140/30
87-68-3	Hexachlorobutadiene	ND		1430	1240	86	1430	1060	74	16	70-130/30

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43713
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43713-1MS	M58167.D	1	01/18/16	XB	n/a	n/a	VM1746
C43713-1MSD	M58168.D	1	01/18/16	XB	n/a	n/a	VM1746
C43713-1	M58161.D	1	01/18/16	XB	n/a	n/a	VM1746

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43713-1, C43713-2, C43713-3, C43713-4

CAS No.	Compound	C43713-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		1430	1260	88	1430	1220	85	3	70-130/30
99-87-6	p-Isopropyltoluene	ND		1430	1200	84	1430	1150	80	4	70-130/30
74-83-9	Methyl bromide	ND		1430	1810	126	1430	1730	121	5	70-130/30
74-87-3	Methyl chloride	ND		1430	1490	104	1430	1510	105	1	70-130/30
74-95-3	Methylene bromide	ND		1430	1420	99	1430	1430	100	1	70-130/30
75-09-2	Methylene chloride	ND		1430	1350	94	1430	1380	96	2	70-130/30
91-20-3	Naphthalene	ND		1430	1150	80	1430	1010	70	13	70-130/30
103-65-1	n-Propylbenzene	ND		1430	1170	82	1430	1150	80	2	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	ND		1430	1260	88	1430	1270	89	1	70-130/30
71-55-6	1,1,1-Trichloroethane	ND		1430	1390	97	1430	1390	97	0	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		1430	1210	84	1430	1200	84	1	70-130/30
79-00-5	1,1,2-Trichloroethane	ND		1430	1340	93	1430	1320	92	2	70-130/30
87-61-6	1,2,3-Trichlorobenzene	ND		1430	1240	86	1430	1030	72	19	70-130/30
96-18-4	1,2,3-Trichloropropane	ND		1430	1210	84	1430	1200	84	1	70-130/30
120-82-1	1,2,4-Trichlorobenzene	ND		1430	1190	83	1430	1020	71	15	70-130/30
95-63-6	1,2,4-Trimethylbenzene	ND		1430	1180	82	1430	1150	80	3	70-130/30
108-67-8	1,3,5-Trimethylbenzene	ND		1430	1220	85	1430	1210	84	1	70-130/30
127-18-4	Tetrachloroethylene	ND		1430	1250	87	1430	1250	87	0	70-130/30
108-88-3	Toluene	ND		1430	1260	88	1430	1250	87	1	70-130/30
79-01-6	Trichloroethylene	ND		1430	1350	94	1430	1370	95	1	70-130/30
75-69-4	Trichlorofluoromethane	ND		1430	1580	110	1430	1570	109	1	70-130/30
75-01-4	Vinyl chloride	ND		1430	834	58* [a]	1430	844	59* [a]	1	70-130/30
1330-20-7	Xylene (total)	ND		4300	3720	86	4300	3660	85	2	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	C43713-1	Limits
1868-53-7	Dibromofluoromethane	99%	98%	101%	70-130%
2037-26-5	Toluene-D8	91%	91%	92%	70-130%
460-00-4	4-Bromofluorobenzene	99%	97%	98%	70-130%

(a) Outside control limits due to matrix interference. AZ:M2

* = Outside of Control Limits.

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Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10713
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/18/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17	-0.15	<2.0
Barium	20	.02	.09	0.28	<20
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031	0.020	<1.0
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054	0.040	<1.0
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76	3.5	<20
Lead	2.0	.1	.14	0.070	<2.0
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026	0.13	<1.5
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33	-0.070	<2.0
Silicon	20	.24	.43		
Silver	1.0	.05	.067	0.0	<1.0
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10713: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10713
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/18/16

Metal	C43660-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	8.0	54.0	45.9	100.3	75-125
Barium	117	153	45.9	78.5	75-125
Beryllium	anr				
Boron					
Cadmium	0.53	46.1	45.9	99.3	75-125
Calcium					
Chromium	10.5	57.5	45.9	102.5	75-125
Cobalt	anr				
Copper	anr				
Iron	17300	21400	1150	357.5(a)	75-125
Lead	24.7	64.9	45.9	87.6	75-125
Magnesium					
Manganese	135	190	45.9	119.9	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	2.3	46.3	45.9	95.9	75-125
Silicon					
Silver	0.10	42.7	45.9	92.9	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10713: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. AZ:M3

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10713
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/18/16

Metal	C43660-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	8.0	50.1	43.9	96.0	7.5	20
Barium	117	161	43.9	100.3	5.1	20
Beryllium	anr					
Boron						
Cadmium	0.53	44.1	43.9	99.3	4.4	20
Calcium						
Chromium	10.5	53.1	43.9	97.1	8.0	20
Cobalt	anr					
Copper	anr					
Iron	17300	18100	1100	73.0 (a)	16.7	20
Lead	24.7	62.9	43.9	87.1	3.1	20
Magnesium						
Manganese	135	166	43.9	70.7N(b)	13.5	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	2.3	43.9	43.9	94.8	5.3	20
Silicon						
Silver	0.10	41.1	43.9	93.5	3.8	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10713: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. AZ:M3
(b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity. AZ:M2

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10713
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/18/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	49.3	50	98.6	80-120
Barium	53.1	50	106.2	80-120
Beryllium	anr			
Boron				
Cadmium	50.1	50	100.2	80-120
Calcium				
Chromium	52.4	50	104.8	80-120
Cobalt	anr			
Copper	anr			
Iron	1310	1250	104.8	80-120
Lead	48.9	50	97.8	80-120
Magnesium				
Manganese	52.9	50	105.8	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	49.0	50	98.0	80-120
Silicon				
Silver	46.9	50	93.8	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10713: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10713
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 01/18/16

Metal	C43660-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	88.0	82.3	6.5	0-10
Barium	1280	1340	4.6	0-10
Beryllium	anr			
Boron				
Cadmium	5.80	4.70	19.0 (a)	0-10
Calcium				
Chromium	116	121	4.9	0-10
Cobalt	anr			
Copper	anr			
Iron	191000	208000	9.3	0-10
Lead	272	292	7.3	0-10
Magnesium				
Manganese	1480	1620	8.9	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	25.1	25.2	0.4	0-10
Silicon				
Silver	1.10	0.00	100.0(a)	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10713: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10725 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 01/18/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.017	.00035	.0019	-0.0053	<0.017

Associated samples MP10725: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1
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MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10725
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/18/16

Metal	C43660-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.057	0.22	0.152	107.6	75-125

Associated samples MP10725: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10725 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 01/18/16

Metal	C43660-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.057	0.23	0.161	107.3	4.4	20

Associated samples MP10725: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43713
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10725
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/18/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP10725: C43713-1, C43713-2, C43713-3, C43713-4

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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01/26/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

Accutest Job Number: C43742

Sampling Date: 01/18/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **24**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Sample Summary

AMEC Foster Wheeler

Job No: C43742

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43742-1	01/18/16	09:30	KK	01/20/16	AQ	Ground Water	BP-29-370-AQ
C43742-2	01/18/16	11:30	KK	01/20/16	AQ	Ground Water	BP-29-380-AQ
C43742-3	01/18/16	11:30	KK	01/20/16	AQ	Ground Water	DUP-BP-29-380-AQ

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43742
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	1/26/2016 5:22:14 PM

3 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/18/2016 and were received at Accutest on 01/20/2016 properly preserved, at 4 Deg. C and intact. These Samples received an Accutest job number of C43742. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VW2248

- All method blanks and blank spikes for this batch meet method specific criteria.
- Sample(s) C43749-22MS, C43749-22MSD were used as the QC samples indicated.
- RPD(s) for MSD for Dichlorodifluoromethane, Vinyl chloride exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43742
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 01/18/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43742-1	**BP-29-370-AQ**					
Dichlorodifluoromethane		2.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		1.7	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		29.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene		3.7	0.50	0.20	ug/l	SW846 8260B
C43742-2	**BP-29-380-AQ**					
Dichlorodifluoromethane		2.5	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		1.4	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		26.7	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene		3.5	0.50	0.20	ug/l	SW846 8260B
C43742-3	**DUP-BP-29-380-AQ**					
Dichlorodifluoromethane		2.2	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		1.3	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		21.9	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene		3.0	0.50	0.20	ug/l	SW846 8260B

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Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-29-370-AQ		
Lab Sample ID:	C43742-1	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W59753.D	1	01/22/16	CV	n/a	n/a	VW2248
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.7	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-AQ		
Lab Sample ID:	C43742-1	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	29.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.7	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		78-125%
2037-26-5	Toluene-D8	102%		86-114%
460-00-4	4-Bromofluorobenzene	92%		80-113%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-380-AQ		
Lab Sample ID:	C43742-2	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W59754.D	1	01/22/16	CV	n/a	n/a	VW2248
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.5	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.4	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-380-AQ		
Lab Sample ID:	C43742-2	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	26.7	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		78-125%
2037-26-5	Toluene-D8	102%		86-114%
460-00-4	4-Bromofluorobenzene	93%		80-113%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-BP-29-380-AQ		
Lab Sample ID:	C43742-3	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W59755.D	1	01/22/16	CV	n/a	n/a	VW2248
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.3	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-BP-29-380-AQ		
Lab Sample ID:	C43742-3	**Date Sampled:**	01/18/16
Matrix:	AQ - Ground Water	**Date Received:**	01/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	21.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.0	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		78-125%
2037-26-5	Toluene-D8	102%		86-114%
460-00-4	4-Bromofluorobenzene	94%		80-113%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Northern California ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
R5	MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 8034 0162 9030
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C C43742

Client / Reporting Information

Company Name: Amec Foster Wheeler
Address: 4600 E Washington St.
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannukakis
Phone #: (602) 733-6013
Sampler's Name: Kyle Keegan

Project Information

Project Name: Bradbury Pontiac ISCO STUDY
Street:
City: Tucson State: AZ
Project #: 14201522042
EMAIL: Alex.Yiannukakis@amec.com
Client Purchase Order #:

Requested Analysis: 8260B

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaOHZnAc	NaHSO4	MEOH	EnCORE	8260B	LAB USE ONLY
1	BP-29-370-Aq	1/18/16	0930	Kyle	Aq	3	X								3	
2	BP-29-380-Aq	"	1130			3	X								3	
3	DUP-BP-29-380-Aq					3	X								3	

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [X] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	1/19/16 1000	[signature]	[signature]	1/19/16 1100	Fedex
2						
3	Fedex	1/20/16 10:30	[signature]			
4						
5						

Custody Seal # Y
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 1.9-0.9=1.0 °C
AZ

5.2 5

C43742: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43742 **Client:** AMEC FOSTER WHEELER **Project:** BROADWAY PANTANO ISCO STUDY

Date / Time Received: 1/20/2016 10:30:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401029030

Cooler Temps (Initial/Adjusted): #1: (4.9/4);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR3;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

Accutest Laboratories
V:408.588.0200

2105 Lundy Avenue
F: 408.588.0201

San Jose, CA 95131
www/accutest.com

C43742: Chain of Custody
Page 2 of 2

Northern California ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2248-MB	W59743.D	1	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2248-MB	W59743.D	1	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	98%	78-125%
2037-26-5	Toluene-D8	103%	86-114%
460-00-4	4-Bromofluorobenzene	96%	80-113%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2248-BS	W59738.D	1	01/22/16	CV	n/a	n/a	VW2248
VW2248-BSD	W59741.D	1	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.5	93	19.2	96	4	77-118/10
108-86-1	Bromobenzene	20	20.1	101	20.5	103	2	78-122/10
74-97-5	Bromochloromethane	20	19.8	99	19.8	99	0	76-124/10
75-27-4	Bromodichloromethane	20	19.4	97	19.5	98	1	74-121/10
75-25-2	Bromoform	20	16.1	81	16.3	82	1	58-133/10
104-51-8	n-Butylbenzene	20	21.1	106	22.0	110	4	75-125/10
135-98-8	sec-Butylbenzene	20	20.8	104	21.7	109	4	76-127/10
98-06-6	tert-Butylbenzene	20	18.0	90	18.7	94	4	76-124/10
108-90-7	Chlorobenzene	20	19.3	97	19.6	98	2	77-120/10
75-00-3	Chloroethane	20	17.7	89	17.9	90	1	63-117/10
67-66-3	Chloroform	20	18.2	91	18.8	94	3	74-123/10
95-49-8	o-Chlorotoluene	20	19.4	97	19.9	100	3	76-125/10
106-43-4	p-Chlorotoluene	20	19.0	95	19.6	98	3	76-123/10
75-15-0	Carbon disulfide	20	17.1	86	18.3	92	7	57-126/11
56-23-5	Carbon tetrachloride	20	19.3	97	20.7	104	7	72-128/11
75-34-3	1,1-Dichloroethane	20	18.5	93	18.9	95	2	70-120/10
75-35-4	1,1-Dichloroethylene	20	17.6	88	19.0	95	8	65-120/11
563-58-6	1,1-Dichloropropene	20	18.2	91	19.5	98	7	69-125/10
96-12-8	1,2-Dibromo-3-chloropropane	20	17.8	89	16.6	83	7	63-128/10
106-93-4	1,2-Dibromoethane	20	20.0	100	20.0	100	0	78-123/10
107-06-2	1,2-Dichloroethane	20	19.0	95	19.3	97	2	72-123/10
78-87-5	1,2-Dichloropropane	20	19.2	96	19.6	98	2	76-119/10
142-28-9	1,3-Dichloropropane	20	20.2	101	20.2	101	0	78-122/10
594-20-7	2,2-Dichloropropane	20	18.9	95	20.3	102	7	68-129/10
124-48-1	Dibromochloromethane	20	16.7	84	16.7	84	0	75-124/10
75-71-8	Dichlorodifluoromethane	20	16.8	84	18.1	91	7	37-149/21
156-59-2	cis-1,2-Dichloroethylene	20	20.1	101	20.4	102	1	74-121/10
10061-01-5	cis-1,3-Dichloropropene	20	21.0	105	21.3	107	1	76-125/10
541-73-1	m-Dichlorobenzene	20	19.5	98	19.9	100	2	77-121/10
95-50-1	o-Dichlorobenzene	20	19.3	97	19.7	99	2	77-120/10
106-46-7	p-Dichlorobenzene	20	19.2	96	19.5	98	2	78-118/10
156-60-5	trans-1,2-Dichloroethylene	20	17.1	86	17.8	89	4	71-118/10
10061-02-6	trans-1,3-Dichloropropene	20	17.8	89	17.8	89	0	73-122/10
100-41-4	Ethylbenzene	20	20.2	101	21.0	105	4	78-121/10
591-78-6	2-Hexanone	80	89.1	111	88.2	110	1	71-139/10
87-68-3	Hexachlorobutadiene	20	19.0	95	18.3	92	4	69-127/11

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2248-BS	W59738.D	1	01/22/16	CV	n/a	n/a	VW2248
VW2248-BSD	W59741.D	1	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.6	103	21.3	107	3	77-125/10
99-87-6	p-Isopropyltoluene	20	18.5	93	19.2	96	4	76-125/10
74-83-9	Methyl bromide	20	19.7	99	19.7	99	0	66-123/10
74-87-3	Methyl chloride	20	16.9	85	17.7	89	5	50-138/19
74-95-3	Methylene bromide	20	19.6	98	20.0	100	2	77-125/10
75-09-2	Methylene chloride	20	17.3	87	17.5	88	1	65-124/14
91-20-3	Naphthalene	20	21.6	108	19.1	96	12	68-122/12
103-65-1	n-Propylbenzene	20	19.7	99	20.7	104	5	76-123/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.7	104	20.7	104	0	79-123/10
71-55-6	1,1,1-Trichloroethane	20	19.2	96	20.7	104	8	73-124/10
79-34-5	1,1,2,2-Tetrachloroethane	20	20.5	103	20.4	102	0	77-123/10
79-00-5	1,1,2-Trichloroethane	20	19.5	98	19.6	98	1	77-120/10
87-61-6	1,2,3-Trichlorobenzene	20	21.1	106	18.9	95	11	70-126/11
96-18-4	1,2,3-Trichloropropane	20	19.6	98	19.0	95	3	65-125/10
120-82-1	1,2,4-Trichlorobenzene	20	20.9	105	19.9	100	5	72-123/10
95-63-6	1,2,4-Trimethylbenzene	20	20.5	103	21.1	106	3	77-122/10
108-67-8	1,3,5-Trimethylbenzene	20	20.8	104	21.6	108	4	79-127/10
127-18-4	Tetrachloroethylene	20	19.2	96	20.2	101	5	71-124/10
108-88-3	Toluene	20	19.3	97	19.8	99	3	78-120/10
79-01-6	Trichloroethylene	20	18.7	94	19.7	99	5	75-119/10
75-69-4	Trichlorofluoromethane	20	19.2	96	19.9	100	4	67-129/14
75-01-4	Vinyl chloride	20	20.9	105	21.6	108	3	60-133/15
1330-20-7	Xylene (total)	60	61.6	103	63.5	106	3	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	101%	100%	78-125%
2037-26-5	Toluene-D8	103%	102%	86-114%
460-00-4	4-Bromofluorobenzene	104%	102%	80-113%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2248-LCS	W59742.D	1	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	97%	78-125%
2037-26-5	Toluene-D8	103%	86-114%
460-00-4	4-Bromofluorobenzene	99%	80-113%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43749-22MS	W59758.D	10	01/22/16	CV	n/a	n/a	VW2248
C43749-22MSD	W59786.D	10	01/25/16	CV	n/a	n/a	VW2248
C43749-22 [a]	W59752.D	10	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	C43749-22 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	79.6		200	265	93	200	250	85	6	77-118/10
108-86-1	Bromobenzene	ND		200	203	102	200	194	97	5	78-122/10
74-97-5	Bromochloromethane	ND		200	202	101	200	195	98	4	76-124/10
75-27-4	Bromodichloromethane	ND		200	195	98	200	189	95	3	74-121/10
75-25-2	Bromoform	ND		200	161	81	200	158	79	2	58-133/10
104-51-8	n-Butylbenzene	ND		200	218	109	200	205	103	6	75-125/10
135-98-8	sec-Butylbenzene	ND		200	218	109	200	208	104	5	76-127/10
98-06-6	tert-Butylbenzene	ND		200	188	94	200	181	91	4	76-124/10
108-90-7	Chlorobenzene	ND		200	198	99	200	188	94	5	77-120/10
75-00-3	Chloroethane	ND		200	177	89	200	161	81	9	63-117/10
67-66-3	Chloroform	ND		200	191	96	200	179	90	6	74-123/10
95-49-8	o-Chlorotoluene	ND		200	198	99	200	193	97	3	76-125/10
106-43-4	p-Chlorotoluene	ND		200	195	98	200	194	97	1	76-123/10
75-15-0	Carbon disulfide	ND		200	186	93	200	179	90	4	57-126/11
56-23-5	Carbon tetrachloride	ND		200	209	105	200	206	103	1	72-128/11
75-34-3	1,1-Dichloroethane	ND		200	197	99	200	181	91	8	70-120/10
75-35-4	1,1-Dichloroethylene	ND		200	197	99	200	190	95	4	65-120/11
563-58-6	1,1-Dichloropropene	ND		200	197	99	200	189	95	4	69-125/10
96-12-8	1,2-Dibromo-3-chloropropane	ND		200	176	88	200	171	86	3	63-128/10
106-93-4	1,2-Dibromoethane	ND		200	204	102	200	197	99	3	78-123/10
107-06-2	1,2-Dichloroethane	ND		200	191	96	200	177	89	8	72-123/10
78-87-5	1,2-Dichloropropane	ND		200	195	98	200	187	94	4	76-119/10
142-28-9	1,3-Dichloropropane	ND		200	205	103	200	195	98	5	78-122/10
594-20-7	2,2-Dichloropropane	ND		200	188	94	200	188	94	0	68-129/10
124-48-1	Dibromochloromethane	ND		200	168	84	200	163	82	3	75-124/10
75-71-8	Dichlorodifluoromethane	ND		200	178	89	200	137	69	26* [b]	37-149/21
156-59-2	cis-1,2-Dichloroethylene	ND		200	209	105	200	199	100	5	74-121/10
10061-01-5	cis-1,3-Dichloropropene	ND		200	206	103	200	203	102	1	76-125/10
541-73-1	m-Dichlorobenzene	ND		200	197	99	200	190	95	4	77-121/10
95-50-1	o-Dichlorobenzene	ND		200	196	98	200	188	94	4	77-120/10
106-46-7	p-Dichlorobenzene	ND		200	193	97	200	185	93	4	78-118/10
156-60-5	trans-1,2-Dichloroethylene	ND		200	184	92	200	179	90	3	71-118/10
10061-02-6	trans-1,3-Dichloropropene	ND		200	176	88	200	169	85	4	73-122/10
100-41-4	Ethylbenzene	3.1	J	200	215	106	200	206	101	4	78-121/10
591-78-6	2-Hexanone	ND		800	906	113	800	823	103	10	71-139/10
87-68-3	Hexachlorobutadiene	ND		200	188	94	200	180	90	4	69-127/11

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43742
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43749-22MS	W59758.D	10	01/22/16	CV	n/a	n/a	VW2248
C43749-22MSD	W59786.D	10	01/25/16	CV	n/a	n/a	VW2248
C43749-22 [a]	W59752.D	10	01/22/16	CV	n/a	n/a	VW2248

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43742-1, C43742-2, C43742-3

CAS No.	Compound	C43749-22 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		200	218	109	200	211	106	3	77-125/10
99-87-6	p-Isopropyltoluene	ND		200	191	96	200	183	92	4	76-125/10
74-83-9	Methyl bromide	ND		200	196	98	200	184	92	6	66-123/10
74-87-3	Methyl chloride	ND		200	178	89	200	155	78	14	50-138/19
74-95-3	Methylene bromide	ND		200	198	99	200	191	96	4	77-125/10
75-09-2	Methylene chloride	ND		200	179	90	200	169	85	6	65-124/14
91-20-3	Naphthalene	ND		200	221	111	200	200	100	10	68-122/12
103-65-1	n-Propylbenzene	3.5	J	200	210	103	200	199	98	5	76-123/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		200	209	105	200	202	101	3	79-123/10
71-55-6	1,1,1-Trichloroethane	ND		200	212	106	200	205	103	3	73-124/10
79-34-5	1,1,2,2-Tetrachloroethane	ND		200	205	103	200	194	97	6	77-123/10
79-00-5	1,1,2-Trichloroethane	ND		200	197	99	200	189	95	4	77-120/10
87-61-6	1,2,3-Trichlorobenzene	ND		200	210	105	200	194	97	8	70-126/11
96-18-4	1,2,3-Trichloropropane	ND		200	189	95	200	183	92	3	65-125/10
120-82-1	1,2,4-Trichlorobenzene	ND		200	208	104	200	201	101	3	72-123/10
95-63-6	1,2,4-Trimethylbenzene	ND		200	210	105	200	199	100	5	77-122/10
108-67-8	1,3,5-Trimethylbenzene	ND		200	215	108	200	206	103	4	79-127/10
127-18-4	Tetrachloroethylene	ND		200	202	101	200	198	99	2	71-124/10
108-88-3	Toluene	ND		200	202	101	200	193	97	5	78-120/10
79-01-6	Trichloroethylene	ND		200	196	98	200	195	98	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		200	195	98	200	170	85	14	67-129/14
75-01-4	Vinyl chloride	ND		200	202	101	200	143	72	34* [b]	60-133/15
1330-20-7	Xylene (total)	ND		600	641	107	600	618	103	4	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C43749-22	Limits
1868-53-7	Dibromofluoromethane	104%	100%		78-125%
2037-26-5	Toluene-D8	103%	101%		86-114%
460-00-4	4-Bromofluorobenzene	104%	104%		80-113%

(a) Sample used for QC purposes only.
(b) RPD exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria. AZ:R5

* = Outside of Control Limits.

Northern California
ACCUTEST
LABORATORIES

02/01/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

Accutest Job Number: C43797

Sampling Date: 01/22/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **35**

NELAP ACCREDITED TNI LABORATORY

James J. Rhudy
Lab Director

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Sample Summary

AMEC Foster Wheeler

Job No: C43797

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43797-1	01/22/16	10:50	KK	01/23/16	SO	Soil	BP-26-300-SO
C43797-2	01/22/16	11:25	KK	01/23/16	SO	Soil	BP-26-320-SO
C43797-3	01/22/16	13:00	KK	01/23/16	SO	Soil	BP-26-340-SO

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43797
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	2/1/2016 9:46:56 AM

3 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/22/2016 and were received at Accutest on 01/23/2016 properly preserved, at 2.4 Deg. C and intact. These Samples received an Accutest job number of C43797. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: SO **Batch ID:** VM1752

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43844-9MS, C43844-9MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Carbon disulfide are outside control limits. Outside control limits due to matrix interference. Confirmed by reanalysis.
- Matrix Spike Duplicate Recovery(s) for 1,1-Dichloroethylene, Carbon disulfide are outside control limits. Probable cause due to matrix interference.

Metals By Method SW846 6010B

Matrix: SO **Batch ID:** MP10744

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43797-1MS, C43797-1MSD, C43797-1SDL were used as the QC samples for metals.
- Matrix Spike Recovery(s) for Iron, Manganese are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- RPD(s) for Serial Dilution for Arsenic, Cadmium, Selenium are outside control limits for sample MP10744-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7471A

Matrix: SO **Batch ID:** MP10758

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43797-1MS, C43797-1MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43797
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 01/22/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43797-1	**BP-26-300-SO**					
Barium		63.1	18		mg/kg	SW846 6010B
Chromium		3.0	0.92		mg/kg	SW846 6010B
Iron		6050	18		mg/kg	SW846 6010B
Lead		5.0	1.8		mg/kg	SW846 6010B
Manganese		218	1.4		mg/kg	SW846 6010B
C43797-2	**BP-26-320-SO**					
No hits reported in this sample.						
C43797-3	**BP-26-340-SO**					
Barium		36.9	19		mg/kg	SW846 6010B
Chromium		3.4	0.95		mg/kg	SW846 6010B
Iron		5630	19		mg/kg	SW846 6010B
Lead		2.7	1.9		mg/kg	SW846 6010B
Manganese		148	1.4		mg/kg	SW846 6010B

Northern California ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-26-300-SO		
Lab Sample ID:	C43797-1	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58370.D	1	01/27/16	XB	n/a	n/a	VM1752
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.64 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.22	0.022	mg/kg	
108-86-1	Bromobenzene	ND	0.22	0.022	mg/kg	
74-97-5	Bromochloromethane	ND	0.22	0.022	mg/kg	
75-27-4	Bromodichloromethane	ND	0.22	0.022	mg/kg	
75-25-2	Bromoform	ND	0.22	0.022	mg/kg	
104-51-8	n-Butylbenzene	ND	0.22	0.022	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.22	0.022	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.22	0.022	mg/kg	
108-90-7	Chlorobenzene	ND	0.22	0.022	mg/kg	
75-00-3	Chloroethane	ND	0.22	0.044	mg/kg	
67-66-3	Chloroform	ND	0.22	0.022	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.22	0.022	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.22	0.022	mg/kg	
75-15-0	Carbon disulfide	ND	0.22	0.022	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.22	0.022	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.22	0.022	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.22	0.022	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.22	0.022	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.22	0.062	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.22	0.022	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.22	0.022	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.22	0.022	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.22	0.022	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.22	0.022	mg/kg	
124-48-1	Dibromochloromethane	ND	0.22	0.022	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.22	0.044	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.22	0.049	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.22	0.022	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.22	0.022	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.22	0.022	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.22	0.022	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.22	0.022	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-300-SO		
Lab Sample ID:	C43797-1	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.22	0.022	mg/kg	
100-41-4	Ethylbenzene	ND	0.22	0.022	mg/kg	
591-78-6	2-Hexanone	ND	0.89	0.089	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.22	0.044	mg/kg	
98-82-8	Isopropylbenzene	ND	0.22	0.022	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.22	0.022	mg/kg	
74-83-9	Methyl bromide	ND	0.22	0.044	mg/kg	
74-87-3	Methyl chloride	ND	0.22	0.044	mg/kg	
74-95-3	Methylene bromide	ND	0.22	0.022	mg/kg	
75-09-2	Methylene chloride	ND	0.89	0.22	mg/kg	
91-20-3	Naphthalene	ND	0.22	0.044	mg/kg	
103-65-1	n-Propylbenzene	ND	0.22	0.022	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.22	0.022	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.22	0.022	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.22	0.022	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.22	0.022	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.22	0.022	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.22	0.044	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.22	0.022	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.22	0.044	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.22	0.044	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.22	0.027	mg/kg	
108-88-3	Toluene	ND	0.22	0.022	mg/kg	
79-01-6	Trichloroethylene	ND	0.22	0.022	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.22	0.044	mg/kg	
75-01-4	Vinyl chloride	ND	0.22	0.044	mg/kg	
1330-20-7	Xylene (total)	ND	0.44	0.044	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		70-130%
2037-26-5	Toluene-D8	99%		70-130%
460-00-4	4-Bromofluorobenzene	87%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-300-SO		
Lab Sample ID:	C43797-1	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.8	1.8	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	63.1	18	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.92	0.92	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	3.0	0.92	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	6050	18	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	5.0	1.8	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	218	1.4	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.016	0.016	mg/kg	1	01/27/16	01/27/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.8	1.8	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.92	0.92	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5559
(2) Instrument QC Batch: MA5565
(3) Prep QC Batch: MP10744
(4) Prep QC Batch: MP10758

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-320-SO		
Lab Sample ID:	C43797-2	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58371.D	1	01/27/16	XB	n/a	n/a	VM1752
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.45 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.23	0.023	mg/kg	
108-86-1	Bromobenzene	ND	0.23	0.023	mg/kg	
74-97-5	Bromochloromethane	ND	0.23	0.023	mg/kg	
75-27-4	Bromodichloromethane	ND	0.23	0.023	mg/kg	
75-25-2	Bromoform	ND	0.23	0.023	mg/kg	
104-51-8	n-Butylbenzene	ND	0.23	0.023	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.23	0.023	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.23	0.023	mg/kg	
108-90-7	Chlorobenzene	ND	0.23	0.023	mg/kg	
75-00-3	Chloroethane	ND	0.23	0.046	mg/kg	
67-66-3	Chloroform	ND	0.23	0.023	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.23	0.023	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.23	0.023	mg/kg	
75-15-0	Carbon disulfide	ND	0.23	0.023	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.23	0.023	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.23	0.023	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.23	0.023	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.23	0.023	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.23	0.064	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.23	0.023	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.23	0.023	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.23	0.023	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.23	0.023	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.23	0.023	mg/kg	
124-48-1	Dibromochloromethane	ND	0.23	0.023	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.23	0.046	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.23	0.050	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.23	0.023	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.23	0.023	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.23	0.023	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.23	0.023	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-SO		
Lab Sample ID:	C43797-2	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
100-41-4	Ethylbenzene	ND	0.23	0.023	mg/kg	
591-78-6	2-Hexanone	ND	0.92	0.092	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.23	0.046	mg/kg	
98-82-8	Isopropylbenzene	ND	0.23	0.023	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.23	0.023	mg/kg	
74-83-9	Methyl bromide	ND	0.23	0.046	mg/kg	
74-87-3	Methyl chloride	ND	0.23	0.046	mg/kg	
74-95-3	Methylene bromide	ND	0.23	0.023	mg/kg	
75-09-2	Methylene chloride	ND	0.92	0.23	mg/kg	
91-20-3	Naphthalene	ND	0.23	0.046	mg/kg	
103-65-1	n-Propylbenzene	ND	0.23	0.023	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.23	0.023	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.23	0.023	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.23	0.023	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.23	0.046	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.23	0.023	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.23	0.046	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.23	0.046	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.23	0.028	mg/kg	
108-88-3	Toluene	ND	0.23	0.023	mg/kg	
79-01-6	Trichloroethylene	ND	0.23	0.023	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.23	0.046	mg/kg	
75-01-4	Vinyl chloride	ND	0.23	0.046	mg/kg	
1330-20-7	Xylene (total)	ND	0.46	0.046	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		70-130%
2037-26-5	Toluene-D8	98%		70-130%
460-00-4	4-Bromofluorobenzene	86%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-340-SO		
Lab Sample ID:	C43797-3	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58372.D	1	01/27/16	XB	n/a	n/a	VM1752
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.19 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.20	0.020	mg/kg	
108-86-1	Bromobenzene	ND	0.20	0.020	mg/kg	
74-97-5	Bromochloromethane	ND	0.20	0.020	mg/kg	
75-27-4	Bromodichloromethane	ND	0.20	0.020	mg/kg	
75-25-2	Bromoform	ND	0.20	0.020	mg/kg	
104-51-8	n-Butylbenzene	ND	0.20	0.020	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.20	0.020	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.20	0.020	mg/kg	
108-90-7	Chlorobenzene	ND	0.20	0.020	mg/kg	
75-00-3	Chloroethane	ND	0.20	0.040	mg/kg	
67-66-3	Chloroform	ND	0.20	0.020	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.20	0.020	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.20	0.020	mg/kg	
75-15-0	Carbon disulfide	ND	0.20	0.020	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.20	0.020	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.20	0.020	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.20	0.020	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.20	0.020	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.20	0.057	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.20	0.020	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.20	0.020	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.20	0.020	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.20	0.020	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.20	0.020	mg/kg	
124-48-1	Dibromochloromethane	ND	0.20	0.020	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.20	0.040	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.044	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.20	0.020	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.20	0.020	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.20	0.020	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.020	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-340-SO		
Lab Sample ID:	C43797-3	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
100-41-4	Ethylbenzene	ND	0.20	0.020	mg/kg	
591-78-6	2-Hexanone	ND	0.81	0.081	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.20	0.040	mg/kg	
98-82-8	Isopropylbenzene	ND	0.20	0.020	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.20	0.020	mg/kg	
74-83-9	Methyl bromide	ND	0.20	0.040	mg/kg	
74-87-3	Methyl chloride	ND	0.20	0.040	mg/kg	
74-95-3	Methylene bromide	ND	0.20	0.020	mg/kg	
75-09-2	Methylene chloride	ND	0.81	0.20	mg/kg	
91-20-3	Naphthalene	ND	0.20	0.040	mg/kg	
103-65-1	n-Propylbenzene	ND	0.20	0.020	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.020	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.020	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.20	0.020	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.20	0.040	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.020	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.040	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.040	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.20	0.024	mg/kg	
108-88-3	Toluene	ND	0.20	0.020	mg/kg	
79-01-6	Trichloroethylene	ND	0.20	0.020	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.20	0.040	mg/kg	
75-01-4	Vinyl chloride	ND	0.20	0.040	mg/kg	
1330-20-7	Xylene (total)	ND	0.40	0.040	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		70-130%
2037-26-5	Toluene-D8	101%		70-130%
460-00-4	4-Bromofluorobenzene	88%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-340-SO		
Lab Sample ID:	C43797-3	**Date Sampled:**	01/22/16
Matrix:	SO - Soil	**Date Received:**	01/23/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.9	1.9	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	36.9	19	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.95	0.95	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	3.4	0.95	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	5630	19	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	2.7	1.9	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	148	1.4	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	< 0.015	0.015	mg/kg	1	01/27/16	01/27/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.9	1.9	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.95	0.95	mg/kg	1	01/25/16	01/25/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5559
(2) Instrument QC Batch: MA5565
(3) Prep QC Batch: MP10744
(4) Prep QC Batch: MP10758

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Northern California ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7034 0103 2791
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C43797

Client / Reporting Information

Company Name: AmecFW
Address: 4600 E Washington St.
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: BP ISCO STUDY
Street: Broadway & Pantano
City: Tucson State: AZ
Project #: 1420152042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #

Requested Analysis

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260B	Total RCRA 8 metals Iron & Manganese	LAB USE ONLY
1	BP-26-300-SO	1/22/16	1050	KK	SO	3	X				X				2	1	
2	BP-26-320-SO	↓	1125	↓	SO	2	X								2		
3	BP-26-340-SO	↓	1300	↓	SO	3	X				X				2	1	

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [x] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	1/22/16 1445	[signature]	[signature]	1/22/16 1530	Fedex
2						
3	FedEx	01/23/16 1130	[signature]			
4						
5						

Custody Seal # INTACT Appropriate Bottle / Pres. Y / N Headspace Y / N On Ice Y / N Cooler Temp. 3.3/2.4 °C T1
Labels match Coc? Y / N Separate Receiving Check List used: Y / N

5.1 5

C43797: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43797 **Client:** AMECFW **Project:** BP ISCO STUDY

Date / Time Received: 1/23/2016 11:30:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401032791

Cooler Temps (Initial/Adjusted): #1: (3.3/2.4);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR3;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

Accutest Laboratories
V:408.588.0200

2105 Lundy Avenue
F: 408.588.0201

San Jose, CA 95131
www/accutest.com

C43797: Chain of Custody
Page 2 of 2

Northern California ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-MB	M58357.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	0.50	ug/kg	
108-86-1	Bromobenzene	ND	5.0	0.50	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.50	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	0.50	ug/kg	
75-25-2	Bromoform	ND	5.0	0.50	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.50	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	0.50	ug/kg	
75-00-3	Chloroethane	ND	5.0	1.0	ug/kg	
67-66-3	Chloroform	ND	5.0	0.50	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/kg	
106-43-4	p-Chlorotoluene	ND	5.0	0.50	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	0.50	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	0.50	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	0.50	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	0.50	ug/kg	
563-58-6	1,1-Dichloropropene	ND	5.0	0.50	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	0.50	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	0.50	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	0.50	ug/kg	
142-28-9	1,3-Dichloropropane	ND	5.0	0.50	ug/kg	
594-20-7	2,2-Dichloropropane	ND	5.0	0.50	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	0.50	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	0.50	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	0.50	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	0.50	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	0.50	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	0.50	ug/kg	
591-78-6	2-Hexanone	ND	20	2.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-MB	M58357.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	5.0	0.50	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	1.0	ug/kg	
74-95-3	Methylene bromide	ND	5.0	0.50	ug/kg	
75-09-2	Methylene chloride	ND	20	5.0	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.0	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.50	ug/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	0.50	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/kg	
96-18-4	1,2,3-Trichloropropane	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	1.0	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	0.60	ug/kg	
108-88-3	Toluene	ND	5.0	0.50	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	0.50	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	10	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	70-130%
2037-26-5	Toluene-D8	98%	70-130%
460-00-4	4-Bromofluorobenzene	91%	70-130%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-BS	M58354.D	1	01/27/16	XB	n/a	n/a	VM1752
VM1752-BSD	M58355.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	40	37.6	94	36.4	91	3	70-130/30
108-86-1	Bromobenzene	40	41.3	103	38.1	95	8	70-130/30
74-97-5	Bromochloromethane	40	39.1	98	38.5	96	2	70-130/30
75-27-4	Bromodichloromethane	40	37.4	94	36.6	92	2	70-130/30
75-25-2	Bromoform	40	42.8	107	43.0	108	0	70-130/30
104-51-8	n-Butylbenzene	40	34.3	86	34.9	87	2	70-130/30
135-98-8	sec-Butylbenzene	40	37.1	93	36.3	91	2	70-130/30
98-06-6	tert-Butylbenzene	40	37.8	95	37.2	93	2	70-130/30
108-90-7	Chlorobenzene	40	38.6	97	37.3	93	3	70-130/30
75-00-3	Chloroethane	40	32.7	82	32.5	81	1	70-130/30
67-66-3	Chloroform	40	34.8	87	34.1	85	2	70-130/30
95-49-8	o-Chlorotoluene	40	36.2	91	34.9	87	4	70-130/30
106-43-4	p-Chlorotoluene	40	37.4	94	34.2	86	9	70-130/30
75-15-0	Carbon disulfide	40	30.7	77	29.8	75	3	70-130/30
56-23-5	Carbon tetrachloride	40	36.2	91	34.9	87	4	70-130/30
75-34-3	1,1-Dichloroethane	40	34.2	86	33.3	83	3	70-130/30
75-35-4	1,1-Dichloroethylene	40	35.1	88	34.5	86	2	70-130/30
563-58-6	1,1-Dichloropropene	40	35.7	89	34.0	85	5	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	40	34.4	86	37.3	93	8	70-130/30
106-93-4	1,2-Dibromoethane	40	40.9	102	39.6	99	3	70-130/30
107-06-2	1,2-Dichloroethane	40	34.8	87	34.3	86	1	70-130/30
78-87-5	1,2-Dichloropropane	40	37.2	93	36.3	91	2	70-130/30
142-28-9	1,3-Dichloropropane	40	39.9	100	38.8	97	3	70-130/30
594-20-7	2,2-Dichloropropane	40	32.6	82	32.5	81	0	70-130/30
124-48-1	Dibromochloromethane	40	41.2	103	39.7	99	4	70-130/30
75-71-8	Dichlorodifluoromethane	40	32.2	81	32.1	80	0	70-130/30
156-59-2	cis-1,2-Dichloroethylene	40	36.5	91	35.9	90	2	70-130/30
10061-01-5	cis-1,3-Dichloropropene	40	38.1	95	36.9	92	3	70-130/30
541-73-1	m-Dichlorobenzene	40	38.1	95	37.2	93	2	70-130/30
95-50-1	o-Dichlorobenzene	40	38.3	96	38.1	95	1	70-130/30
106-46-7	p-Dichlorobenzene	40	38.2	96	37.0	93	3	70-130/30
156-60-5	trans-1,2-Dichloroethylene	40	35.8	90	34.5	86	4	70-130/30
10061-02-6	trans-1,3-Dichloropropene	40	39.1	98	37.2	93	5	70-130/30
100-41-4	Ethylbenzene	40	37.2	93	36.1	90	3	70-130/30
591-78-6	2-Hexanone	160	172	108	165	103	4	60-140/30
87-68-3	Hexachlorobutadiene	40	35.4	89	38.7	97	9	70-130/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-BS	M58354.D	1	01/27/16	XB	n/a	n/a	VM1752
VM1752-BSD	M58355.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	40	36.9	92	37.2	93	1	70-130/30
99-87-6	p-Isopropyltoluene	40	36.8	92	36.6	92	1	70-130/30
74-83-9	Methyl bromide	40	37.8	95	37.6	94	1	70-130/30
74-87-3	Methyl chloride	40	32.2	81	31.5	79	2	70-130/30
74-95-3	Methylene bromide	40	38.9	97	38.2	96	2	70-130/30
75-09-2	Methylene chloride	40	36.0	90	35.5	89	1	70-130/30
91-20-3	Naphthalene	40	37.4	94	42.7	107	13	70-130/30
103-65-1	n-Propylbenzene	40	36.9	92	34.7	87	6	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	40	37.8	95	38.0	95	1	70-130/30
71-55-6	1,1,1-Trichloroethane	40	34.5	86	33.9	85	2	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	40	40.4	101	39.4	99	3	70-130/30
79-00-5	1,1,2-Trichloroethane	40	41.1	103	39.9	100	3	70-130/30
87-61-6	1,2,3-Trichlorobenzene	40	35.7	89	40.7	102	13	70-130/30
96-18-4	1,2,3-Trichloropropane	40	39.2	98	39.1	98	0	70-130/30
120-82-1	1,2,4-Trichlorobenzene	40	34.6	87	39.8	100	14	70-130/30
95-63-6	1,2,4-Trimethylbenzene	40	36.5	91	35.3	88	3	70-130/30
108-67-8	1,3,5-Trimethylbenzene	40	36.6	92	35.2	88	4	70-130/30
127-18-4	Tetrachloroethylene	40	42.4	106	42.8	107	1	70-130/30
108-88-3	Toluene	40	38.4	96	36.3	91	6	70-130/30
79-01-6	Trichloroethylene	40	39.8	100	38.1	95	4	70-130/30
75-69-4	Trichlorofluoromethane	40	35.4	89	35.1	88	1	70-130/30
75-01-4	Vinyl chloride	40	32.4	81	31.3	78	3	70-130/30
1330-20-7	Xylene (total)	120	112	93	110	92	2	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	93%	95%	70-130%
2037-26-5	Toluene-D8	97%	97%	70-130%
460-00-4	4-Bromofluorobenzene	92%	91%	70-130%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-LCS	M58356.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	Spike ug/kg	LCS ug/kg	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	96%	70-130%
2037-26-5	Toluene-D8	97%	70-130%
460-00-4	4-Bromofluorobenzene	92%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43844-9MS	M58374.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9MSD	M58375.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9	M58366.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	C43844-9 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		39.6	34.6	87	39.8	33.9	85	2	70-130/30
108-86-1	Bromobenzene	ND		39.6	35.0	88	39.8	34.8	88	1	70-130/30
74-97-5	Bromochloromethane	ND		39.6	36.0	91	39.8	35.7	90	1	70-130/30
75-27-4	Bromodichloromethane	ND		39.6	35.1	89	39.8	34.8	88	1	70-130/30
75-25-2	Bromoform	ND		39.6	40.0	101	39.8	38.9	98	3	70-130/30
104-51-8	n-Butylbenzene	ND		39.6	31.9	81	39.8	31.6	79	1	70-130/30
135-98-8	sec-Butylbenzene	ND		39.6	33.3	84	39.8	33.3	84	0	70-130/30
98-06-6	tert-Butylbenzene	ND		39.6	33.3	84	39.8	33.6	85	1	70-130/30
108-90-7	Chlorobenzene	ND		39.6	34.6	87	39.8	33.7	85	3	70-130/30
75-00-3	Chloroethane	ND		39.6	35.5	90	39.8	35.9	90	1	70-130/30
67-66-3	Chloroform	0.79	J	39.6	36.2	89	39.8	35.5	87	2	70-130/30
95-49-8	o-Chlorotoluene	ND		39.6	33.8	85	39.8	33.5	84	1	70-130/30
106-43-4	p-Chlorotoluene	ND		39.6	31.7	80	39.8	32.5	82	2	70-130/30
75-15-0	Carbon disulfide	ND		39.6	24.7	62* [a]	39.8	24.0	60* [a]	3	70-130/30
56-23-5	Carbon tetrachloride	ND		39.6	33.9	86	39.8	33.8	85	0	70-130/30
75-34-3	1,1-Dichloroethane	ND		39.6	32.9	83	39.8	32.0	80	3	70-130/30
75-35-4	1,1-Dichloroethylene	ND		39.6	28.1	71	39.8	27.6	69* [a]	2	70-130/30
563-58-6	1,1-Dichloropropene	ND		39.6	29.2	74	39.8	28.7	72	2	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	ND		39.6	37.2	94	39.8	35.6	90	4	70-130/30
106-93-4	1,2-Dibromoethane	ND		39.6	37.6	95	39.8	36.1	91	4	70-130/30
107-06-2	1,2-Dichloroethane	ND		39.6	35.6	90	39.8	34.7	87	3	70-130/30
78-87-5	1,2-Dichloropropane	ND		39.6	36.4	92	39.8	35.0	88	4	70-130/30
142-28-9	1,3-Dichloropropane	ND		39.6	39.8	100	39.8	38.0	96	5	70-130/30
594-20-7	2,2-Dichloropropane	ND		39.6	32.2	81	39.8	29.9	75	7	70-130/30
124-48-1	Dibromochloromethane	ND		39.6	36.7	93	39.8	36.2	91	1	70-130/30
75-71-8	Dichlorodifluoromethane	ND		39.6	37.2	94	39.8	38.8	98	4	70-130/30
156-59-2	cis-1,2-Dichloroethylene	ND		39.6	36.0	91	39.8	35.1	88	3	70-130/30
10061-01-5	cis-1,3-Dichloropropene	ND		39.6	36.4	92	39.8	35.5	89	3	70-130/30
541-73-1	m-Dichlorobenzene	ND		39.6	32.6	82	39.8	32.7	82	0	70-130/30
95-50-1	o-Dichlorobenzene	ND		39.6	34.6	87	39.8	34.2	86	1	70-130/30
106-46-7	p-Dichlorobenzene	ND		39.6	32.8	83	39.8	33.0	83	1	70-130/30
156-60-5	trans-1,2-Dichloroethylene	ND		39.6	28.9	73	39.8	28.2	71	2	70-130/30
10061-02-6	trans-1,3-Dichloropropene	ND		39.6	35.3	89	39.8	34.3	86	3	70-130/30
100-41-4	Ethylbenzene	ND		39.6	34.6	87	39.8	33.9	85	2	70-130/30
591-78-6	2-Hexanone	ND		158	180	114	159	170	107	6	60-140/30
87-68-3	Hexachlorobutadiene	ND		39.6	32.2	81	39.8	32.5	82	1	70-130/30

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43797
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43844-9MS	M58374.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9MSD	M58375.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9	M58366.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43797-1, C43797-2, C43797-3

CAS No.	Compound	C43844-9 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		39.6	34.9	88	39.8	33.9	85	3	70-130/30
99-87-6	p-Isopropyltoluene	ND		39.6	32.8	83	39.8	32.6	82	1	70-130/30
74-83-9	Methyl bromide	ND		39.6	39.7	100	39.8	40.1	101	1	70-130/30
74-87-3	Methyl chloride	ND		39.6	41.3	104	39.8	41.7	105	1	70-130/30
74-95-3	Methylene bromide	ND		39.6	37.8	95	39.8	37.4	94	1	70-130/30
75-09-2	Methylene chloride	ND		39.6	33.6	85	39.8	32.4	81	4	70-130/30
91-20-3	Naphthalene	ND		39.6	34.8	88	39.8	34.6	87	1	70-130/30
103-65-1	n-Propylbenzene	ND		39.6	32.0	81	39.8	31.6	79	1	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	ND		39.6	35.7	90	39.8	35.2	89	1	70-130/30
71-55-6	1,1,1-Trichloroethane	ND		39.6	34.5	87	39.8	33.2	83	4	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		39.6	39.3	99	39.8	39.2	99	0	70-130/30
79-00-5	1,1,2-Trichloroethane	ND		39.6	40.0	101	39.8	38.4	97	4	70-130/30
87-61-6	1,2,3-Trichlorobenzene	ND		39.6	33.1	84	39.8	33.2	83	0	70-130/30
96-18-4	1,2,3-Trichloropropane	ND		39.6	38.8	98	39.8	37.9	95	2	70-130/30
120-82-1	1,2,4-Trichlorobenzene	ND		39.6	31.4	79	39.8	30.9	78	2	70-130/30
95-63-6	1,2,4-Trimethylbenzene	ND		39.6	32.4	82	39.8	32.7	82	1	70-130/30
108-67-8	1,3,5-Trimethylbenzene	ND		39.6	33.6	85	39.8	33.1	83	1	70-130/30
127-18-4	Tetrachloroethylene	ND		39.6	39.8	100	39.8	39.5	99	1	70-130/30
108-88-3	Toluene	ND		39.6	34.7	88	39.8	33.8	85	3	70-130/30
79-01-6	Trichloroethylene	ND		39.6	33.5	85	39.8	33.4	84	0	70-130/30
75-69-4	Trichlorofluoromethane	ND		39.6	39.2	99	39.8	39.9	100	2	70-130/30
75-01-4	Vinyl chloride	ND		39.6	48.7	123	39.8	50.4	127	3	70-130/30
1330-20-7	Xylene (total)	ND		119	102	86	119	99.7	84	2	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	C43844-9	Limits
1868-53-7	Dibromofluoromethane	106%	104%	112%	70-130%
2037-26-5	Toluene-D8	99%	100%	98%	70-130%
460-00-4	4-Bromofluorobenzene	97%	97%	88%	70-130%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.

* = Outside of Control Limits.

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Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10744
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/25/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17	-0.13	<2.0
Barium	20	.02	.09	0.27	<20
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031	0.020	<1.0
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054	0.040	<1.0
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76	2.9	<20
Lead	2.0	.1	.14	0.040	<2.0
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026	0.12	<1.5
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33	0.36	<2.0
Silicon	20	.24	.43		
Silver	1.0	.05	.067	0.060	<1.0
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10744: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10744
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/25/16

Metal	C43797-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	1.1	44.9	46.7	93.7	75-125
Barium	63.1	107	46.7	93.9	75-125
Beryllium	anr				
Boron					
Cadmium	0.092	44.6	46.7	95.2	75-125
Calcium					
Chromium	3.0	50.0	46.7	100.6	75-125
Cobalt	anr				
Copper	anr				
Iron	6050	7800	1170	149.8(a)	75-125
Lead	5.0	48.1	46.7	92.2	75-125
Magnesium					
Manganese	218	221	46.7	6.4 (a)	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	0.54	43.2	46.7	91.3	75-125
Silicon					
Silver	0.0	41.5	46.7	88.8	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10744: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10744
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/25/16

Metal	C43797-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	1.1	43.3	45.5	92.8	3.6	20
Barium	63.1	103	45.5	87.8	3.8	20
Beryllium	anr					
Boron						
Cadmium	0.092	43.3	45.5	95.1	3.0	20
Calcium						
Chromium	3.0	48.2	45.5	99.4	3.7	20
Cobalt	anr					
Copper	anr					
Iron	6050	7470	1140	125.0	4.3	20
Lead	5.0	47.3	45.5	93.1	1.7	20
Magnesium						
Manganese	218	228	45.5	22.0 (a)	3.1	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	0.54	42.1	45.5	91.4	2.6	20
Silicon						
Silver	0.0	39.8	45.5	87.6	4.2	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10744: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10744
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/25/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	47.8	50	95.6	80-120
Barium	50.7	50	101.4	80-120
Beryllium	anr			
Boron				
Cadmium	48.5	50	97.0	80-120
Calcium				
Chromium	50.4	50	100.8	80-120
Cobalt	anr			
Copper	anr			
Iron	1270	1250	101.6	80-120
Lead	46.7	50	93.4	80-120
Magnesium				
Manganese	50.4	50	100.8	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	47.8	50	95.6	80-120
Silicon				
Silver	45.4	50	90.8	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10744: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10744
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 01/25/16

Metal	C43797-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	11.8	0.00	100.0(a)	0-10
Barium	688	700	1.8	0-10
Beryllium	anr			
Boron				
Cadmium	1.00	1.80	80.0 (a)	0-10
Calcium				
Chromium	32.5	35.1	8.0	0-10
Cobalt	anr			
Copper	anr			
Iron	65900	68400	3.7	0-10
Lead	54.4	56.6	4.0	0-10
Magnesium				
Manganese	2380	2500	4.9	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	5.90	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	2.50	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10744: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.017	.00035	.0019	0.0058	<0.017

Associated samples MP10758: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	C43797-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0019	0.17	0.152	110.9	75-125

Associated samples MP10758: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 01/27/16

Metal	C43797-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0019	0.18	0.161	110.4	5.7	20

Associated samples MP10758: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43797
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP10758: C43797-1, C43797-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.3

7

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02/01/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

Accutest Job Number: C43816

Sampling Date: 01/25/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **41**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

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Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Sample Summary

AMEC Foster Wheeler

Job No: C43816

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43816-1	01/25/16	10:15	KK	01/26/16	AQ	Ground Water	BP-26-340-AQ
C43816-2	01/25/16	11:00	KK	01/26/16	SO	Soil	BP-26-350-SO

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43816
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	2/1/2016 2:28:23 PM

2 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/25/2016 and were received at Accutest on 01/26/2016 properly preserved, at 3 Deg. C and intact. These Samples received an Accutest job number of C43816. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VW2253

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43808-2MS, C43808-2MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Naphthalene are outside control limits. Probable cause due to matrix interference.
- Matrix Spike Duplicate Recovery(s) for Naphthalene are outside control limits. Probable cause due to matrix interference.
- C43816-1: Sample vial contained more than 0.5cm of sediment.
- VW2253-BSD for Vinyl chloride: Outside laboratory control limits; but within marginal exceedance criteria.

Matrix: SO **Batch ID:** VM1752

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43844-9MS, C43844-9MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Carbon disulfide are outside control limits. Outside control limits due to matrix interference. Confirmed by reanalysis.
- Matrix Spike Duplicate Recovery(s) for 1,1-Dichloroethylene, Carbon disulfide are outside control limits. Probable cause due to matrix interference.

Metals By Method SW846 6010B

Matrix: SO **Batch ID:** MP10763

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43844-3MS, C43844-3MSD, C43844-3SDL were used as the QC samples for metals.
- Matrix Spike Recovery(s) for Iron, Manganese are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- RPD(s) for Serial Dilution for Cadmium, Selenium are outside control limits for sample MP10763-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7471A

Matrix: SO	**Batch ID:** MP10758

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) C43797-1MS, C43797-1MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43816
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 01/25/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43816-1	**BP-26-340-AQ**					
Benzene [a]		0.32 J	1.0	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		7.7	0.50	0.20	ug/l	SW846 8260B
2-Hexanone [a]		4.1 J	10	2.0	ug/l	SW846 8260B
Tetrachloroethylene [b]		8.7	0.50	0.30	ug/l	SW846 8260B
Toluene [b]		1.2	1.0	0.20	ug/l	SW846 8260B
Trichloroethylene [b]		3.4	0.50	0.20	ug/l	SW846 8260B
C43816-2	**BP-26-350-SO**					
Barium		39.5	16		mg/kg	SW846 6010B
Chromium		2.6	0.81		mg/kg	SW846 6010B
Iron		4210	16		mg/kg	SW846 6010B
Lead		2.4	1.6		mg/kg	SW846 6010B
Manganese		127	1.2		mg/kg	SW846 6010B

(a) Sample vial contained more than 0.5cm of sediment. AZ:E4
(b) Sample vial contained more than 0.5cm of sediment.

Northern California ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-26-340-AQ		
Lab Sample ID:	C43816-1	**Date Sampled:**	01/25/16
Matrix:	AQ - Ground Water	**Date Received:**	01/26/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W59848.D	1	01/27/16	CV	n/a	n/a	VW2253
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.32	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	7.7	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-340-AQ		
Lab Sample ID:	C43816-1	**Date Sampled:**	01/25/16
Matrix:	AQ - Ground Water	**Date Received:**	01/26/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone [b]	4.1	10	2.0	ug/l	J
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	8.7	0.50	0.30	ug/l	
108-88-3	Toluene	1.2	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.4	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		78-125%
2037-26-5	Toluene-D8	103%		86-114%
460-00-4	4-Bromofluorobenzene	107%		80-113%

(a) Sample vial contained more than 0.5cm of sediment.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-350-SO		
Lab Sample ID:	C43816-2	**Date Sampled:**	01/25/16
Matrix:	SO - Soil	**Date Received:**	01/26/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58373.D	1	01/27/16	XB	n/a	n/a	VM1752
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	6.15 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.20	0.020	mg/kg	
108-86-1	Bromobenzene	ND	0.20	0.020	mg/kg	
74-97-5	Bromochloromethane	ND	0.20	0.020	mg/kg	
75-27-4	Bromodichloromethane	ND	0.20	0.020	mg/kg	
75-25-2	Bromoform	ND	0.20	0.020	mg/kg	
104-51-8	n-Butylbenzene	ND	0.20	0.020	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.20	0.020	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.20	0.020	mg/kg	
108-90-7	Chlorobenzene	ND	0.20	0.020	mg/kg	
75-00-3	Chloroethane	ND	0.20	0.041	mg/kg	
67-66-3	Chloroform	ND	0.20	0.020	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.20	0.020	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.20	0.020	mg/kg	
75-15-0	Carbon disulfide	ND	0.20	0.020	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.20	0.020	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.20	0.020	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.20	0.020	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.20	0.020	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.20	0.057	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.20	0.020	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.20	0.020	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.20	0.020	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.20	0.020	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.20	0.020	mg/kg	
124-48-1	Dibromochloromethane	ND	0.20	0.020	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.20	0.041	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.045	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.20	0.020	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.20	0.020	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.20	0.020	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.020	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-350-SO		
Lab Sample ID:	C43816-2	**Date Sampled:**	01/25/16
Matrix:	SO - Soil	**Date Received:**	01/26/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	mg/kg	
100-41-4	Ethylbenzene	ND	0.20	0.020	mg/kg	
591-78-6	2-Hexanone	ND	0.81	0.081	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.20	0.041	mg/kg	
98-82-8	Isopropylbenzene	ND	0.20	0.020	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.20	0.020	mg/kg	
74-83-9	Methyl bromide	ND	0.20	0.041	mg/kg	
74-87-3	Methyl chloride	ND	0.20	0.041	mg/kg	
74-95-3	Methylene bromide	ND	0.20	0.020	mg/kg	
75-09-2	Methylene chloride	ND	0.81	0.20	mg/kg	
91-20-3	Naphthalene	ND	0.20	0.041	mg/kg	
103-65-1	n-Propylbenzene	ND	0.20	0.020	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.020	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.020	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.020	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.20	0.020	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.20	0.041	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.020	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.041	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.041	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.20	0.024	mg/kg	
108-88-3	Toluene	ND	0.20	0.020	mg/kg	
79-01-6	Trichloroethylene	ND	0.20	0.020	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.20	0.041	mg/kg	
75-01-4	Vinyl chloride	ND	0.20	0.041	mg/kg	
1330-20-7	Xylene (total)	ND	0.41	0.041	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		70-130%
2037-26-5	Toluene-D8	99%		70-130%
460-00-4	4-Bromofluorobenzene	89%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-350-SO		
Lab Sample ID:	C43816-2	**Date Sampled:**	01/25/16
Matrix:	SO - Soil	**Date Received:**	01/26/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.6	1.6	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	39.5	16	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium	< 0.81	0.81	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	2.6	0.81	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	4210	16	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Lead	2.4	1.6	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	127	1.2	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Mercury	< 0.016	0.016	mg/kg	1	01/27/16	01/27/16	EB	SW846 7471A [1]	SW846 7471A [3]
Selenium	< 1.6	1.6	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	< 0.81	0.81	mg/kg	1	01/29/16	01/29/16	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5565
(2) Instrument QC Batch: MA5568
(3) Prep QC Batch: MP10758
(4) Prep QC Batch: MP10763

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Northern California ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).

PHOENIX

CHAIN OF CUSTODY

ACCUTEST® LABORATORIES

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 8034010290 20 | Bottle Order Control #
Accutest Quote # | Accutest NC Job #: C C43816

Client / Reporting Information

Company Name: Amec Foster Wheeler
Address: 4600 E Washington ST. Suite 600
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: BP ISCO STUDY
Street: Broadway & Pantano
City: Tucson State: AZ
Project #: 1420152042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	DI/DORC	8260B	Total RCRA 8 Metals Manganese & Iron											Matrix Codes / LAB USE ONLY
1	BP-26-340-Ag	1/25/16	1015	KGK	Ag	3	X								3												
2	BP-26-350-SO	↓	1100	↓	SO	3	X				X				2	1											

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Turnaround Time (Business days)

- [X] 10 Day STANDARD Turn around
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Approved By / Date:

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Ag Samples Lid were bad leaving bubbles in some, Use Sample with the least silt to test

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	1/25/16 1540	1 [signature]	2 [signature]	1/25/16 1630	2 Fedex
3	FEDX	1/26/16 1045	3 [signature]	4		4
5			5			

Custody Seal # Y | Appropriate Bottle / Pres. Y / N | Headspace Y / N | On Ice Y / N | Cooler Temp 3.9 | 3.0 °C
Labels match Coc? Y / N | Separate Receiving Check List used: Y / N

AZ

LB

C43816: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43816 **Client:** AMEC FOSTER WHEELER **Project:** BP ISCO STUDY

Date / Time Received: 1/26/2016 10:45:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401029020

Cooler Temps (Initial/Adjusted): #1: (3.9/3);

Cooler Security	Y	or N		Y	or N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR3;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y	or N	N/A
1. Trip Blank present / cooler:	☐	☑	☐
2. Trip Blank listed on COC:	☐	☑	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	or N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	or N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	or N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments

Accutest Laboratories
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2105 Lundy Avenue
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San Jose, CA 95131
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5.2

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C43816: Chain of Custody
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Northern California ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2253-MB	W59846.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2253-MB	W59846.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	98%	78-125%
2037-26-5	Toluene-D8	105%	86-114%
460-00-4	4-Bromofluorobenzene	101%	80-113%

Method Blank Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-MB	M58357.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	0.50	ug/kg	
108-86-1	Bromobenzene	ND	5.0	0.50	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.50	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	0.50	ug/kg	
75-25-2	Bromoform	ND	5.0	0.50	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.50	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	0.50	ug/kg	
75-00-3	Chloroethane	ND	5.0	1.0	ug/kg	
67-66-3	Chloroform	ND	5.0	0.50	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/kg	
106-43-4	p-Chlorotoluene	ND	5.0	0.50	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	0.50	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	0.50	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	0.50	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	0.50	ug/kg	
563-58-6	1,1-Dichloropropene	ND	5.0	0.50	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	0.50	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	0.50	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	0.50	ug/kg	
142-28-9	1,3-Dichloropropane	ND	5.0	0.50	ug/kg	
594-20-7	2,2-Dichloropropane	ND	5.0	0.50	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	0.50	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	0.50	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	0.50	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	0.50	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	0.50	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	0.50	ug/kg	
591-78-6	2-Hexanone	ND	20	2.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-MB	M58357.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	5.0	0.50	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	1.0	ug/kg	
74-95-3	Methylene bromide	ND	5.0	0.50	ug/kg	
75-09-2	Methylene chloride	ND	20	5.0	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.0	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.50	ug/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	0.50	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/kg	
96-18-4	1,2,3-Trichloropropane	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	1.0	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	0.60	ug/kg	
108-88-3	Toluene	ND	5.0	0.50	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	0.50	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	10	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	70-130%
2037-26-5	Toluene-D8	98%	70-130%
460-00-4	4-Bromofluorobenzene	91%	70-130%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2253-BS	W59842.D	1	01/27/16	CV	n/a	n/a	VW2253
VW2253-BSD	W59843.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	17.9	90	18.1	91	1	77-118/10
108-86-1	Bromobenzene	20	19.6	98	19.3	97	2	78-122/10
74-97-5	Bromochloromethane	20	19.4	97	19.3	97	1	76-124/10
75-27-4	Bromodichloromethane	20	19.0	95	19.0	95	0	74-121/10
75-25-2	Bromoform	20	16.5	83	16.4	82	1	58-133/10
104-51-8	n-Butylbenzene	20	20.1	101	20.2	101	0	75-125/10
135-98-8	sec-Butylbenzene	20	20.1	101	20.4	102	1	76-127/10
98-06-6	tert-Butylbenzene	20	17.3	87	17.8	89	3	76-124/10
108-90-7	Chlorobenzene	20	18.7	94	18.5	93	1	77-120/10
75-00-3	Chloroethane	20	16.3	82	15.6	78	4	63-117/10
67-66-3	Chloroform	20	17.6	88	17.5	88	1	74-123/10
95-49-8	o-Chlorotoluene	20	19.3	97	19.1	96	1	76-125/10
106-43-4	p-Chlorotoluene	20	18.7	94	19.0	95	2	76-123/10
75-15-0	Carbon disulfide	20	16.2	81	16.5	83	2	57-126/11
56-23-5	Carbon tetrachloride	20	19.4	97	20.3	102	5	72-128/11
75-34-3	1,1-Dichloroethane	20	17.3	87	17.1	86	1	70-120/10
75-35-4	1,1-Dichloroethylene	20	17.6	88	18.0	90	2	65-120/11
563-58-6	1,1-Dichloropropene	20	17.8	89	18.6	93	4	69-125/10
96-12-8	1,2-Dibromo-3-chloropropane	20	17.0	85	17.6	88	3	63-128/10
106-93-4	1,2-Dibromoethane	20	19.8	99	19.4	97	2	78-123/10
107-06-2	1,2-Dichloroethane	20	17.7	89	17.5	88	1	72-123/10
78-87-5	1,2-Dichloropropane	20	18.2	91	18.0	90	1	76-119/10
142-28-9	1,3-Dichloropropane	20	19.1	96	18.7	94	2	78-122/10
594-20-7	2,2-Dichloropropane	20	18.8	94	18.6	93	1	68-129/10
124-48-1	Dibromochloromethane	20	16.7	84	16.4	82	2	75-124/10
75-71-8	Dichlorodifluoromethane	20	14.5	73	12.7	64	13	37-149/21
156-59-2	cis-1,2-Dichloroethylene	20	19.4	97	19.2	96	1	74-121/10
10061-01-5	cis-1,3-Dichloropropene	20	20.6	103	20.4	102	1	76-125/10
541-73-1	m-Dichlorobenzene	20	18.8	94	18.8	94	0	77-121/10
95-50-1	o-Dichlorobenzene	20	18.7	94	18.7	94	0	77-120/10
106-46-7	p-Dichlorobenzene	20	18.6	93	18.5	93	1	78-118/10
156-60-5	trans-1,2-Dichloroethylene	20	16.9	85	17.2	86	2	71-118/10
10061-02-6	trans-1,3-Dichloropropene	20	16.9	85	16.8	84	1	73-122/10
100-41-4	Ethylbenzene	20	19.6	98	19.6	98	0	78-121/10
591-78-6	2-Hexanone	80	80.2	100	78.6	98	2	71-139/10
87-68-3	Hexachlorobutadiene	20	18.7	94	19.6	98	5	69-127/11

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2253-BS	W59842.D	1	01/27/16	CV	n/a	n/a	VW2253
VW2253-BSD	W59843.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.1	101	20.3	102	1	77-125/10
99-87-6	p-Isopropyltoluene	20	18.0	90	18.2	91	1	76-125/10
74-83-9	Methyl bromide	20	18.4	92	17.9	90	3	66-123/10
74-87-3	Methyl chloride	20	14.7	74	14.4	72	2	50-138/19
74-95-3	Methylene bromide	20	18.8	94	19.0	95	1	77-125/10
75-09-2	Methylene chloride	20	16.7	84	16.4	82	2	65-124/14
91-20-3	Naphthalene	20	19.4	97	21.9	110	12	68-122/12
103-65-1	n-Propylbenzene	20	19.0	95	19.1	96	1	76-123/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.5	103	20.1	101	2	79-123/10
71-55-6	1,1,1-Trichloroethane	20	19.4	97	19.8	99	2	73-124/10
79-34-5	1,1,2,2-Tetrachloroethane	20	19.4	97	19.1	96	2	77-123/10
79-00-5	1,1,2-Trichloroethane	20	18.4	92	18.3	92	1	77-120/10
87-61-6	1,2,3-Trichlorobenzene	20	19.0	95	21.3	107	11	70-126/11
96-18-4	1,2,3-Trichloropropane	20	18.9	95	18.6	93	2	65-125/10
120-82-1	1,2,4-Trichlorobenzene	20	19.8	99	21.0	105	6	72-123/10
95-63-6	1,2,4-Trimethylbenzene	20	19.6	98	19.6	98	0	77-122/10
108-67-8	1,3,5-Trimethylbenzene	20	20.4	102	20.3	102	0	79-127/10
127-18-4	Tetrachloroethylene	20	19.2	96	19.8	99	3	71-124/10
108-88-3	Toluene	20	18.7	94	18.7	94	0	78-120/10
79-01-6	Trichloroethylene	20	18.7	94	19.2	96	3	75-119/10
75-69-4	Trichlorofluoromethane	20	19.7	99	17.9	90	10	67-129/14
75-01-4	Vinyl chloride	20	15.6	78	11.5	58* [a]	30* [a]	60-133/15
1330-20-7	Xylene (total)	60	59.6	99	59.2	99	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	98%	98%	78-125%
2037-26-5	Toluene-D8	100%	99%	86-114%
460-00-4	4-Bromofluorobenzene	104%	104%	80-113%

(a) Outside laboratory control limits; but within marginal exceedance criteria.

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-BS	M58354.D	1	01/27/16	XB	n/a	n/a	VM1752
VM1752-BSD	M58355.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	40	37.6	94	36.4	91	3	70-130/30
108-86-1	Bromobenzene	40	41.3	103	38.1	95	8	70-130/30
74-97-5	Bromochloromethane	40	39.1	98	38.5	96	2	70-130/30
75-27-4	Bromodichloromethane	40	37.4	94	36.6	92	2	70-130/30
75-25-2	Bromoform	40	42.8	107	43.0	108	0	70-130/30
104-51-8	n-Butylbenzene	40	34.3	86	34.9	87	2	70-130/30
135-98-8	sec-Butylbenzene	40	37.1	93	36.3	91	2	70-130/30
98-06-6	tert-Butylbenzene	40	37.8	95	37.2	93	2	70-130/30
108-90-7	Chlorobenzene	40	38.6	97	37.3	93	3	70-130/30
75-00-3	Chloroethane	40	32.7	82	32.5	81	1	70-130/30
67-66-3	Chloroform	40	34.8	87	34.1	85	2	70-130/30
95-49-8	o-Chlorotoluene	40	36.2	91	34.9	87	4	70-130/30
106-43-4	p-Chlorotoluene	40	37.4	94	34.2	86	9	70-130/30
75-15-0	Carbon disulfide	40	30.7	77	29.8	75	3	70-130/30
56-23-5	Carbon tetrachloride	40	36.2	91	34.9	87	4	70-130/30
75-34-3	1,1-Dichloroethane	40	34.2	86	33.3	83	3	70-130/30
75-35-4	1,1-Dichloroethylene	40	35.1	88	34.5	86	2	70-130/30
563-58-6	1,1-Dichloropropene	40	35.7	89	34.0	85	5	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	40	34.4	86	37.3	93	8	70-130/30
106-93-4	1,2-Dibromoethane	40	40.9	102	39.6	99	3	70-130/30
107-06-2	1,2-Dichloroethane	40	34.8	87	34.3	86	1	70-130/30
78-87-5	1,2-Dichloropropane	40	37.2	93	36.3	91	2	70-130/30
142-28-9	1,3-Dichloropropane	40	39.9	100	38.8	97	3	70-130/30
594-20-7	2,2-Dichloropropane	40	32.6	82	32.5	81	0	70-130/30
124-48-1	Dibromochloromethane	40	41.2	103	39.7	99	4	70-130/30
75-71-8	Dichlorodifluoromethane	40	32.2	81	32.1	80	0	70-130/30
156-59-2	cis-1,2-Dichloroethylene	40	36.5	91	35.9	90	2	70-130/30
10061-01-5	cis-1,3-Dichloropropene	40	38.1	95	36.9	92	3	70-130/30
541-73-1	m-Dichlorobenzene	40	38.1	95	37.2	93	2	70-130/30
95-50-1	o-Dichlorobenzene	40	38.3	96	38.1	95	1	70-130/30
106-46-7	p-Dichlorobenzene	40	38.2	96	37.0	93	3	70-130/30
156-60-5	trans-1,2-Dichloroethylene	40	35.8	90	34.5	86	4	70-130/30
10061-02-6	trans-1,3-Dichloropropene	40	39.1	98	37.2	93	5	70-130/30
100-41-4	Ethylbenzene	40	37.2	93	36.1	90	3	70-130/30
591-78-6	2-Hexanone	160	172	108	165	103	4	60-140/30
87-68-3	Hexachlorobutadiene	40	35.4	89	38.7	97	9	70-130/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-BS	M58354.D	1	01/27/16	XB	n/a	n/a	VM1752
VM1752-BSD	M58355.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	40	36.9	92	37.2	93	1	70-130/30
99-87-6	p-Isopropyltoluene	40	36.8	92	36.6	92	1	70-130/30
74-83-9	Methyl bromide	40	37.8	95	37.6	94	1	70-130/30
74-87-3	Methyl chloride	40	32.2	81	31.5	79	2	70-130/30
74-95-3	Methylene bromide	40	38.9	97	38.2	96	2	70-130/30
75-09-2	Methylene chloride	40	36.0	90	35.5	89	1	70-130/30
91-20-3	Naphthalene	40	37.4	94	42.7	107	13	70-130/30
103-65-1	n-Propylbenzene	40	36.9	92	34.7	87	6	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	40	37.8	95	38.0	95	1	70-130/30
71-55-6	1,1,1-Trichloroethane	40	34.5	86	33.9	85	2	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	40	40.4	101	39.4	99	3	70-130/30
79-00-5	1,1,2-Trichloroethane	40	41.1	103	39.9	100	3	70-130/30
87-61-6	1,2,3-Trichlorobenzene	40	35.7	89	40.7	102	13	70-130/30
96-18-4	1,2,3-Trichloropropane	40	39.2	98	39.1	98	0	70-130/30
120-82-1	1,2,4-Trichlorobenzene	40	34.6	87	39.8	100	14	70-130/30
95-63-6	1,2,4-Trimethylbenzene	40	36.5	91	35.3	88	3	70-130/30
108-67-8	1,3,5-Trimethylbenzene	40	36.6	92	35.2	88	4	70-130/30
127-18-4	Tetrachloroethylene	40	42.4	106	42.8	107	1	70-130/30
108-88-3	Toluene	40	38.4	96	36.3	91	6	70-130/30
79-01-6	Trichloroethylene	40	39.8	100	38.1	95	4	70-130/30
75-69-4	Trichlorofluoromethane	40	35.4	89	35.1	88	1	70-130/30
75-01-4	Vinyl chloride	40	32.4	81	31.3	78	3	70-130/30
1330-20-7	Xylene (total)	120	112	93	110	92	2	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	93%	95%	70-130%
2037-26-5	Toluene-D8	97%	97%	70-130%
460-00-4	4-Bromofluorobenzene	92%	91%	70-130%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2253-LCS	W59844.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	96%	78-125%
2037-26-5	Toluene-D8	105%	86-114%
460-00-4	4-Bromofluorobenzene	102%	80-113%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1752-LCS	M58356.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	Spike ug/kg	LCS ug/kg	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	96%	70-130%
2037-26-5	Toluene-D8	97%	70-130%
460-00-4	4-Bromofluorobenzene	92%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43844-9MS	M58374.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9MSD	M58375.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9	M58366.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	C43844-9 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		39.6	34.6	87	39.8	33.9	85	2	70-130/30
108-86-1	Bromobenzene	ND		39.6	35.0	88	39.8	34.8	88	1	70-130/30
74-97-5	Bromochloromethane	ND		39.6	36.0	91	39.8	35.7	90	1	70-130/30
75-27-4	Bromodichloromethane	ND		39.6	35.1	89	39.8	34.8	88	1	70-130/30
75-25-2	Bromoform	ND		39.6	40.0	101	39.8	38.9	98	3	70-130/30
104-51-8	n-Butylbenzene	ND		39.6	31.9	81	39.8	31.6	79	1	70-130/30
135-98-8	sec-Butylbenzene	ND		39.6	33.3	84	39.8	33.3	84	0	70-130/30
98-06-6	tert-Butylbenzene	ND		39.6	33.3	84	39.8	33.6	85	1	70-130/30
108-90-7	Chlorobenzene	ND		39.6	34.6	87	39.8	33.7	85	3	70-130/30
75-00-3	Chloroethane	ND		39.6	35.5	90	39.8	35.9	90	1	70-130/30
67-66-3	Chloroform	0.79	J	39.6	36.2	89	39.8	35.5	87	2	70-130/30
95-49-8	o-Chlorotoluene	ND		39.6	33.8	85	39.8	33.5	84	1	70-130/30
106-43-4	p-Chlorotoluene	ND		39.6	31.7	80	39.8	32.5	82	2	70-130/30
75-15-0	Carbon disulfide	ND		39.6	24.7	62* [a]	39.8	24.0	60* [a]	3	70-130/30
56-23-5	Carbon tetrachloride	ND		39.6	33.9	86	39.8	33.8	85	0	70-130/30
75-34-3	1,1-Dichloroethane	ND		39.6	32.9	83	39.8	32.0	80	3	70-130/30
75-35-4	1,1-Dichloroethylene	ND		39.6	28.1	71	39.8	27.6	69* [a]	2	70-130/30
563-58-6	1,1-Dichloropropene	ND		39.6	29.2	74	39.8	28.7	72	2	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	ND		39.6	37.2	94	39.8	35.6	90	4	70-130/30
106-93-4	1,2-Dibromoethane	ND		39.6	37.6	95	39.8	36.1	91	4	70-130/30
107-06-2	1,2-Dichloroethane	ND		39.6	35.6	90	39.8	34.7	87	3	70-130/30
78-87-5	1,2-Dichloropropane	ND		39.6	36.4	92	39.8	35.0	88	4	70-130/30
142-28-9	1,3-Dichloropropane	ND		39.6	39.8	100	39.8	38.0	96	5	70-130/30
594-20-7	2,2-Dichloropropane	ND		39.6	32.2	81	39.8	29.9	75	7	70-130/30
124-48-1	Dibromochloromethane	ND		39.6	36.7	93	39.8	36.2	91	1	70-130/30
75-71-8	Dichlorodifluoromethane	ND		39.6	37.2	94	39.8	38.8	98	4	70-130/30
156-59-2	cis-1,2-Dichloroethylene	ND		39.6	36.0	91	39.8	35.1	88	3	70-130/30
10061-01-5	cis-1,3-Dichloropropene	ND		39.6	36.4	92	39.8	35.5	89	3	70-130/30
541-73-1	m-Dichlorobenzene	ND		39.6	32.6	82	39.8	32.7	82	0	70-130/30
95-50-1	o-Dichlorobenzene	ND		39.6	34.6	87	39.8	34.2	86	1	70-130/30
106-46-7	p-Dichlorobenzene	ND		39.6	32.8	83	39.8	33.0	83	1	70-130/30
156-60-5	trans-1,2-Dichloroethylene	ND		39.6	28.9	73	39.8	28.2	71	2	70-130/30
10061-02-6	trans-1,3-Dichloropropene	ND		39.6	35.3	89	39.8	34.3	86	3	70-130/30
100-41-4	Ethylbenzene	ND		39.6	34.6	87	39.8	33.9	85	2	70-130/30
591-78-6	2-Hexanone	ND		158	180	114	159	170	107	6	60-140/30
87-68-3	Hexachlorobutadiene	ND		39.6	32.2	81	39.8	32.5	82	1	70-130/30

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43844-9MS	M58374.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9MSD	M58375.D	1	01/27/16	XB	n/a	n/a	VM1752
C43844-9	M58366.D	1	01/27/16	XB	n/a	n/a	VM1752

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-2

CAS No.	Compound	C43844-9 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		39.6	34.9	88	39.8	33.9	85	3	70-130/30
99-87-6	p-Isopropyltoluene	ND		39.6	32.8	83	39.8	32.6	82	1	70-130/30
74-83-9	Methyl bromide	ND		39.6	39.7	100	39.8	40.1	101	1	70-130/30
74-87-3	Methyl chloride	ND		39.6	41.3	104	39.8	41.7	105	1	70-130/30
74-95-3	Methylene bromide	ND		39.6	37.8	95	39.8	37.4	94	1	70-130/30
75-09-2	Methylene chloride	ND		39.6	33.6	85	39.8	32.4	81	4	70-130/30
91-20-3	Naphthalene	ND		39.6	34.8	88	39.8	34.6	87	1	70-130/30
103-65-1	n-Propylbenzene	ND		39.6	32.0	81	39.8	31.6	79	1	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	ND		39.6	35.7	90	39.8	35.2	89	1	70-130/30
71-55-6	1,1,1-Trichloroethane	ND		39.6	34.5	87	39.8	33.2	83	4	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		39.6	39.3	99	39.8	39.2	99	0	70-130/30
79-00-5	1,1,2-Trichloroethane	ND		39.6	40.0	101	39.8	38.4	97	4	70-130/30
87-61-6	1,2,3-Trichlorobenzene	ND		39.6	33.1	84	39.8	33.2	83	0	70-130/30
96-18-4	1,2,3-Trichloropropane	ND		39.6	38.8	98	39.8	37.9	95	2	70-130/30
120-82-1	1,2,4-Trichlorobenzene	ND		39.6	31.4	79	39.8	30.9	78	2	70-130/30
95-63-6	1,2,4-Trimethylbenzene	ND		39.6	32.4	82	39.8	32.7	82	1	70-130/30
108-67-8	1,3,5-Trimethylbenzene	ND		39.6	33.6	85	39.8	33.1	83	1	70-130/30
127-18-4	Tetrachloroethylene	ND		39.6	39.8	100	39.8	39.5	99	1	70-130/30
108-88-3	Toluene	ND		39.6	34.7	88	39.8	33.8	85	3	70-130/30
79-01-6	Trichloroethylene	ND		39.6	33.5	85	39.8	33.4	84	0	70-130/30
75-69-4	Trichlorofluoromethane	ND		39.6	39.2	99	39.8	39.9	100	2	70-130/30
75-01-4	Vinyl chloride	ND		39.6	48.7	123	39.8	50.4	127	3	70-130/30
1330-20-7	Xylene (total)	ND		119	102	86	119	99.7	84	2	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	C43844-9	Limits
1868-53-7	Dibromofluoromethane	106%	104%	112%	70-130%
2037-26-5	Toluene-D8	99%	100%	98%	70-130%
460-00-4	4-Bromofluorobenzene	97%	97%	88%	70-130%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43808-2MS	W59890.D	1	01/29/16	CV	n/a	n/a	VW2253
C43808-2MSD	W59891.D	1	01/29/16	CV	n/a	n/a	VW2253
C43808-2	W59854.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	C43808-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	0.37	J	20	20.6	101	20	19.9	98	3	77-118/10
108-86-1	Bromobenzene	ND		20	21.4	107	20	20.9	105	2	78-122/10
74-97-5	Bromochloromethane	ND		20	20.9	105	20	20.3	102	3	76-124/10
75-27-4	Bromodichloromethane	ND		20	20.8	104	20	20.3	102	2	74-121/10
75-25-2	Bromoform	ND		20	17.4	87	20	17.4	87	0	58-133/10
104-51-8	n-Butylbenzene	0.34	J	20	22.6	111	20	21.4	105	5	75-125/10
135-98-8	sec-Butylbenzene	0.22	J	20	22.8	113	20	21.8	108	4	76-127/10
98-06-6	tert-Butylbenzene	ND		20	20.0	100	20	19.3	97	4	76-124/10
108-90-7	Chlorobenzene	ND		20	20.6	103	20	19.9	100	3	77-120/10
75-00-3	Chloroethane	ND		20	18.9	95	20	18.1	91	4	63-117/10
67-66-3	Chloroform	ND		20	19.5	98	20	18.8	94	4	74-123/10
95-49-8	o-Chlorotoluene	ND		20	21.1	106	20	20.3	102	4	76-125/10
106-43-4	p-Chlorotoluene	ND		20	21.0	105	20	20.5	103	2	76-123/10
75-15-0	Carbon disulfide	ND		20	20.0	100	20	18.9	95	6	57-126/11
56-23-5	Carbon tetrachloride	ND		20	24.3	122	20	23.5	118	3	72-128/11
75-34-3	1,1-Dichloroethane	ND		20	19.3	97	20	18.5	93	4	70-120/10
75-35-4	1,1-Dichloroethylene	ND		20	21.6	108	20	20.6	103	5	65-120/11
563-58-6	1,1-Dichloropropene	ND		20	21.5	108	20	20.9	105	3	69-125/10
96-12-8	1,2-Dibromo-3-chloropropane	ND		20	21.7	109	20	21.5	108	1	63-128/10
106-93-4	1,2-Dibromoethane	ND		20	21.3	107	20	21.2	106	0	78-123/10
107-06-2	1,2-Dichloroethane	ND		20	18.9	95	20	18.5	93	2	72-123/10
78-87-5	1,2-Dichloropropane	ND		20	19.8	99	20	19.2	96	3	76-119/10
142-28-9	1,3-Dichloropropane	ND		20	20.5	103	20	20.1	101	2	78-122/10
594-20-7	2,2-Dichloropropane	ND		20	20.2	101	20	19.1	96	6	68-129/10
124-48-1	Dibromochloromethane	ND		20	18.1	91	20	17.9	90	1	75-124/10
75-71-8	Dichlorodifluoromethane	ND		20	18.5	93	20	16.4	82	12	37-149/21
156-59-2	cis-1,2-Dichloroethylene	ND		20	21.7	109	20	20.8	104	4	74-121/10
10061-01-5	cis-1,3-Dichloropropene	ND		20	20.8	104	20	20.3	102	2	76-125/10
541-73-1	m-Dichlorobenzene	ND		20	20.6	103	20	20.1	101	2	77-121/10
95-50-1	o-Dichlorobenzene	ND		20	20.7	104	20	20.1	101	3	77-120/10
106-46-7	p-Dichlorobenzene	ND		20	20.3	102	20	19.8	99	2	78-118/10
156-60-5	trans-1,2-Dichloroethylene	ND		20	19.7	99	20	18.9	95	4	71-118/10
10061-02-6	trans-1,3-Dichloropropene	ND		20	17.2	86	20	16.5	83	4	73-122/10
100-41-4	Ethylbenzene	0.89	J	20	23.2	112	20	22.4	108	4	78-121/10
591-78-6	2-Hexanone	ND		80	95.1	119	80	94.2	118	1	71-139/10
87-68-3	Hexachlorobutadiene	ND		20	19.4	97	20	18.5	93	5	69-127/11

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43816
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43808-2MS	W59890.D	1	01/29/16	CV	n/a	n/a	VW2253
C43808-2MSD	W59891.D	1	01/29/16	CV	n/a	n/a	VW2253
C43808-2	W59854.D	1	01/27/16	CV	n/a	n/a	VW2253

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43816-1

CAS No.	Compound	C43808-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		20	23.3	117	20	22.4	112	4	77-125/10
99-87-6	p-Isopropyltoluene	0.33	J	20	20.3	100	20	19.4	95	5	76-125/10
74-83-9	Methyl bromide	ND		20	19.9	100	20	18.7	94	6	66-123/10
74-87-3	Methyl chloride	ND		20	17.1	86	20	15.3	77	11	50-138/19
74-95-3	Methylene bromide	ND		20	20.4	102	20	20.0	100	2	77-125/10
75-09-2	Methylene chloride	ND		20	18.0	90	20	17.4	87	3	65-124/14
91-20-3	Naphthalene	27.4		20	28.3	5* [a]	20	28.9	8* [a]	2	68-122/12
103-65-1	n-Propylbenzene	0.26	J	20	21.7	107	20	20.9	103	4	76-123/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		20	22.2	111	20	21.6	108	3	79-123/10
71-55-6	1,1,1-Trichloroethane	ND		20	23.6	118	20	22.8	114	3	73-124/10
79-34-5	1,1,2,2-Tetrachloroethane	ND		20	21.8	109	20	21.3	107	2	77-123/10
79-00-5	1,1,2-Trichloroethane	ND		20	20.2	101	20	19.8	99	2	77-120/10
87-61-6	1,2,3-Trichlorobenzene	ND		20	24.4	122	20	24.3	122	0	70-126/11
96-18-4	1,2,3-Trichloropropane	0.26	J	20	17.9	88	20	17.4	86	3	65-125/10
120-82-1	1,2,4-Trichlorobenzene	ND		20	23.0	115	20	22.3	112	3	72-123/10
95-63-6	1,2,4-Trimethylbenzene	1.4	J	20	23.0	108	20	22.2	104	4	77-122/10
108-67-8	1,3,5-Trimethylbenzene	0.63	J	20	23.5	114	20	22.8	111	3	79-127/10
127-18-4	Tetrachloroethylene	ND		20	22.6	113	20	22.2	111	2	71-124/10
108-88-3	Toluene	8.2		20	28.9	104	20	28.7	103	1	78-120/10
79-01-6	Trichloroethylene	ND		20	21.8	109	20	21.4	107	2	75-119/10
75-69-4	Trichlorofluoromethane	ND		20	24.1	121	20	23.4	117	3	67-129/14
75-01-4	Vinyl chloride	ND		20	19.8	99	20	19.1	96	4	60-133/15
1330-20-7	Xylene (total)	6.0		60	72.8	111	60	70.6	108	3	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C43808-2	Limits
1868-53-7	Dibromofluoromethane	100%	100%	95%	78-125%
2037-26-5	Toluene-D8	101%	102%	102%	86-114%
460-00-4	4-Bromofluorobenzene	106%	106%	105%	80-113%

(a) Outside laboratory control limits.

* = Outside of Control Limits.

Northern California ACCUTEST LABORATORIES

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.017	.00035	.0019	0.0058	<0.017

Associated samples MP10758: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.1.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	C43797-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0019	0.17	0.152	110.9	75-125

Associated samples MP10758: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.1.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	C43797-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0019	0.18	0.161	110.4	5.7	20

Associated samples MP10758: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.1.2

7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10758
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/27/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP10758: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.1.3

7

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10763
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/29/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17	-0.11	<2.0
Barium	20	.02	.09	0.23	<20
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031	-0.010	<1.0
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054	0.020	<1.0
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76	2.3	<20
Lead	2.0	.1	.14	-0.020	<2.0
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026	0.10	<1.5
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33	-0.17	<2.0
Silicon	20	.24	.43		
Silver	1.0	.05	.067	0.020	<1.0
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10763: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10763
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/29/16

Metal	C43844-3 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	2.0	42.3	45.5	88.7	75-125
Barium	62.9	109	45.5	101.4	75-125
Beryllium	anr				
Boron					
Cadmium	0.15	42.6	45.5	93.4	75-125
Calcium					
Chromium	17.2	62.0	45.5	98.6	75-125
Cobalt	anr				
Copper	anr				
Iron	14900	16900	1140	176.0(a)	75-125
Lead	4.3	46.4	45.5	92.6	75-125
Magnesium					
Manganese	486	551	45.5	143.0(a)	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	0.85	40.9	45.5	88.1	75-125
Silicon					
Silver	0.0	40.7	45.5	89.5	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10763: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10763
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/29/16

Metal	C43844-3 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	2.0	40.8	43.9	88.5	3.6	20
Barium	62.9	110	43.9	107.4	0.9	20
Beryllium	anr					
Boron						
Cadmium	0.15	41.0	43.9	93.1	3.8	20
Calcium						
Chromium	17.2	60.1	43.9	97.8	3.1	20
Cobalt	anr					
Copper	anr					
Iron	14900	17300	1100	218.9(a)	2.3	20
Lead	4.3	45.1	43.9	93.0	2.8	20
Magnesium						
Manganese	486	571	43.9	193.8(a)	3.6	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	0.85	39.0	43.9	87.0	4.8	20
Silicon						
Silver	0.0	39.5	43.9	90.1	3.0	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10763: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10763
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/29/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	47.8	50	95.6	80-120
Barium	50.4	50	100.8	80-120
Beryllium	anr			
Boron				
Cadmium	48.7	50	97.4	80-120
Calcium				
Chromium	51.3	50	102.6	80-120
Cobalt	anr			
Copper	anr			
Iron	1240	1250	99.2	80-120
Lead	47.2	50	94.4	80-120
Magnesium				
Manganese	53.8	50	107.6	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	47.3	50	94.6	80-120
Silicon				
Silver	46.1	50	92.2	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10763: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43816
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10763
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 01/29/16

Metal	C43844-3 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	22.0	20.8	5.5	0-10
Barium	698	720	3.1	0-10
Beryllium	anr			
Boron				
Cadmium	1.70	2.00	17.6 (a)	0-10
Calcium				
Chromium	191	190	0.6	0-10
Cobalt	anr			
Copper	anr			
Iron	165000	168000	1.9	0-10
Lead	47.8	47.8	0.0	0-10
Magnesium				
Manganese	5390	5750	6.6	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	9.40	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10763: C43816-2

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

SGS Accutest Job Number: C43984

Sampling Dates: 02/04/16 - 02/05/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **61**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C43984

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43984-1	02/04/16	15:10	KGK	02/06/16	SO	Soil	BP-27-290-SO
C43984-2	02/05/16	08:30	KGK	02/06/16	AQ	Ground Water	BP-27-320-AQ
C43984-3	02/05/16	11:00	KGK	02/06/16	SO	Soil	BP-27-345-SO
C43984-4	02/05/16	11:00	KGK	02/06/16	SO	Soil	DUP-BP-27-345-SO
C43984-5	02/05/16	12:00	KGK	02/06/16	AQ	Ground Water	BP-27-345-AQ
C43984-6	02/05/16	14:30	KGK	02/06/16	AQ	Ground Water	BP-27-360-AQ

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43984
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	2/16/2016 6:13:40 PM

6 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected between 02/04/2016 and 02/05/2016 and were received at Accutest on 02/06/2016 properly preserved, at 3.1 Deg. C and intact. These Samples received an Accutest job number of C43984. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VU1337

- Sample(s) C43945-11MS, C43945-11MSD were used as the QC samples indicated.
- Sample C43984-5 has for Dichlorodifluoromethane a CCV outside of control limits; results may be biased high. Insufficient intact vials remained for further reanalysis.
- C43984-5: Sample vial contained more than 0.5cm of sediment.

Matrix: AQ **Batch ID:** VW2259

- Sample(s) C43987-7MS, C43987-7MSD were used as the QC samples indicated.
- Sample(s) C43984-2, C43984-6, C43984-5 have for Dichlorodifluoromethane, Methyl chloride a CCV outside of control limits (biased high); not detected in samples.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,1-Dichloroethane, Chloroethane, Methyl chloride, Hexachlorobutadiene, cis-1,2-Dichloroethylene, Vinyl chloride are outside laboratory control limits. Probable cause due to matrix interference. The associated blank spike recoveries were acceptable.
- RPD(s) for MSD for 1,2,3-Trichlorobenzene, cis-1,2-Dichloroethylene, Naphthalene, Vinyl chloride are outside laboratory control limits for sample C43987-7MSD.

Matrix: SO **Batch ID:** VM1757

- Sample(s) C44001-1MS, C44001-1MSD were used as the QC samples indicated.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, Hexachlorobutadiene, n-Butylbenzene, p-Chlorotoluene, p-Isopropyltoluene, sec-Butylbenzene, Tetrachloroethylene are outside laboratory control limits. Probable cause due to matrix interference. The associated blank spike recoveries were acceptable.

Metals By Method SW846 6010B

Matrix: SO **Batch ID:** MP10801

- Sample(s) C43792-1RMS, C43792-1RMSD, C43792-1RSDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Arsenic, Selenium are outside control limits for sample MP10801-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Matrix: SO **Batch ID:** MP10813

- Sample(s) C44022-5MS, C44022-5MSD, C44022-5SDL were used as the QC samples for metals.
- Matrix Spike Recovery(s) for Manganese are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. The associated blank spike recoveries were acceptable.

Metals By Method SW846 7471A

Matrix: SO **Batch ID:** MP10805

- Sample(s) C43792-1RMS, C43792-1RMSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43984
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 02/04/16 thru 02/05/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43984-1	**BP-27-290-SO**					
No hits reported in this sample.						
C43984-2	**BP-27-320-AQ**					
Chloroform [a]		0.32 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane		1.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		1.9	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		7.4	0.50	0.30	ug/l	SW846 8260B
Toluene [a]		0.74 J	1.0	0.20	ug/l	SW846 8260B
Trichloroethylene		4.3	0.50	0.20	ug/l	SW846 8260B
C43984-3	**BP-27-345-SO**					
Chromium		1.1	0.88		mg/kg	SW846 6010B
Iron		2320	19		mg/kg	SW846 6010B
Lead		1.8	1.8		mg/kg	SW846 6010B
Manganese		65.6	1.4		mg/kg	SW846 6010B
C43984-4	**DUP-BP-27-345-SO**					
No hits reported in this sample.						
C43984-5	**BP-27-345-AQ**					
Benzene [b]		1.4	1.0	0.20	ug/l	SW846 8260B
Chloroform [b]		0.50	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.26 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.93	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		3.6	1.3	0.50	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		50.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.1	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [b]		2.0	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		104	1.3	0.75	ug/l	SW846 8260B
Toluene [c]		0.47 J	1.0	0.20	ug/l	SW846 8260B
Trichloroethylene [b]		40.5	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.98	0.50	0.20	ug/l	SW846 8260B
C43984-6	**BP-27-360-AQ**					
Benzene [a]		0.35 J	1.0	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane		2.5	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		9.5	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		53.6	0.50	0.30	ug/l	SW846 8260B

Summary of Hits

Job Number: C43984
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 02/04/16 thru 02/05/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Toluene [a]		0.43 J	1.0	0.20	ug/l	SW846 8260B
Trichloroethylene		11.7	0.50	0.20	ug/l	SW846 8260B

(a) AZ:E4
(b) Sample vial contained more than 0.5cm of sediment.
(c) Sample vial contained more than 0.5cm of sediment. AZ:E4
(d) Sample vial contained more than 0.5cm of sediment. CCV outside of control limits; results may be biased high. Insufficient intact vials remained for further reanalysis. AZ:V2

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-290-SO		
Lab Sample ID:	C43984-1	**Date Sampled:**	02/04/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58561.D	1	02/08/16	XB	n/a	n/a	VM1757
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.52 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.23	0.023	mg/kg	
108-86-1	Bromobenzene	ND	0.23	0.023	mg/kg	
74-97-5	Bromochloromethane	ND	0.23	0.023	mg/kg	
75-27-4	Bromodichloromethane	ND	0.23	0.023	mg/kg	
75-25-2	Bromoform	ND	0.23	0.023	mg/kg	
104-51-8	n-Butylbenzene	ND	0.23	0.023	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.23	0.023	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.23	0.023	mg/kg	
108-90-7	Chlorobenzene	ND	0.23	0.023	mg/kg	
75-00-3	Chloroethane	ND	0.23	0.045	mg/kg	
67-66-3	Chloroform	ND	0.23	0.023	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.23	0.023	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.23	0.023	mg/kg	
75-15-0	Carbon disulfide	ND	0.23	0.023	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.23	0.023	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.23	0.023	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.23	0.023	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.23	0.023	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.23	0.063	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.23	0.023	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.23	0.023	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.23	0.023	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.23	0.023	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.23	0.023	mg/kg	
124-48-1	Dibromochloromethane	ND	0.23	0.023	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.23	0.045	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.23	0.050	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.23	0.023	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.23	0.023	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.23	0.023	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.23	0.023	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-290-SO		
Lab Sample ID:	C43984-1	**Date Sampled:**	02/04/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
100-41-4	Ethylbenzene	ND	0.23	0.023	mg/kg	
591-78-6	2-Hexanone	ND	0.91	0.091	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.23	0.045	mg/kg	
98-82-8	Isopropylbenzene	ND	0.23	0.023	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.23	0.023	mg/kg	
74-83-9	Methyl bromide	ND	0.23	0.045	mg/kg	
74-87-3	Methyl chloride	ND	0.23	0.045	mg/kg	
74-95-3	Methylene bromide	ND	0.23	0.023	mg/kg	
75-09-2	Methylene chloride	ND	0.91	0.23	mg/kg	
91-20-3	Naphthalene	ND	0.23	0.045	mg/kg	
103-65-1	n-Propylbenzene	ND	0.23	0.023	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.23	0.023	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.23	0.023	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.23	0.023	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.23	0.045	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.23	0.023	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.23	0.045	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.23	0.045	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.23	0.027	mg/kg	
108-88-3	Toluene	ND	0.23	0.023	mg/kg	
79-01-6	Trichloroethylene	ND	0.23	0.023	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.23	0.045	mg/kg	
75-01-4	Vinyl chloride	ND	0.23	0.045	mg/kg	
1330-20-7	Xylene (total)	ND	0.45	0.045	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		70-130%
2037-26-5	Toluene-D8	105%		70-130%
460-00-4	4-Bromofluorobenzene	95%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-AQ		
Lab Sample ID:	C43984-2	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W60015.D	1	02/08/16	CV	n/a	n/a	VW2259
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [a]	0.32	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	1.1	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane [b]	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.9	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-AQ		
Lab Sample ID:	C43984-2	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [b]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	7.4	0.50	0.30	ug/l	
108-88-3	Toluene [a]	0.74	1.0	0.20	ug/l	J
79-01-6	Trichloroethylene	4.3	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

(a) AZ:E4
(b) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-345-SO		
Lab Sample ID:	C43984-3	**Date Sampled:**	02/05/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58562.D	1	02/08/16	XB	n/a	n/a	VM1757
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.56 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.22	0.022	mg/kg	
108-86-1	Bromobenzene	ND	0.22	0.022	mg/kg	
74-97-5	Bromochloromethane	ND	0.22	0.022	mg/kg	
75-27-4	Bromodichloromethane	ND	0.22	0.022	mg/kg	
75-25-2	Bromoform	ND	0.22	0.022	mg/kg	
104-51-8	n-Butylbenzene	ND	0.22	0.022	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.22	0.022	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.22	0.022	mg/kg	
108-90-7	Chlorobenzene	ND	0.22	0.022	mg/kg	
75-00-3	Chloroethane	ND	0.22	0.045	mg/kg	
67-66-3	Chloroform	ND	0.22	0.022	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.22	0.022	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.22	0.022	mg/kg	
75-15-0	Carbon disulfide	ND	0.22	0.022	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.22	0.022	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.22	0.022	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.22	0.022	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.22	0.022	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.22	0.063	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.22	0.022	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.22	0.022	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.22	0.022	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.22	0.022	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.22	0.022	mg/kg	
124-48-1	Dibromochloromethane	ND	0.22	0.022	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.22	0.045	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.22	0.049	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.22	0.022	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.22	0.022	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.22	0.022	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.22	0.022	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.22	0.022	mg/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-345-SO		
Lab Sample ID:	C43984-3	**Date Sampled:**	02/05/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.22	0.022	mg/kg	
100-41-4	Ethylbenzene	ND	0.22	0.022	mg/kg	
591-78-6	2-Hexanone	ND	0.90	0.090	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.22	0.045	mg/kg	
98-82-8	Isopropylbenzene	ND	0.22	0.022	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.22	0.022	mg/kg	
74-83-9	Methyl bromide	ND	0.22	0.045	mg/kg	
74-87-3	Methyl chloride	ND	0.22	0.045	mg/kg	
74-95-3	Methylene bromide	ND	0.22	0.022	mg/kg	
75-09-2	Methylene chloride	ND	0.90	0.22	mg/kg	
91-20-3	Naphthalene	ND	0.22	0.045	mg/kg	
103-65-1	n-Propylbenzene	ND	0.22	0.022	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.22	0.022	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.22	0.022	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.22	0.022	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.22	0.022	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.22	0.022	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.22	0.045	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.22	0.022	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.22	0.045	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.22	0.045	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.22	0.027	mg/kg	
108-88-3	Toluene	ND	0.22	0.022	mg/kg	
79-01-6	Trichloroethylene	ND	0.22	0.022	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.22	0.045	mg/kg	
75-01-4	Vinyl chloride	ND	0.22	0.045	mg/kg	
1330-20-7	Xylene (total)	ND	0.45	0.045	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		70-130%
2037-26-5	Toluene-D8	104%		70-130%
460-00-4	4-Bromofluorobenzene	97%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-345-SO		
Lab Sample ID:	C43984-3	**Date Sampled:**	02/05/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 1.8	1.8	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Barium	< 18	18	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Cadmium	< 0.88	0.88	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Chromium	1.1	0.88	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Iron	2320	19	mg/kg	1	02/10/16	02/10/16	RS	SW846 6010B [3]	SW846 3050B [6]
Lead	1.8	1.8	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Manganese	65.6	1.4	mg/kg	1	02/10/16	02/10/16	RS	SW846 6010B [3]	SW846 3050B [6]
Mercury	< 0.015	0.015	mg/kg	1	02/08/16	02/08/16	EB	SW846 7471A [1]	SW846 7471A [5]
Selenium	< 1.8	1.8	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]
Silver	< 0.88	0.88	mg/kg	1	02/09/16	02/09/16	RS	SW846 6010B [2]	SW846 3050B [4]

(1) Instrument QC Batch: MA5585
(2) Instrument QC Batch: MA5590
(3) Instrument QC Batch: MA5596
(4) Prep QC Batch: MP10801
(5) Prep QC Batch: MP10805
(6) Prep QC Batch: MP10813

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	DUP-BP-27-345-SO		
Lab Sample ID:	C43984-4	**Date Sampled:**	02/05/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58563.D	1	02/08/16	XB	n/a	n/a	VM1757
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.38 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.23	0.023	mg/kg	
108-86-1	Bromobenzene	ND	0.23	0.023	mg/kg	
74-97-5	Bromochloromethane	ND	0.23	0.023	mg/kg	
75-27-4	Bromodichloromethane	ND	0.23	0.023	mg/kg	
75-25-2	Bromoform	ND	0.23	0.023	mg/kg	
104-51-8	n-Butylbenzene	ND	0.23	0.023	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.23	0.023	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.23	0.023	mg/kg	
108-90-7	Chlorobenzene	ND	0.23	0.023	mg/kg	
75-00-3	Chloroethane	ND	0.23	0.046	mg/kg	
67-66-3	Chloroform	ND	0.23	0.023	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.23	0.023	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.23	0.023	mg/kg	
75-15-0	Carbon disulfide	ND	0.23	0.023	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.23	0.023	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.23	0.023	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.23	0.023	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.23	0.023	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.23	0.065	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.23	0.023	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.23	0.023	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.23	0.023	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.23	0.023	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.23	0.023	mg/kg	
124-48-1	Dibromochloromethane	ND	0.23	0.023	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.23	0.046	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.23	0.051	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.23	0.023	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.23	0.023	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.23	0.023	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.23	0.023	mg/kg	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-BP-27-345-SO		
Lab Sample ID:	C43984-4	**Date Sampled:**	02/05/16
Matrix:	SO - Soil	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.23	0.023	mg/kg	
100-41-4	Ethylbenzene	ND	0.23	0.023	mg/kg	
591-78-6	2-Hexanone	ND	0.93	0.093	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.23	0.046	mg/kg	
98-82-8	Isopropylbenzene	ND	0.23	0.023	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.23	0.023	mg/kg	
74-83-9	Methyl bromide	ND	0.23	0.046	mg/kg	
74-87-3	Methyl chloride	ND	0.23	0.046	mg/kg	
74-95-3	Methylene bromide	ND	0.23	0.023	mg/kg	
75-09-2	Methylene chloride	ND	0.93	0.23	mg/kg	
91-20-3	Naphthalene	ND	0.23	0.046	mg/kg	
103-65-1	n-Propylbenzene	ND	0.23	0.023	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.23	0.023	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.23	0.023	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.23	0.023	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.23	0.023	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.23	0.046	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.23	0.023	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.23	0.046	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.23	0.046	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.23	0.028	mg/kg	
108-88-3	Toluene	ND	0.23	0.023	mg/kg	
79-01-6	Trichloroethylene	ND	0.23	0.023	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.23	0.046	mg/kg	
75-01-4	Vinyl chloride	ND	0.23	0.046	mg/kg	
1330-20-7	Xylene (total)	ND	0.46	0.046	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		70-130%
2037-26-5	Toluene-D8	106%		70-130%
460-00-4	4-Bromofluorobenzene	92%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-345-AQ		
Lab Sample ID:	C43984-5	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W60016.D	1	02/09/16	CV	n/a	n/a	VW2259
Run #2 [a]	U32694.D	2.5	02/11/16	JC	n/a	n/a	VU1337

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	1.4	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	0.50	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.26	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.93	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane [c]	3.6 [d]	1.3	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	50.1	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	2.0	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-345-AQ		
Lab Sample ID:	C43984-5	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [e]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	104 [d]	1.3	0.75	ug/l	
108-88-3	Toluene [b]	0.47	1.0	0.20	ug/l	J
79-01-6	Trichloroethylene	40.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.98	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%	92%	80-123%
2037-26-5	Toluene-D8	97%	90%	88-112%
460-00-4	4-Bromofluorobenzene	89%	86%	79-114%

(a) Sample vial contained more than 0.5cm of sediment.
(b) AZ:E4
(c) CCV outside of control limits; results may be biased high. Insufficient intact vials remained for further reanalysis. AZ:V2
(d) Result is from Run# 2
(e) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-360-AQ		
Lab Sample ID:	C43984-6	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W60017.D	1	02/09/16	CV	n/a	n/a	VW2259
Run #2	V31734.D	1	02/15/16	KZ	n/a	n/a	VV1303

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [a]	0.35	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.5 [b]	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	9.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-360-AQ		
Lab Sample ID:	C43984-6	**Date Sampled:**	02/05/16
Matrix:	AQ - Ground Water	**Date Received:**	02/06/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	53.6	0.50	0.30	ug/l	
108-88-3	Toluene [a]	0.43	1.0	0.20	ug/l	J
79-01-6	Trichloroethylene	11.7	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%	95%	80-123%
2037-26-5	Toluene-D8	97%	100%	88-112%
460-00-4	4-Bromofluorobenzene	89%	101%	79-114%

(a) AZ:E4
(b) Result is from Run# 2
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R9	Sample RPD exceeded the laboratory acceptance limit.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
V2	CCV recovery was above method acceptance limits. This target analyte was detected in the sample. The sample could not be reanalyzed due to insufficient sample.

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 803401028869
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C CU3984

Client / Reporting Information

Company Name: AmecFW
Address: 4600 E. Washington St. Suite 600
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: Broadway Pantano ISCO STUDY
Street: Broadway & Pantano
City: Tucson State: AZ
Project #: 4420152042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #

Requested Analysis

8260B
Total RCRA 8 Metals
Iron & Manganese

Matrix Codes

WW- Wastewater
GW- Ground Water
SW- Surface Water
SO- Soil
OI-Oil
WP-Wipe
LIQ - Non-aqueous Liquid
AIR
DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	Na2S2O3	MEOH	ENCORE	8260B	Total RCRA 8 Metals Iron & Manganese									LAB USE ONLY
1	BP-27-290-SO	2/4/16	1510	KGK	SO	2	X								2										
2	BP-27-320-Ag	2/5/16	0830		Ag	3	X								3										
3	BP-27-345-SO		1100		SO	3	X				X				2	1									
4	DUP-BP-27-345-SO				SO	2	X								2										
5	BP-27-345-Ag		1200		Ag	3	X								3										
6	BP-27-360-Ag		1430		Ag	3	X								3										

Turnaround Time (Business days)

Approved By / Date:

- [x] 10 Day Normal Turnaround
- [x] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

BP-27-320-Ag Sample 2/4 full vial last
Bad vials on Ag Samples (Do not seal)

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	2/6/16 1300	1	2	2/5/16 1600	2 Fedex
Relinquished By:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
FDX	2/6/16 0930	3	4		4
Relinquished By:	Date Time:	Received By:	Custody Seal #	Appropriate Bottle / Pres. Y / N	Headspace Y / N	On Ice Y / N	Cooler Temp.
		5	Y	Labels match Coc? Y / N	Separate Receiving Check List used: Y / N		4.0/3.1

5.2 5

C43984: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43984 **Client:** AMEC FOSTER WHEELER **Project:** BROADWAY PANTANO ISCO STUDY

Date / Time Received: 2/6/2016 9:50:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401028869

Cooler Temps (Initial/Adjusted): #1: (4/3.1);

Cooler Security	Y	or N		Y	or N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	or N
1. Temp criteria achieved:	☑	☐
2. Therm ID:	IR3;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

Quality Control Preservation	Y	or N	N/A
1. Trip Blank present / cooler:	☐	☑	☐
2. Trip Blank listed on COC:	☐	☑	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	or N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	or N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	or N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments

Accutest Laboratories
V:408.588.0200
2105 Lundy Avenue
F: 408.588.0201
San Jose, CA 95131
www/accutest.com

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1757-MB	M58549.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	0.50	ug/kg	
108-86-1	Bromobenzene	ND	5.0	0.50	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.50	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	0.50	ug/kg	
75-25-2	Bromoform	ND	5.0	0.50	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.50	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	0.50	ug/kg	
75-00-3	Chloroethane	ND	5.0	1.0	ug/kg	
67-66-3	Chloroform	ND	5.0	0.50	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/kg	
106-43-4	p-Chlorotoluene	ND	5.0	0.50	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	0.50	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	0.50	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	0.50	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	0.50	ug/kg	
563-58-6	1,1-Dichloropropene	ND	5.0	0.50	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	0.50	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	0.50	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	0.50	ug/kg	
142-28-9	1,3-Dichloropropane	ND	5.0	0.50	ug/kg	
594-20-7	2,2-Dichloropropane	ND	5.0	0.50	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	0.50	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	0.50	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	0.50	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	0.50	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	0.50	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	0.50	ug/kg	
591-78-6	2-Hexanone	ND	20	2.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1757-MB	M58549.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	5.0	0.50	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	1.0	ug/kg	
74-95-3	Methylene bromide	ND	5.0	0.50	ug/kg	
75-09-2	Methylene chloride	ND	20	5.0	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.0	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.50	ug/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	0.50	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/kg	
96-18-4	1,2,3-Trichloropropane	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	1.0	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	0.60	ug/kg	
108-88-3	Toluene	ND	5.0	0.50	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	0.50	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	10	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	108%	70-130%
2037-26-5	Toluene-D8	101%	70-130%
460-00-4	4-Bromofluorobenzene	98%	70-130%

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2259-MB	W60002.D	1	02/08/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2259-MB	W60002.D	1	02/08/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	97%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	92%	79-114%

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1337-MB	U32680.D	1	02/11/16	JC	n/a	n/a	VU1337

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-5

CAS No.	Compound	Result	RL	MDL	Units	Q
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	87%	80-123%
2037-26-5	Toluene-D8	97%	88-112%
460-00-4	4-Bromofluorobenzene	88%	79-114%

Method Blank Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1303-MB	V31729.D	1	02/15/16	KZ	n/a	n/a	VV1303

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-6

CAS No.	Compound	Result	RL	MDL	Units	Q
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	95%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	100%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1757-BS	M58545.D	1	02/08/16	XB	n/a	n/a	VM1757
VM1757-BSD	M58547.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	40	34.9	87	38.2	96	9	70-130/30
108-86-1	Bromobenzene	40	37.7	94	39.3	98	4	70-130/30
74-97-5	Bromochloromethane	40	37.4	94	39.2	98	5	70-130/30
75-27-4	Bromodichloromethane	40	34.9	87	37.3	93	7	70-130/30
75-25-2	Bromoform	40	38.2	96	38.6	97	1	70-130/30
104-51-8	n-Butylbenzene	40	37.6	94	38.3	96	2	70-130/30
135-98-8	sec-Butylbenzene	40	36.5	91	37.7	94	3	70-130/30
98-06-6	tert-Butylbenzene	40	36.4	91	37.2	93	2	70-130/30
108-90-7	Chlorobenzene	40	35.1	88	37.6	94	7	70-130/30
75-00-3	Chloroethane	40	35.6	89	38.4	96	8	70-130/30
67-66-3	Chloroform	40	35.5	89	37.9	95	7	70-130/30
95-49-8	o-Chlorotoluene	40	39.2	98	40.8	102	4	70-130/30
106-43-4	p-Chlorotoluene	40	33.1	83	34.6	87	4	70-130/30
75-15-0	Carbon disulfide	40	31.6	79	32.5	81	3	70-130/30
56-23-5	Carbon tetrachloride	40	34.2	86	37.0	93	8	70-130/30
75-34-3	1,1-Dichloroethane	40	35.1	88	37.3	93	6	70-130/30
75-35-4	1,1-Dichloroethylene	40	33.0	83	34.7	87	5	70-130/30
563-58-6	1,1-Dichloropropene	40	33.3	83	36.4	91	9	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	40	40.2	101	36.0	90	11	70-130/30
106-93-4	1,2-Dibromoethane	40	39.0	98	39.0	98	0	70-130/30
107-06-2	1,2-Dichloroethane	40	36.0	90	37.5	94	4	70-130/30
78-87-5	1,2-Dichloropropane	40	36.5	91	38.9	97	6	70-130/30
142-28-9	1,3-Dichloropropane	40	40.8	102	41.4	104	1	70-130/30
594-20-7	2,2-Dichloropropane	40	31.8	80	36.5	91	14	70-130/30
124-48-1	Dibromochloromethane	40	37.2	93	38.1	95	2	70-130/30
75-71-8	Dichlorodifluoromethane	40	27.8	70	30.9	77	11	70-130/30
156-59-2	cis-1,2-Dichloroethylene	40	37.0	93	39.6	99	7	70-130/30
10061-01-5	cis-1,3-Dichloropropene	40	38.2	96	40.3	101	5	70-130/30
541-73-1	m-Dichlorobenzene	40	36.2	91	38.0	95	5	70-130/30
95-50-1	o-Dichlorobenzene	40	37.5	94	38.5	96	3	70-130/30
106-46-7	p-Dichlorobenzene	40	37.2	93	38.4	96	3	70-130/30
156-60-5	trans-1,2-Dichloroethylene	40	31.8	80	34.2	86	7	70-130/30
10061-02-6	trans-1,3-Dichloropropene	40	37.8	95	38.6	97	2	70-130/30
100-41-4	Ethylbenzene	40	35.9	90	38.8	97	8	70-130/30
591-78-6	2-Hexanone	160	186	116	175	109	6	60-140/30
87-68-3	Hexachlorobutadiene	40	39.9	100	39.8	100	0	70-130/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1757-BS	M58545.D	1	02/08/16	XB	n/a	n/a	VM1757
VM1757-BSD	M58547.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	40	35.3	88	37.7	94	7	70-130/30
99-87-6	p-Isopropyltoluene	40	37.0	93	37.8	95	2	70-130/30
74-83-9	Methyl bromide	40	37.6	94	40.9	102	8	70-130/30
74-87-3	Methyl chloride	40	29.5	74	32.6	82	10	70-130/30
74-95-3	Methylene bromide	40	37.2	93	38.4	96	3	70-130/30
75-09-2	Methylene chloride	40	36.7	92	37.9	95	3	70-130/30
91-20-3	Naphthalene	40	44.1	110	40.3	101	9	70-130/30
103-65-1	n-Propylbenzene	40	35.5	89	37.2	93	5	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	40	35.7	89	38.1	95	7	70-130/30
71-55-6	1,1,1-Trichloroethane	40	36.1	90	38.3	96	6	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	40	41.9	105	38.1	95	9	70-130/30
79-00-5	1,1,2-Trichloroethane	40	38.7	97	39.6	99	2	70-130/30
87-61-6	1,2,3-Trichlorobenzene	40	41.8	105	40.9	102	2	70-130/30
96-18-4	1,2,3-Trichloropropane	40	39.0	98	37.7	94	3	70-130/30
120-82-1	1,2,4-Trichlorobenzene	40	40.6	102	40.4	101	0	70-130/30
95-63-6	1,2,4-Trimethylbenzene	40	36.3	91	37.2	93	2	70-130/30
108-67-8	1,3,5-Trimethylbenzene	40	37.0	93	38.4	96	4	70-130/30
127-18-4	Tetrachloroethylene	40	36.2	91	40.3	101	11	70-130/30
108-88-3	Toluene	40	35.9	90	38.5	96	7	70-130/30
79-01-6	Trichloroethylene	40	34.8	87	38.1	95	9	70-130/30
75-69-4	Trichlorofluoromethane	40	37.6	94	41.2	103	9	70-130/30
75-01-4	Vinyl chloride	40	29.5	74	33.8	85	14	70-130/30
1330-20-7	Xylene (total)	120	104	87	112	93	7	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	103%	100%	70-130%
2037-26-5	Toluene-D8	103%	101%	70-130%
460-00-4	4-Bromofluorobenzene	99%	99%	70-130%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2259-BS	W59998.D	1	02/08/16	CV	n/a	n/a	VW2259
VW2259-BSD	W59999.D	1	02/08/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.8	104	20.4	102	2	76-120/10
108-86-1	Bromobenzene	20	19.9	100	20.1	101	1	80-123/10
74-97-5	Bromochloromethane	20	21.0	105	21.0	105	0	79-124/10
75-27-4	Bromodichloromethane	20	21.0	105	20.9	105	0	75-121/10
75-25-2	Bromoform	20	17.5	88	17.6	88	1	62-127/10
104-51-8	n-Butylbenzene	20	21.9	110	21.4	107	2	74-129/10
135-98-8	sec-Butylbenzene	20	21.7	109	21.3	107	2	75-128/11
98-06-6	tert-Butylbenzene	20	21.3	107	21.2	106	0	74-127/11
108-90-7	Chlorobenzene	20	20.1	101	20.1	101	0	79-119/10
75-00-3	Chloroethane	20	20.8	104	20.6	103	1	60-115/14
67-66-3	Chloroform	20	20.9	105	20.5	103	2	75-122/10
95-49-8	o-Chlorotoluene	20	21.2	106	21.0	105	1	76-125/12
106-43-4	p-Chlorotoluene	20	21.8	109	21.8	109	0	76-126/11
75-15-0	Carbon disulfide	20	19.1	96	18.3	92	4	51-130/13
56-23-5	Carbon tetrachloride	20	21.6	108	21.2	106	2	72-128/13
75-34-3	1,1-Dichloroethane	20	21.7	109	20.9	105	4	70-121/10
75-35-4	1,1-Dichloroethylene	20	19.0	95	18.1	91	5	62-125/13
563-58-6	1,1-Dichloropropene	20	20.4	102	19.9	100	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	19.0	95	19.2	96	1	64-129/11
106-93-4	1,2-Dibromoethane	20	20.4	102	20.8	104	2	81-124/10
107-06-2	1,2-Dichloroethane	20	20.8	104	20.6	103	1	74-122/10
78-87-5	1,2-Dichloropropane	20	21.9	110	21.5	108	2	75-123/10
142-28-9	1,3-Dichloropropane	20	21.1	106	21.1	106	0	81-127/11
594-20-7	2,2-Dichloropropane	20	22.0	110	20.6	103	7	66-130/12
124-48-1	Dibromochloromethane	20	17.7	89	17.7	89	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	25.5	128	23.8	119	7	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	22.2	111	21.7	109	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	23.1	116	22.8	114	1	76-131/10
541-73-1	m-Dichlorobenzene	20	20.2	101	20.3	102	0	79-121/10
95-50-1	o-Dichlorobenzene	20	20.1	101	20.3	102	1	79-120/10
106-46-7	p-Dichlorobenzene	20	20.3	102	20.3	102	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.0	95	18.3	92	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	21.6	108	21.3	107	1	73-125/10
100-41-4	Ethylbenzene	20	21.3	107	21.2	106	0	78-123/10
591-78-6	2-Hexanone	80	91.5	114	90.3	113	1	71-145/12
87-68-3	Hexachlorobutadiene	20	19.9	100	19.8	99	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2259-BS	W59998.D	1	02/08/16	CV	n/a	n/a	VW2259
VW2259-BSD	W59999.D	1	02/08/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	21.2	106	21.2	106	0	77-125/10
99-87-6	p-Isopropyltoluene	20	22.0	110	21.7	109	1	76-126/10
74-83-9	Methyl bromide	20	21.4	107	21.1	106	1	65-124/13
74-87-3	Methyl chloride	20	22.8	114	22.4	112	2	47-143/20
74-95-3	Methylene bromide	20	21.5	108	21.6	108	0	80-125/10
75-09-2	Methylene chloride	20	22.5	113	22.1	111	2	65-124/15
91-20-3	Naphthalene	20	22.2	111	21.9	110	1	66-120/12
103-65-1	n-Propylbenzene	20	21.1	106	20.8	104	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	21.3	107	21.3	107	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	21.8	109	21.3	107	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	22.0	110	21.6	108	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.9	105	20.7	104	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	22.2	111	22.5	113	1	70-128/12
96-18-4	1,2,3-Trichloropropane	20	22.4	112	22.0	110	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	20.7	104	20.8	104	0	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	21.6	108	21.3	107	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	21.7	109	21.5	108	1	79-130/10
127-18-4	Tetrachloroethylene	20	19.8	99	19.7	99	1	72-124/13
108-88-3	Toluene	20	20.5	103	20.4	102	0	78-121/10
79-01-6	Trichloroethylene	20	20.5	103	20.4	102	0	75-119/10
75-69-4	Trichlorofluoromethane	20	22.2	111	22.1	111	0	68-130/19
75-01-4	Vinyl chloride	20	26.0	130	25.7	129	1	57-137/18
1330-20-7	Xylene (total)	60	65.4	109	64.2	107	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	100%	99%	80-123%
2037-26-5	Toluene-D8	96%	97%	88-112%
460-00-4	4-Bromofluorobenzene	95%	98%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1337-BS	U32677.D	1	02/10/16	JC	n/a	n/a	VU1337
VU1337-BSD	U32678.D	1	02/11/16	JC	n/a	n/a	VU1337

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
75-71-8	Dichlorodifluoromethane	20	18.2	91	17.6	88	3	26-163/26
127-18-4	Tetrachloroethylene	20	18.9	95	19.1	96	1	72-124/13

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	96%	96%	80-123%
2037-26-5	Toluene-D8	94%	94%	88-112%
460-00-4	4-Bromofluorobenzene	96%	94%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1303-BS	V31726.D	1	02/15/16	KZ	n/a	n/a	VV1303
VV1303-BSD	V31727.D	1	02/15/16	KZ	n/a	n/a	VV1303

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
75-71-8	Dichlorodifluoromethane	20	16.0	80	15.7	79	2	26-163/26

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	97%	98%	80-123%
2037-26-5	Toluene-D8	96%	96%	88-112%
460-00-4	4-Bromofluorobenzene	99%	102%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1757-LCS	M58548.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	Spike ug/kg	LCS ug/kg	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	100%	70-130%
2037-26-5	Toluene-D8	106%	70-130%
460-00-4	4-Bromofluorobenzene	99%	70-130%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1303-LCS	V31728.D	1	02/15/16	KZ	n/a	n/a	VV1303

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-6

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	95%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	100%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44001-1MS	M58558.D	1	02/08/16	XB	n/a	n/a	VM1757
C44001-1MSD	M58559.D	1	02/08/16	XB	n/a	n/a	VM1757
C44001-1	M58556.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	C44001-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		39.1	36.6	94	39.3	36.7	93	0	70-130/30
108-86-1	Bromobenzene	ND		39.1	34.2	88	39.3	32.2	82	6	70-130/30
74-97-5	Bromochloromethane	ND		39.1	38.6	99	39.3	40.0	102	4	70-130/30
75-27-4	Bromodichloromethane	ND		39.1	36.9	94	39.3	36.6	93	1	70-130/30
75-25-2	Bromoform	ND		39.1	38.4	98	39.3	37.9	96	1	70-130/30
104-51-8	n-Butylbenzene	ND		39.1	27.5	70	39.3	24.9	63* [a]	10	70-130/30
135-98-8	sec-Butylbenzene	ND		39.1	29.1	74	39.3	26.7	68* [a]	9	70-130/30
98-06-6	tert-Butylbenzene	ND		39.1	31.8	81	39.3	29.3	75	8	70-130/30
108-90-7	Chlorobenzene	ND		39.1	33.6	86	39.3	32.7	83	3	70-130/30
75-00-3	Chloroethane	ND		39.1	35.3	90	39.3	35.6	91	1	70-130/30
67-66-3	Chloroform	ND		39.1	37.6	96	39.3	37.7	96	0	70-130/30
95-49-8	o-Chlorotoluene	ND		39.1	31.2	80	39.3	29.0	74	7	70-130/30
106-43-4	p-Chlorotoluene	ND		39.1	32.6	83	39.3	25.7	65* [a]	24	70-130/30
75-15-0	Carbon disulfide	ND		39.1	31.1	80	39.3	31.3	80	1	70-130/30
56-23-5	Carbon tetrachloride	ND		39.1	35.2	90	39.3	36.1	92	3	70-130/30
75-34-3	1,1-Dichloroethane	ND		39.1	36.3	93	39.3	37.2	95	2	70-130/30
75-35-4	1,1-Dichloroethylene	ND		39.1	32.7	84	39.3	33.8	86	3	70-130/30
563-58-6	1,1-Dichloropropene	ND		39.1	34.1	87	39.3	33.9	86	1	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	ND		39.1	36.4	93	39.3	37.8	96	4	70-130/30
106-93-4	1,2-Dibromoethane	ND		39.1	38.2	98	39.3	37.9	96	1	70-130/30
107-06-2	1,2-Dichloroethane	ND		39.1	38.6	99	39.3	39.3	100	2	70-130/30
78-87-5	1,2-Dichloropropane	ND		39.1	38.1	98	39.3	37.3	95	2	70-130/30
142-28-9	1,3-Dichloropropane	ND		39.1	41.5	106	39.3	40.0	102	4	70-130/30
594-20-7	2,2-Dichloropropane	ND		39.1	31.8	81	39.3	34.9	89	9	70-130/30
124-48-1	Dibromochloromethane	ND		39.1	37.3	95	39.3	37.4	95	0	70-130/30
75-71-8	Dichlorodifluoromethane	ND		39.1	28.8	74	39.3	29.9	76	4	70-130/30
156-59-2	cis-1,2-Dichloroethylene	ND		39.1	37.8	97	39.3	38.6	98	2	70-130/30
10061-01-5	cis-1,3-Dichloropropene	ND		39.1	37.9	97	39.3	36.3	92	4	70-130/30
541-73-1	m-Dichlorobenzene	ND		39.1	29.6	76	39.3	28.6	73	3	70-130/30
95-50-1	o-Dichlorobenzene	ND		39.1	31.6	81	39.3	30.7	78	3	70-130/30
106-46-7	p-Dichlorobenzene	ND		39.1	31.1	80	39.3	29.2	74	6	70-130/30
156-60-5	trans-1,2-Dichloroethylene	ND		39.1	32.4	83	39.3	33.2	84	2	70-130/30
10061-02-6	trans-1,3-Dichloropropene	ND		39.1	37.2	95	39.3	35.8	91	4	70-130/30
100-41-4	Ethylbenzene	ND		39.1	34.3	88	39.3	33.6	86	2	70-130/30
591-78-6	2-Hexanone	ND		156	184	118	157	175	111	5	60-140/30
87-68-3	Hexachlorobutadiene	ND		39.1	22.4	57* [a]	39.3	19.4	49* [a]	14	70-130/30

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44001-1MS	M58558.D	1	02/08/16	XB	n/a	n/a	VM1757
C44001-1MSD	M58559.D	1	02/08/16	XB	n/a	n/a	VM1757
C44001-1	M58556.D	1	02/08/16	XB	n/a	n/a	VM1757

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-1, C43984-3, C43984-4

CAS No.	Compound	C44001-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		39.1	31.9	82	39.3	31.4	80	2	70-130/30
99-87-6	p-Isopropyltoluene	ND		39.1	28.5	73	39.3	26.3	67* [a]	8	70-130/30
74-83-9	Methyl bromide	ND		39.1	38.2	98	39.3	38.3	97	0	70-130/30
74-87-3	Methyl chloride	ND		39.1	33.5	86	39.3	33.4	85	0	70-130/30
74-95-3	Methylene bromide	ND		39.1	39.2	100	39.3	39.6	101	1	70-130/30
75-09-2	Methylene chloride	ND		39.1	36.2	93	39.3	37.5	95	4	70-130/30
91-20-3	Naphthalene	ND		39.1	32.3	83	39.3	32.6	83	1	70-130/30
103-65-1	n-Propylbenzene	ND		39.1	30.4	78	39.3	27.9	71	9	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	ND		39.1	35.5	91	39.3	36.8	94	4	70-130/30
71-55-6	1,1,1-Trichloroethane	ND		39.1	36.8	94	39.3	37.2	95	1	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		39.1	37.0	95	39.3	34.8	89	6	70-130/30
79-00-5	1,1,2-Trichloroethane	ND		39.1	39.8	102	39.3	40.4	103	1	70-130/30
87-61-6	1,2,3-Trichlorobenzene	ND		39.1	28.3	72	39.3	27.3	69* [a]	4	70-130/30
96-18-4	1,2,3-Trichloropropane	ND		39.1	36.4	93	39.3	37.6	96	3	70-130/30
120-82-1	1,2,4-Trichlorobenzene	ND		39.1	27.3	70	39.3	25.6	65* [a]	6	70-130/30
95-63-6	1,2,4-Trimethylbenzene	ND		39.1	30.4	78	39.3	28.6	73	6	70-130/30
108-67-8	1,3,5-Trimethylbenzene	ND		39.1	31.6	81	39.3	28.9	74	9	70-130/30
127-18-4	Tetrachloroethylene	ND		39.1	51.0	131* [b]	39.3	51.0	130	0	70-130/30
108-88-3	Toluene	ND		39.1	35.4	91	39.3	35.3	90	0	70-130/30
79-01-6	Trichloroethylene	ND		39.1	35.9	92	39.3	35.9	91	0	70-130/30
75-69-4	Trichlorofluoromethane	ND		39.1	38.9	100	39.3	38.6	98	1	70-130/30
75-01-4	Vinyl chloride	ND		39.1	39.2	100	39.3	39.1	100	0	70-130/30
1330-20-7	Xylene (total)	ND		117	96.7	83	118	95.3	81	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	C44001-1	Limits
1868-53-7	Dibromofluoromethane	107%	108%	116%	70-130%
2037-26-5	Toluene-D8	102%	107%	103%	70-130%
460-00-4	4-Bromofluorobenzene	98%	99%	95%	70-130%

(a) Outside laboratory control limits. AZ:M2
(b) Outside laboratory control limits. AZ:M1

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43987-7MS	W60019.D	500	02/09/16	CV	n/a	n/a	VW2259
C43987-7MSD	W60020.D	500	02/09/16	CV	n/a	n/a	VW2259
C43987-7 [a]	W60018.D	500	02/09/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	C43987-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		10000	11100	111	10000	10900	109	2	76-120/10
108-86-1	Bromobenzene	ND		10000	9910	99	10000	9840	98	1	80-123/10
74-97-5	Bromochloromethane	ND		10000	10900	109	10000	10700	107	2	79-124/10
75-27-4	Bromodichloromethane	ND		10000	10700	107	10000	10600	106	1	75-121/10
75-25-2	Bromoform	ND		10000	8270	83	10000	8190	82	1	62-127/10
104-51-8	n-Butylbenzene	ND		10000	12000	120	10000	12000	120	0	74-129/10
135-98-8	sec-Butylbenzene	ND		10000	11600	116	10000	11500	115	1	75-128/11
98-06-6	tert-Butylbenzene	ND		10000	11000	110	10000	10900	109	1	74-127/11
108-90-7	Chlorobenzene	ND		10000	10300	103	10000	10100	101	2	79-119/10
75-00-3	Chloroethane	ND		10000	11800	118* [b]	10000	11400	114	3	60-115/14
67-66-3	Chloroform	ND		10000	11100	111	10000	11000	110	1	75-122/10
95-49-8	o-Chlorotoluene	ND		10000	11000	110	10000	10800	108	2	76-125/12
106-43-4	p-Chlorotoluene	ND		10000	11000	110	10000	11100	111	1	76-126/11
75-15-0	Carbon disulfide	ND		10000	10700	107	10000	10200	102	5	51-130/13
56-23-5	Carbon tetrachloride	ND		10000	11100	111	10000	11000	110	1	72-128/13
75-34-3	1,1-Dichloroethane	ND		10000	12200	122* [b]	10000	11900	119	2	70-121/10
75-35-4	1,1-Dichloroethylene	ND		10000	10200	102	10000	10100	101	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		10000	10900	109	10000	10700	107	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		10000	9390	94	10000	9880	99	5	64-129/11
106-93-4	1,2-Dibromoethane	ND		10000	10200	102	10000	10200	102	0	81-124/10
107-06-2	1,2-Dichloroethane	ND		10000	10900	109	10000	10800	108	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		10000	11800	118	10000	11600	116	2	75-123/10
142-28-9	1,3-Dichloropropane	ND		10000	10900	109	10000	10900	109	0	81-127/11
594-20-7	2,2-Dichloropropane	ND		10000	10300	103	10000	10100	101	2	66-130/12
124-48-1	Dibromochloromethane	ND		10000	8660	87	10000	8680	87	0	76-124/10
75-71-8	Dichlorodifluoromethane	ND		10000	16300	163	10000	15200	152	7	26-163/26
156-59-2	cis-1,2-Dichloroethylene	11200		10000	23400	122	10000	26700	155* [b]	13* [c]	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		10000	11600	116	10000	11400	114	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		10000	10200	102	10000	10000	100	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		10000	10100	101	10000	10100	101	0	79-120/10
106-46-7	p-Dichlorobenzene	ND		10000	10200	102	10000	10000	100	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	321		10000	10600	103	10000	10600	103	0	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		10000	10500	105	10000	10600	106	1	73-125/10
100-41-4	Ethylbenzene	1170		10000	12600	114	10000	12800	116	2	78-123/10
591-78-6	2-Hexanone	ND		40000	50800	127	40000	49500	124	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		10000	13000	130	10000	13900	139* [b]	7	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43987-7MS	W60019.D	500	02/09/16	CV	n/a	n/a	VW2259
C43987-7MSD	W60020.D	500	02/09/16	CV	n/a	n/a	VW2259
C43987-7 [a]	W60018.D	500	02/09/16	CV	n/a	n/a	VW2259

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-2, C43984-5, C43984-6

CAS No.	Compound	C43987-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		10000	11200	112	10000	11000	110	2	77-125/10
99-87-6	p-Isopropyltoluene	ND		10000	11500	115	10000	11500	115	0	76-126/10
74-83-9	Methyl bromide	ND		10000	11600	116	10000	11300	113	3	65-124/13
74-87-3	Methyl chloride	ND		10000	15000	150* [b]	10000	13600	136	10	47-143/20
74-95-3	Methylene bromide	ND		10000	11100	111	10000	11000	110	1	80-125/10
75-09-2	Methylene chloride	ND		10000	11900	119	10000	11600	116	3	65-124/15
91-20-3	Naphthalene	ND		10000	9080	91	10000	10700	107	16* [c]	66-120/12
103-65-1	n-Propylbenzene	ND		10000	11200	112	10000	11000	110	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10000	10500	105	10000	10600	106	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		10000	11500	115	10000	11200	112	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		10000	11400	114	10000	11400	114	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		10000	10900	109	10000	10700	107	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		10000	8740	87	10000	10400	104	17* [c]	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		10000	11100	111	10000	10900	109	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		10000	9060	91	10000	9880	99	9	72-125/11
95-63-6	1,2,4-Trimethylbenzene	120	J	10000	11300	112	10000	11200	111	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		10000	11300	113	10000	11200	112	1	79-130/10
127-18-4	Tetrachloroethylene	ND		10000	10000	100	10000	9940	99	1	72-124/13
108-88-3	Toluene	1120		10000	11900	108	10000	12100	110	2	78-121/10
79-01-6	Trichloroethylene	ND		10000	10600	106	10000	10400	104	2	75-119/10
75-69-4	Trichlorofluoromethane	ND		10000	11700	117	10000	11600	116	1	68-130/19
75-01-4	Vinyl chloride	17800		10000	28200	104	10000	36100	183* [b]	25* [c]	57-137/18
1330-20-7	Xylene (total)	1770		30000	36100	114	30000	36400	115	1	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C43987-7	Limits
1868-53-7	Dibromofluoromethane	103%	103%	100%	80-123%
2037-26-5	Toluene-D8	97%	98%	97%	88-112%
460-00-4	4-Bromofluorobenzene	95%	97%	89%	79-114%

(a) Dilution required due to nature of sample matrix.
(b) Outside laboratory control limits. AZ:M1
(c) Outside laboratory control limits. AZ:R9

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43945-11MS	U32696.D	10	02/11/16	JC	n/a	n/a	VU1337
C43945-11MSD	U32697.D	10	02/11/16	JC	n/a	n/a	VU1337
C43945-11	U32695.D	1	02/11/16	JC	n/a	n/a	VU1337
C43945-11	U32682.D	10	02/11/16	JC	n/a	n/a	VU1337

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-5

CAS No.	Compound	C43945-11 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-71-8	Dichlorodifluoromethane	ND		200	203	102	200	203	102	0	26-163/26
127-18-4	Tetrachloroethylene	99.6 [a]		200	299	100	200	307	104	3	72-124/13

CAS No.	Surrogate Recoveries	MS	MSD	C43945-11	C43945-11	Limits
1868-53-7	Dibromofluoromethane	102%	102%	93%	88%	80-123%
2037-26-5	Toluene-D8	93%	93%	95%	96%	88-112%
460-00-4	4-Bromofluorobenzene	96%	95%	86%	87%	79-114%

(a) Result is from Run #2.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43984
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44014-1MS	V31746.D	1	02/15/16	KZ	n/a	n/a	VV1303
C44014-1MSD	V31747.D	1	02/15/16	KZ	n/a	n/a	VV1303
C44014-1	V31737.D	1	02/15/16	KZ	n/a	n/a	VV1303

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43984-6

CAS No.	Compound	C44014-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-71-8	Dichlorodifluoromethane	ND		20	18.1	91	20	18.5	93	2	26-163/26

CAS No.	Surrogate Recoveries	MS	MSD	C44014-1	Limits
1868-53-7	Dibromofluoromethane	95%	95%	94%	80-123%
2037-26-5	Toluene-D8	96%	96%	100%	88-112%
460-00-4	4-Bromofluorobenzene	102%	99%	101%	79-114%

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10801
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/08/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17	-0.070	<2.0
Barium	20	.02	.09	0.27	<20
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031	0.0	<1.0
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054	0.060	<1.0
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76		
Lead	2.0	.1	.14	0.010	<2.0
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026		
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33	-0.060	<2.0
Silicon	20	.24	.43		
Silver	1.0	.05	.067	-0.010	<1.0
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10801: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10801
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/08/16

Metal	C43792-1R Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	4.7	54.5	56.5	88.1	75-125
Barium	95.2	151	56.5	98.7	75-125
Beryllium	anr				
Boron					
Cadmium	6.6	55.9	56.5	87.2	75-125
Calcium					
Chromium	44.8	98.5	56.5	95.0	75-125
Cobalt	anr				
Copper	anr				
Iron					
Lead	7.7	59.6	56.5	91.8	75-125
Magnesium					
Manganese					
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	1.1	49.5	56.5	85.6	75-125
Silicon					
Silver	0.0	48.0	56.5	84.9	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10801: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10801
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/08/16

Metal	C43792-1R Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	4.7	55.8	56.5	90.4	2.4	20
Barium	95.2	151	56.5	98.7	0.0	20
Beryllium	anr					
Boron						
Cadmium	6.6	56.0	56.5	87.4	0.2	20
Calcium						
Chromium	44.8	99.9	56.5	97.5	1.4	20
Cobalt	anr					
Copper	anr					
Iron						
Lead	7.7	59.4	56.5	91.5	0.3	20
Magnesium						
Manganese						
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	1.1	50.4	56.5	87.2	1.8	20
Silicon						
Silver	0.0	48.6	56.5	86.0	1.2	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10801: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10801
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/08/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	45.6	50	91.2	80-120
Barium	48.2	50	96.4	80-120
Beryllium	anr			
Boron				
Cadmium	47.0	50	94.0	80-120
Calcium				
Chromium	50.3	50	100.6	80-120
Cobalt	anr			
Copper	anr			
Iron				
Lead	45.4	50	90.8	80-120
Magnesium				
Manganese				
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	44.6	50	89.2	80-120
Silicon				
Silver	44.4	50	88.8	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10801: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10801
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 02/08/16

Metal	C43792-1R Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	42.1	37.5	10.9 (a)	0-10
Barium	850	878	3.2	0-10
Beryllium	anr			
Boron				
Cadmium	58.8	61.0	3.7	0-10
Calcium				
Chromium	400	417	4.3	0-10
Cobalt	anr			
Copper	anr			
Iron				
Lead	68.9	73.5	6.7	0-10
Magnesium				
Manganese				
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	9.90	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10801: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10805 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 02/08/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.017	.00035	.0019	0.0031	<0.017

Associated samples MP10805: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1
7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10805
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 02/08/16

Metal	C43792-1R Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.021	0.23	0.199	104.9	75-125

Associated samples MP10805: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10805 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 02/08/16

Metal	C43792-1R Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.021	0.23	0.202	103.3	0.0	20

Associated samples MP10805: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10805
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 02/08/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP10805: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.3

7

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10813
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/10/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17		
Barium	20	.02	.09		
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031		
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054		
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76	2.6	<20
Lead	2.0	.1	.14		
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026	0.12	<1.5
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33		
Silicon	20	.24	.43		
Silver	1.0	.05	.067		
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10813: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10813 Methods: SW846 6010B
Matrix Type: SOLID Units: mg/kg

Prep Date: 02/10/16

Metal	C44022-5 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium	anr				
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron	21100	22100	1190	84.0	75-125
Lead	anr				
Magnesium					
Manganese	493	500	47.6	14.7 (a)	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10813: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. AZ:M3

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10813 Methods: SW846 6010B
Matrix Type: SOLID Units: mg/kg

Prep Date: 02/10/16

Metal	C44022-5 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron	21100	22100	1150	87.2	0.0	20
Lead	anr					
Magnesium						
Manganese	493	556	45.9	137.3(a)	10.6	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10813: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. AZ:M3

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10813
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 02/10/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron	1250	1250	100.0	80-120
Lead	anr			
Magnesium				
Manganese	51.1	50	102.2	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10813: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43984
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10813
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 02/10/16

Metal	C44022-5 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron	220000	237000	7.9	0-10
Lead	anr			
Magnesium				
Manganese	5130	5590	8.9	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10813: C43984-3

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

Carus Remediation Technologies
Remediation Report

19th February, 2016

Customer: Amec Foster Wheeler
4600 E. Washington St
Phoenix, AZ 85034

Cc: T. Lizer

Attention: Alex Yiannakakis

From: L. Mueller

TECH # 16-020

Subject: RemOx® L ISCO Reagent Permanganate Natural Oxidant Demand

Summary
The overall average RemOx® L ISCO reagent permanganate natural oxidant demand (PNOD) at 48 hours for the soil samples was determined to be 0.2 g/kg. The average demands ranged from 0.0 g/kg to 0.2 g/kg. These values are calculated on a weight as sodium permanganate ($NaMnO_4$) per dry weight of soil.

Background
Four soil samples were received from Amec Foster Wheeler from the BP ISCO STUDY project located in Tuscon, AZ. The soil sample designations were BP-28-320, BP-28-350, BP29-300, and BP-27-345. The samples were analyzed for permanganate natural oxidant demand. The measurement of the permanganate natural oxidant demand is used to estimate the concentration of permanganate that will be consumed by the natural reducing agents during a given time period of 48 hours.

Experimental
The samples were analyzed for permanganate natural oxidant demand following ASTM D7262-07 Test Method A. A brief summary is as follows:

To determine the PNOD, the soil was baked at 105°C for 24 hours then allowed to cool to room temperature. The soil was then blended and passed through a U.S. 10 sieve (2 mm). Reactors were loaded with 50 grams of soil and 100 mL of 20 g/L $NaMnO_4$ for an initial dose of 40 g/kg $NaMnO_4$ on a dry soil weight basis at a 1:2 soil to aqueous reagent ratio. Each soil dose was performed in triplicate. The reaction vessels were inverted once to mix the reagents. Residual permanganate (MnO_4^-) was determined at 48 hours. The demands were calculated on a dry weight basis.

Results
The permanganate demand is the amount of permanganate consumed in a given amount of time. It should be noted that in a soil or groundwater sample, the oxidation of any compound by permanganate is dependent on the initial dose of permanganate and the reaction time available. As the permanganate dose is increased, the reaction rate and oxidant consumption may also increase. Some compounds that are not typically oxidized by permanganate under low doses can become

reactive with permanganate at higher concentrations. The 48-hour PNOD results can be seen in Table 1 (on a dry soil basis).

Table 1: 48-Hour PNOD *

Soil Sample Identification	Average and Standard Deviation (g/kg)	Replicate 1 (g/kg)	Replicate 2 (g/kg)	Replicate 3 (g/kg)
BP-28-320	0.0 ± 0.02	0.0	0.0	0.0
BP-28-350	0.0 ± 0.08	0.0	0.0	0.0
BP-29-300	0.2 ± 0.57	0.7	0.0	0.0
BP-27-345	0.0 ± 0.05	0.0	0.0	0.0
Overall Average	0.06			

*Demands were calculated on a weight $NaMnO_4$/dry soil weight basis from an initial dose of 40.0 g/kg $NaMnO_4$ initial dose at a 1:2 soil to aqueous solution ratio.

Conclusions

For this application the amount of permanganate needed will be dependent on the reaction time allowed. On average, the soil samples had a 48-hour permanganate demand value of 0.06 g/kg. The average demands ranged from 0.0 g/kg to 0.2 g/kg. Generally, remediation sites with a soil demand of less than 20.0 g/kg at the time of interest are favorable for *in situ* chemical oxidation with permanganate (see Table 2 for additional information).

Table 2: Correlation of Permanganate Natural Oxidant Demand Results*

PNOD (g/kg)	**Rank**	Comment
<10	Low	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is low.
10-20	Moderate	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is moderate. Economics should be considered.
>20	High	ISCO with MnO_4^- is technically feasible. Other technologies may provide lower cost alternatives.

*Dry Weight Basis

RemOx® L ISCO reagent is a registered trademark of Carus Corporation

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest NC Job #: C

Client / Reporting Information

Company Name: Amec Foster Wheeler
Address: 4600 E. Washington St.
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: BP ISCO STUDY
Street: Broadway and Pantano
City: Tucson State: AZ
Project #: 1420152042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	NOD									LAB USE ONLY
	BP-28-320	2/3/16	1430	KGK							✓				1									
	BP-28-350	↓	↓	↓							✓				1									
	BP-29-300										✓				1									
	BP-27-345	2/10/16	1000	KGK							✓				1									

Matrix Codes

WW- Wastewater
GW- Ground Water
SW- Surface Water
SO- Soil
OI-Oil
WP-Wipe
LIQ - Non-aqueous Liquid
AIR
DW- Drinking Water (Perchlorate Only)

Turnaround Time (Business days)

- [x] 10 Day standard
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Approved By:/ Date:

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [x] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Tech #: 16-020
Logged by: DK
Customer Service Rep:
Report Issued: Taxable: No

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	2/3/16 1430	[signature]	[signature]	2/10/16 1000	
2	[signature]	2/3/16 14:31	[signature]	[signature]	2/10/16 Tam	
3						
4						
5						

Custody Seal #:
Appropriate Bottle / Pres. Y / N
Headspace Y / N
On Ice Y / N
Cooler Temp. ____ oC
Labels match Coc? Y / N
Separate Receiving Check List used: Y / N

Northern California
ACCUTEST
LABORATORIES

01/18/16

Effective January 1, 2016, SGS has acquired all of the assets of Accutest Laboratories and will continue to operate as SGS-Accutest. SGS-Accutest is part of SGS, the world's leading inspection, verification, testing and certification company.

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

Accutest Job Number: C43641

Sampling Date: 01/11/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **30**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Sample Summary

AMEC Foster Wheeler

Job No: C43641

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C43641-1	01/11/16	15:00	KK	01/13/16	SO	Soil	REFUSE BINS

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C43641
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	1/18/2016 5:49:50 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 01/11/2016 and were received at Accutest on 01/13/2016 properly preserved, at 4.3 Deg. C and intact. These Samples received an Accutest job number of C43641. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: SO **Batch ID:** VM1743

- Sample(s) C43639-1MS, C43639-1MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for 1,2,4-Trichlorobenzene, Vinyl chloride are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
- Matrix Spike Duplicate Recovery(s) for 1,1-Dichloropropene, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,2,4-Trimethylbenzene, Carbon disulfide, Hexachlorobutadiene, m-Dichlorobenzene, n-Butylbenzene, n-Propylbenzene, Naphthalene, o-Chlorotoluene, o-Dichlorobenzene, p-Dichlorobenzene, p-Isopropyltoluene, sec-Butylbenzene are outside control limits. Probable cause due to matrix interference.

Metals By Method SW846 6010B

Matrix: SO **Batch ID:** MP10701

- Sample(s) C43653-4MS, C43653-4MSD, C43653-4SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Arsenic, Cadmium are outside control limits for sample MP10701-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7471A

Matrix: SO **Batch ID:** MP10721

- Sample(s) C43653-5MS, C43653-5MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C43641
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 01/11/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C43641-1	**REFUSE BINS**					
Arsenic		3.0	1.7		mg/kg	SW846 6010B
Barium		68.6	17		mg/kg	SW846 6010B
Chromium		5.7	0.87		mg/kg	SW846 6010B
Iron		7950	17		mg/kg	SW846 6010B
Lead		27.3	1.7		mg/kg	SW846 6010B
Manganese		165	1.3		mg/kg	SW846 6010B
Mercury		0.029	0.016		mg/kg	SW846 7471A

Northern California ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	REFUSE BINS		
Lab Sample ID:	C43641-1	**Date Sampled:**	01/11/16
Matrix:	SO - Soil	**Date Received:**	01/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M58087.D	1	01/13/16	XB	n/a	n/a	VM1743
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	4.80 g	5.0 ml	100 ul
Run #2			

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.26	0.026	mg/kg	
108-86-1	Bromobenzene	ND	0.26	0.026	mg/kg	
74-97-5	Bromochloromethane	ND	0.26	0.026	mg/kg	
75-27-4	Bromodichloromethane	ND	0.26	0.026	mg/kg	
75-25-2	Bromoform	ND	0.26	0.026	mg/kg	
104-51-8	n-Butylbenzene	ND	0.26	0.026	mg/kg	
135-98-8	sec-Butylbenzene	ND	0.26	0.026	mg/kg	
98-06-6	tert-Butylbenzene	ND	0.26	0.026	mg/kg	
108-90-7	Chlorobenzene	ND	0.26	0.026	mg/kg	
75-00-3	Chloroethane	ND	0.26	0.052	mg/kg	
67-66-3	Chloroform	ND	0.26	0.026	mg/kg	
95-49-8	o-Chlorotoluene	ND	0.26	0.026	mg/kg	
106-43-4	p-Chlorotoluene	ND	0.26	0.026	mg/kg	
75-15-0	Carbon disulfide	ND	0.26	0.026	mg/kg	
56-23-5	Carbon tetrachloride	ND	0.26	0.026	mg/kg	
75-34-3	1,1-Dichloroethane	ND	0.26	0.026	mg/kg	
75-35-4	1,1-Dichloroethylene	ND	0.26	0.026	mg/kg	
563-58-6	1,1-Dichloropropene	ND	0.26	0.026	mg/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.26	0.073	mg/kg	
106-93-4	1,2-Dibromoethane	ND	0.26	0.026	mg/kg	
107-06-2	1,2-Dichloroethane	ND	0.26	0.026	mg/kg	
78-87-5	1,2-Dichloropropane	ND	0.26	0.026	mg/kg	
142-28-9	1,3-Dichloropropane	ND	0.26	0.026	mg/kg	
594-20-7	2,2-Dichloropropane	ND	0.26	0.026	mg/kg	
124-48-1	Dibromochloromethane	ND	0.26	0.026	mg/kg	
75-71-8	Dichlorodifluoromethane	ND	0.26	0.052	mg/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	0.26	0.057	mg/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	0.26	0.026	mg/kg	
541-73-1	m-Dichlorobenzene	ND	0.26	0.026	mg/kg	
95-50-1	o-Dichlorobenzene	ND	0.26	0.026	mg/kg	
106-46-7	p-Dichlorobenzene	ND	0.26	0.026	mg/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	0.26	0.026	mg/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	REFUSE BINS		
Lab Sample ID:	C43641-1	**Date Sampled:**	01/11/16
Matrix:	SO - Soil	**Date Received:**	01/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.26	0.026	mg/kg	
100-41-4	Ethylbenzene	ND	0.26	0.026	mg/kg	
591-78-6	2-Hexanone	ND	1.0	0.10	mg/kg	
87-68-3	Hexachlorobutadiene	ND	0.26	0.052	mg/kg	
98-82-8	Isopropylbenzene	ND	0.26	0.026	mg/kg	
99-87-6	p-Isopropyltoluene	ND	0.26	0.026	mg/kg	
74-83-9	Methyl bromide	ND	0.26	0.052	mg/kg	
74-87-3	Methyl chloride	ND	0.26	0.052	mg/kg	
74-95-3	Methylene bromide	ND	0.26	0.026	mg/kg	
75-09-2	Methylene chloride	ND	1.0	0.26	mg/kg	
91-20-3	Naphthalene	ND	0.26	0.052	mg/kg	
103-65-1	n-Propylbenzene	ND	0.26	0.026	mg/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.26	0.026	mg/kg	
71-55-6	1,1,1-Trichloroethane	ND	0.26	0.026	mg/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.26	0.026	mg/kg	
79-00-5	1,1,2-Trichloroethane	ND	0.26	0.026	mg/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	0.26	0.026	mg/kg	
96-18-4	1,2,3-Trichloropropane	ND	0.26	0.052	mg/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	0.26	0.026	mg/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	0.26	0.052	mg/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	0.26	0.052	mg/kg	
127-18-4	Tetrachloroethylene	ND	0.26	0.031	mg/kg	
108-88-3	Toluene	ND	0.26	0.026	mg/kg	
79-01-6	Trichloroethylene	ND	0.26	0.026	mg/kg	
75-69-4	Trichlorofluoromethane	ND	0.26	0.052	mg/kg	
75-01-4	Vinyl chloride	ND	0.26	0.052	mg/kg	
1330-20-7	Xylene (total)	ND	0.52	0.052	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		70-130%
2037-26-5	Toluene-D8	98%		70-130%
460-00-4	4-Bromofluorobenzene	95%		70-130%

(a) All results reported on a wet weight basis.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	REFUSE BINS		
Lab Sample ID:	C43641-1	**Date Sampled:**	01/11/16
Matrix:	SO - Soil	**Date Received:**	01/13/16
		Percent Solids:	n/a [a]
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	3.0	1.7	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Barium	68.6	17	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Cadmium	< 0.87	0.87	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Chromium	5.7	0.87	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Iron	7950	17	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Lead	27.3	1.7	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Manganese	165	1.3	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Mercury	0.029	0.016	mg/kg	1	01/18/16	01/18/16	EB	SW846 7471A [2]	SW846 7471A [4]
Selenium	< 1.7	1.7	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]
Silver	< 0.87	0.87	mg/kg	1	01/14/16	01/14/16	RS	SW846 6010B [1]	SW846 3050B [3]

(1) Instrument QC Batch: MA5530
(2) Instrument QC Batch: MA5537
(3) Prep QC Batch: MP10701
(4) Prep QC Batch: MP10721

(a) All results reported on a wet weight basis.

RL = Reporting Limit

Northern California ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

PHOENIX ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 8034012 8003
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C43641

Client / Reporting Information

Company Name: Amec Foster Wheeler
Address: 4600 E Washington St.
City / State / Zip:
Project Contact: Alex Yiannakakis
Phone #: (602) 733-6013
Samplers's Name: Kyle Keegan

Project Information

Project Name: Broadway Pantano ISCO STUDY
Street: Prudence & Broadway
City: Tucson State: AZ
Project #: 1420152042
EMAIL: Alex.Yiannakakis@amec.com
Client Purchase Order #:

Requested Analysis

8260B
Total RCRA 8 metals, TCLP & Manganese

Matrix Codes

WW- Wastewater
GW- Ground Water
SW- Surface Water
SO- Soil
OI-Oil
WP-Wipe
LIQ - Non-aqueous Liquid
AIR
DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	EnCORE	8260B	Total RCRA 8 metals, TCLP & Manganese	LAB USE ONLY
1	Refuse Bins	1/11/16	1500	KCK	SO	3					X		X		2	1	

3 DAYS

Turnaround Time (Business days)

Approved By:/ Date:

- [ ] 10 Day
- [ ] 5 Day
- [x] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Profile for disposal

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	1/12/16 913	1	2 1/12/16 1000		2 FedeX
3 FEDEX	1/13/16 0930	3	4		4
5		5			

Custody Seal # INTACT
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 5.2/4.3

C43641: Chain of Custody
Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C43641 **Client:** AMEC FOSTER WHEELER **Project:** BROADWAY PANTANO ISCO STUDY

Date / Time Received: 1/13/2016 9:30:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401028803

Cooler Temps (Initial/Adjusted): #1: (5.2/4.3);

Cooler Security	Y	or N		Y	or N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	or N
1. Temp criteria achieved:	☑	☐
2. Therm ID:	IR3;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

Quality Control Preservation	Y	or N	N/A
1. Trip Blank present / cooler:	☐	☐	☑
2. Trip Blank listed on COC:	☐	☐	☑
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☐	☐	☑

Sample Integrity - Documentation	Y	or N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	or N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	or N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments

Accutest Laboratories
V:408.588.0200
2105 Lundy Avenue
F: 408.588.0201
San Jose, CA 95131
www/accutest.com

C43641: Chain of Custody
Page 2 of 2

Northern California ACCUTEST LABORATORIES

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1743-MB	M58071.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	0.50	ug/kg	
108-86-1	Bromobenzene	ND	5.0	0.50	ug/kg	
74-97-5	Bromochloromethane	ND	5.0	0.50	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	0.50	ug/kg	
75-25-2	Bromoform	ND	5.0	0.50	ug/kg	
104-51-8	n-Butylbenzene	ND	5.0	0.50	ug/kg	
135-98-8	sec-Butylbenzene	ND	5.0	0.50	ug/kg	
98-06-6	tert-Butylbenzene	ND	5.0	0.50	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	0.50	ug/kg	
75-00-3	Chloroethane	ND	5.0	1.0	ug/kg	
67-66-3	Chloroform	ND	5.0	0.50	ug/kg	
95-49-8	o-Chlorotoluene	ND	5.0	0.50	ug/kg	
106-43-4	p-Chlorotoluene	ND	5.0	0.50	ug/kg	
75-15-0	Carbon disulfide	ND	5.0	0.50	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	0.50	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	0.50	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	0.50	ug/kg	
563-58-6	1,1-Dichloropropene	ND	5.0	0.50	ug/kg	
96-12-8	1,2-Dibromo-3-chloropropane	ND	5.0	1.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	0.50	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	0.50	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	0.50	ug/kg	
142-28-9	1,3-Dichloropropane	ND	5.0	0.50	ug/kg	
594-20-7	2,2-Dichloropropane	ND	5.0	0.50	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	0.50	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	1.1	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	0.50	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	0.50	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	0.50	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	0.50	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	0.50	ug/kg	
591-78-6	2-Hexanone	ND	20	2.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	5.0	1.0	ug/kg	

Method Blank Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1743-MB	M58071.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	5.0	0.50	ug/kg	
99-87-6	p-Isopropyltoluene	ND	5.0	0.50	ug/kg	
74-83-9	Methyl bromide	ND	5.0	1.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	1.0	ug/kg	
74-95-3	Methylene bromide	ND	5.0	0.50	ug/kg	
75-09-2	Methylene chloride	ND	20	5.0	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.0	ug/kg	
103-65-1	n-Propylbenzene	ND	5.0	0.50	ug/kg	
630-20-6	1,1,1,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	0.50	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	0.50	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	0.50	ug/kg	
87-61-6	1,2,3-Trichlorobenzene	ND	5.0	0.50	ug/kg	
96-18-4	1,2,3-Trichloropropane	ND	5.0	1.0	ug/kg	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.50	ug/kg	
95-63-6	1,2,4-Trimethylbenzene	ND	5.0	1.0	ug/kg	
108-67-8	1,3,5-Trimethylbenzene	ND	5.0	1.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	0.60	ug/kg	
108-88-3	Toluene	ND	5.0	0.50	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	0.50	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	1.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	10	1.0	ug/kg	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	70-130%
2037-26-5	Toluene-D8	96%	70-130%
460-00-4	4-Bromofluorobenzene	96%	70-130%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1743-BS	M58068.D	1	01/13/16	XB	n/a	n/a	VM1743
VM1743-BSD	M58069.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	40	34.1	85	38.8	97	13	70-130/30
108-86-1	Bromobenzene	40	32.4	81	36.4	91	12	70-130/30
74-97-5	Bromochloromethane	40	37.2	93	41.1	103	10	70-130/30
75-27-4	Bromodichloromethane	40	33.6	84	38.2	96	13	70-130/30
75-25-2	Bromoform	40	34.4	86	37.8	95	9	70-130/30
104-51-8	n-Butylbenzene	40	32.5	81	34.5	86	6	70-130/30
135-98-8	sec-Butylbenzene	40	32.2	81	35.0	88	8	70-130/30
98-06-6	tert-Butylbenzene	40	32.1	80	35.0	88	9	70-130/30
108-90-7	Chlorobenzene	40	32.3	81	35.5	89	9	70-130/30
75-00-3	Chloroethane	40	38.0	95	40.1	100	5	70-130/30
67-66-3	Chloroform	40	34.6	87	37.8	95	9	70-130/30
95-49-8	o-Chlorotoluene	40	34.4	86	33.6	84	2	70-130/30
106-43-4	p-Chlorotoluene	40	32.8	82	35.4	89	8	70-130/30
75-15-0	Carbon disulfide	40	30.3	76	33.3	83	9	70-130/30
56-23-5	Carbon tetrachloride	40	33.2	83	38.0	95	13	70-130/30
75-34-3	1,1-Dichloroethane	40	32.9	82	36.2	91	10	70-130/30
75-35-4	1,1-Dichloroethylene	40	31.5	79	35.1	88	11	70-130/30
563-58-6	1,1-Dichloropropene	40	29.0	73	33.1	83	13	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	40	34.0	85	34.1	85	0	70-130/30
106-93-4	1,2-Dibromoethane	40	32.5	81	35.8	90	10	70-130/30
107-06-2	1,2-Dichloroethane	40	33.9	85	38.1	95	12	70-130/30
78-87-5	1,2-Dichloropropane	40	34.0	85	38.7	97	13	70-130/30
142-28-9	1,3-Dichloropropane	40	34.4	86	37.9	95	10	70-130/30
594-20-7	2,2-Dichloropropane	40	34.3	86	37.3	93	8	70-130/30
124-48-1	Dibromochloromethane	40	32.9	82	36.3	91	10	70-130/30
75-71-8	Dichlorodifluoromethane	40	38.8	97	40.1	100	3	70-130/30
156-59-2	cis-1,2-Dichloroethylene	40	37.2	93	40.5	101	8	70-130/30
10061-01-5	cis-1,3-Dichloropropene	40	35.0	88	40.0	100	13	70-130/30
541-73-1	m-Dichlorobenzene	40	32.6	82	35.5	89	9	70-130/30
95-50-1	o-Dichlorobenzene	40	33.9	85	36.7	92	8	70-130/30
106-46-7	p-Dichlorobenzene	40	33.0	83	35.6	89	8	70-130/30
156-60-5	trans-1,2-Dichloroethylene	40	30.4	76	34.1	85	11	70-130/30
10061-02-6	trans-1,3-Dichloropropene	40	31.2	78	34.6	87	10	70-130/30
100-41-4	Ethylbenzene	40	32.5	81	35.3	88	8	70-130/30
591-78-6	2-Hexanone	160	131	82	140	88	7	60-140/30
87-68-3	Hexachlorobutadiene	40	36.0	90	37.7	94	5	70-130/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1743-BS	M58068.D	1	01/13/16	XB	n/a	n/a	VM1743
VM1743-BSD	M58069.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	BSD ug/kg	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	40	33.2	83	36.2	91	9	70-130/30
99-87-6	p-Isopropyltoluene	40	32.1	80	35.0	88	9	70-130/30
74-83-9	Methyl bromide	40	43.7	109	45.5	114	4	70-130/30
74-87-3	Methyl chloride	40	40.9	102	42.5	106	4	70-130/30
74-95-3	Methylene bromide	40	35.9	90	40.7	102	13	70-130/30
75-09-2	Methylene chloride	40	35.8	90	39.3	98	9	70-130/30
91-20-3	Naphthalene	40	35.3	88	35.9	90	2	70-130/30
103-65-1	n-Propylbenzene	40	29.9	75	33.1	83	10	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	40	34.5	86	36.9	92	7	70-130/30
71-55-6	1,1,1-Trichloroethane	40	34.1	85	37.6	94	10	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	40	34.7	87	36.5	91	5	70-130/30
79-00-5	1,1,2-Trichloroethane	40	34.1	85	36.8	92	8	70-130/30
87-61-6	1,2,3-Trichlorobenzene	40	37.2	93	38.1	95	2	70-130/30
96-18-4	1,2,3-Trichloropropane	40	33.7	84	35.7	89	6	70-130/30
120-82-1	1,2,4-Trichlorobenzene	40	36.5	91	37.5	94	3	70-130/30
95-63-6	1,2,4-Trimethylbenzene	40	31.8	80	34.3	86	8	70-130/30
108-67-8	1,3,5-Trimethylbenzene	40	32.3	81	35.1	88	8	70-130/30
127-18-4	Tetrachloroethylene	40	30.8	77	35.5	89	14	70-130/30
108-88-3	Toluene	40	32.3	81	35.6	89	10	70-130/30
79-01-6	Trichloroethylene	40	33.3	83	38.8	97	15	70-130/30
75-69-4	Trichlorofluoromethane	40	41.2	103	43.1	108	5	70-130/30
75-01-4	Vinyl chloride	40	40.9	102	42.6	107	4	70-130/30
1330-20-7	Xylene (total)	120	96.8	81	106	88	9	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	104%	100%	70-130%
2037-26-5	Toluene-D8	95%	93%	70-130%
460-00-4	4-Bromofluorobenzene	98%	97%	70-130%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VM1743-LCS	M58070.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	Spike ug/kg	LCS ug/kg	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	98%	70-130%
2037-26-5	Toluene-D8	96%	70-130%
460-00-4	4-Bromofluorobenzene	98%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43639-1MS	M58088.D	1	01/13/16	XB	n/a	n/a	VM1743
C43639-1MSD	M58089.D	1	01/13/16	XB	n/a	n/a	VM1743
C43639-1	M58072.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	C43639-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		38.9	34.8	89	39.8	31.1	78	11	70-130/30
108-86-1	Bromobenzene	ND		38.9	32.0	82	39.8	29.4	74	8	70-130/30
74-97-5	Bromochloromethane	ND		38.9	37.8	97	39.8	33.3	84	13	70-130/30
75-27-4	Bromodichloromethane	ND		38.9	35.4	91	39.8	31.7	80	11	70-130/30
75-25-2	Bromoform	ND		38.9	36.7	94	39.8	31.4	79	16	70-130/30
104-51-8	n-Butylbenzene	ND		38.9	29.6	76	39.8	25.6	64* [a]	14	70-130/30
135-98-8	sec-Butylbenzene	ND		38.9	31.1	80	39.8	27.4	69* [a]	13	70-130/30
98-06-6	tert-Butylbenzene	ND		38.9	31.2	80	39.8	27.7	70	12	70-130/30
108-90-7	Chlorobenzene	ND		38.9	32.4	83	39.8	28.2	71	14	70-130/30
75-00-3	Chloroethane	ND		38.9	38.6	99	39.8	33.1	83	15	70-130/30
67-66-3	Chloroform	ND		38.9	36.4	94	39.8	31.9	80	13	70-130/30
95-49-8	o-Chlorotoluene	ND		38.9	30.9	79	39.8	26.8	67* [a]	14	70-130/30
106-43-4	p-Chlorotoluene	ND		38.9	29.8	77	39.8	28.2	71	6	70-130/30
75-15-0	Carbon disulfide	ND		38.9	30.4	78	39.8	27.0	68* [a]	12	70-130/30
56-23-5	Carbon tetrachloride	ND		38.9	34.7	89	39.8	31.0	78	11	70-130/30
75-34-3	1,1-Dichloroethane	ND		38.9	34.2	88	39.8	30.4	76	12	70-130/30
75-35-4	1,1-Dichloroethylene	ND		38.9	31.5	81	39.8	28.3	71	11	70-130/30
563-58-6	1,1-Dichloropropene	ND		38.9	30.1	77	39.8	26.7	67* [a]	12	70-130/30
96-12-8	1,2-Dibromo-3-chloropropane	ND		38.9	33.4	86	39.8	28.6	72	15	70-130/30
106-93-4	1,2-Dibromoethane	ND		38.9	35.3	91	39.8	30.8	77	14	70-130/30
107-06-2	1,2-Dichloroethane	ND		38.9	36.5	94	39.8	32.0	80	13	70-130/30
78-87-5	1,2-Dichloropropane	ND		38.9	36.2	93	39.8	32.3	81	11	70-130/30
142-28-9	1,3-Dichloropropane	ND		38.9	37.4	96	39.8	32.9	83	13	70-130/30
594-20-7	2,2-Dichloropropane	ND		38.9	33.3	86	39.8	28.2	71	17	70-130/30
124-48-1	Dibromochloromethane	ND		38.9	34.6	89	39.8	30.2	76	14	70-130/30
75-71-8	Dichlorodifluoromethane	ND		38.9	39.8	102	39.8	35.3	89	12	70-130/30
156-59-2	cis-1,2-Dichloroethylene	ND		38.9	36.9	95	39.8	32.9	83	11	70-130/30
10061-01-5	cis-1,3-Dichloropropene	ND		38.9	36.5	94	39.8	32.5	82	12	70-130/30
541-73-1	m-Dichlorobenzene	ND		38.9	29.7	76	39.8	26.6	67* [a]	11	70-130/30
95-50-1	o-Dichlorobenzene	ND		38.9	30.7	79	39.8	27.5	69* [a]	11	70-130/30
106-46-7	p-Dichlorobenzene	ND		38.9	30.2	78	39.8	26.9	68* [a]	12	70-130/30
156-60-5	trans-1,2-Dichloroethylene	ND		38.9	30.9	79	39.8	27.8	70	11	70-130/30
10061-02-6	trans-1,3-Dichloropropene	ND		38.9	33.1	85	39.8	28.8	72	14	70-130/30
100-41-4	Ethylbenzene	ND		38.9	33.3	86	39.8	29.0	73	14	70-130/30
591-78-6	2-Hexanone	ND		156	158	102	159	131	82	19	60-140/30
87-68-3	Hexachlorobutadiene	ND		38.9	27.9	72	39.8	23.6	59* [a]	17	70-130/30

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C43641
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C43639-1MS	M58088.D	1	01/13/16	XB	n/a	n/a	VM1743
C43639-1MSD	M58089.D	1	01/13/16	XB	n/a	n/a	VM1743
C43639-1	M58072.D	1	01/13/16	XB	n/a	n/a	VM1743

The QC reported here applies to the following samples: **Method:** SW846 8260B

C43641-1

CAS No.	Compound	C43639-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		38.9	33.2	85	39.8	28.5	72	15	70-130/30
99-87-6	p-Isopropyltoluene	ND		38.9	30.6	79	39.8	27.0	68* [a]	13	70-130/30
74-83-9	Methyl bromide	ND		38.9	42.6	109	39.8	35.9	90	17	70-130/30
74-87-3	Methyl chloride	ND		38.9	45.4	117	39.8	38.4	96	17	70-130/30
74-95-3	Methylene bromide	ND		38.9	38.6	99	39.8	34.2	86	12	70-130/30
75-09-2	Methylene chloride	ND		38.9	35.4	91	39.8	31.5	79	12	70-130/30
91-20-3	Naphthalene	ND		38.9	29.9	77	39.8	25.6	64* [a]	15	70-130/30
103-65-1	n-Propylbenzene	ND		38.9	30.0	77	39.8	26.9	68* [a]	11	70-130/30
630-20-6	1,1,1,2-Tetrachloroethane	ND		38.9	33.6	86	39.8	29.3	74	14	70-130/30
71-55-6	1,1,1-Trichloroethane	ND		38.9	36.2	93	39.8	31.8	80	13	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	ND		38.9	36.1	93	39.8	31.2	78	15	70-130/30
79-00-5	1,1,2-Trichloroethane	ND		38.9	37.2	96	39.8	31.7	80	16	70-130/30
87-61-6	1,2,3-Trichlorobenzene	ND		38.9	28.5	73	39.8	24.9	62* [a]	13	70-130/30
96-18-4	1,2,3-Trichloropropane	ND		38.9	36.2	93	39.8	30.0	75	19	70-130/30
120-82-1	1,2,4-Trichlorobenzene	ND		38.9	26.8	69* [a]	39.8	23.8	60* [a]	12	70-130/30
95-63-6	1,2,4-Trimethylbenzene	ND		38.9	30.5	78	39.8	27.1	68* [a]	12	70-130/30
108-67-8	1,3,5-Trimethylbenzene	ND		38.9	31.3	80	39.8	27.8	70	12	70-130/30
127-18-4	Tetrachloroethylene	ND		38.9	33.2	85	39.8	30.0	75	10	70-130/30
108-88-3	Toluene	ND		38.9	32.7	84	39.8	28.6	72	13	70-130/30
79-01-6	Trichloroethylene	ND		38.9	33.7	87	39.8	30.5	77	10	70-130/30
75-69-4	Trichlorofluoromethane	ND		38.9	43.0	111	39.8	37.1	93	15	70-130/30
75-01-4	Vinyl chloride	ND		38.9	54.1	139* [a]	39.8	46.1	116	16	70-130/30
1330-20-7	Xylene (total)	ND		117	97.9	84	120	83.6	70	16	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	C43639-1	Limits
1868-53-7	Dibromofluoromethane	107%	105%	106%	70-130%
2037-26-5	Toluene-D8	96%	93%	99%	70-130%
460-00-4	4-Bromofluorobenzene	105%	98%	95%	70-130%

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

* = Outside of Control Limits.

Northern California ACCUTEST LABORATORIES

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10701
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/14/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.4	1.5		
Antimony	2.0	.12	.18		
Arsenic	2.0	.16	.17	0.11	<2.0
Barium	20	.02	.09	0.29	<20
Beryllium	1.0	.02	.01		
Boron	10	.18	.15		
Cadmium	1.0	.02	.031	0.0	<1.0
Calcium	500	2.8	4.5		
Chromium	1.0	.04	.054	0.010	<1.0
Cobalt	1.0	.03	.025		
Copper	2.5	.12	.15		
Iron	20	.53	.76		
Lead	2.0	.1	.14	0.14	<2.0
Magnesium	500	1.6	2.1		
Manganese	1.5	.02	.026		
Molybdenum	2.0	.05	.04		
Nickel	1.0	.04	.047		
Potassium	1000	3.5	4.6		
Selenium	2.0	.17	.33	0.020	<2.0
Silicon	20	.24	.43		
Silver	1.0	.05	.067	-0.010	<1.0
Sodium	1000	1.1	1.2		
Strontium	1.0	.01	.018		
Thallium	2.0	.17	.12		
Tin	50	.08	.28		
Titanium	1.0	.08	.13		
Vanadium	1.0	.06	.074		
Zinc	2.0	.05	.22		

Associated samples MP10701: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10701
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/14/16

Metal	C43653-4 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	3.9	45.1	45	91.5	75-125
Barium	234	290	45	124.3	75-125
Beryllium	anr				
Boron					
Cadmium	0.37	44.1	45	97.1	75-125
Calcium					
Chromium	71.7	118	45	102.8	75-125
Cobalt	anr				
Copper	anr				
Iron					
Lead	10.6	54.4	45	97.2	75-125
Magnesium					
Manganese					
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	0.0	39.3	45	87.2	75-125
Silicon					
Silver	0.0	41.2	45	91.5	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10701: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10701
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/14/16

Metal	C43653-4 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	3.9	42.6	42.4	91.3	5.7	20
Barium	234	302	42.4	160.5(a)	4.1	20
Beryllium	anr					
Boron						
Cadmium	0.37	41.4	42.4	96.8	6.3	20
Calcium						
Chromium	71.7	115	42.4	102.2	2.6	20
Cobalt	anr					
Copper	anr					
Iron						
Lead	10.6	51.8	42.4	97.2	4.9	20
Magnesium						
Manganese						
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	0.0	36.8	42.4	86.8	6.6	20
Silicon						
Silver	0.0	37.9	42.4	89.4	8.3	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10701: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10701
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 01/14/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	50.3	50	100.6	80-120
Barium	56.1	50	112.2	80-120
Beryllium	anr			
Boron				
Cadmium	51.2	50	102.4	80-120
Calcium				
Chromium	54.4	50	108.8	80-120
Cobalt	anr			
Copper	anr			
Iron				
Lead	50.1	50	100.2	80-120
Magnesium				
Manganese				
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	49.2	50	98.4	80-120
Silicon				
Silver	48.0	50	96.0	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10701: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10701
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 01/14/16

Metal	C43653-4 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	43.4	49.5	14.1 (a)	0-10
Barium	2600	2780	7.3	0-10
Beryllium	anr			
Boron				
Cadmium	4.10	2.10	48.8 (a)	0-10
Calcium				
Chromium	796	854	7.3	0-10
Cobalt	anr			
Copper	anr			
Iron				
Lead	118	121	3.0	0-10
Magnesium				
Manganese				
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10701: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10721 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 01/18/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.017	.00035	.0019	-0.0022	<0.017

Associated samples MP10721: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10721
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/18/16

Metal	C43653-5 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.041	0.22	0.159	112.8	75-125

Associated samples MP10721: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10721
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/18/16

Metal	C43653-5 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.041	0.21	0.156	108.2	4.7	20

Associated samples MP10721: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

7.2.2

7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C43641
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

QC Batch ID: MP10721
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 01/18/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP10721: C43641-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.3

7

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

1420152042

SGS Accutest Job Number: C44193

Sampling Date: 02/18/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **20**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C44193

Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C44193-1	02/18/16	13:15	PC	02/20/16	AQ	Ground Water	FRAC TANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C44193
Site:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, A	**Report Date**	2/24/2016 2:58:10 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 02/18/2016 and were received at Accutest on 02/20/2016 properly preserved, at 4.7 Deg. C and intact. These Samples received an Accutest job number of C44193. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VW2272

- Sample(s) C44157-12MS, C44157-12MSD were used as the QC samples indicated.
- Sample(s) C44193-1 have for Methyl chloride a CCV outside of control limits (biased high); not detected in sample.
- RPD(s) for MSD for Methyl chloride, Vinyl chloride exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C44193
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ
Collected: 02/18/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C44193-1	**FRAC TANK**					
Dichlorodifluoromethane		0.87	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		5.4	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		22.1	0.50	0.30	ug/l	SW846 8260B
Toluene		3.4	1.0	0.20	ug/l	SW846 8260B
Trichloroethylene		5.2	0.50	0.20	ug/l	SW846 8260B

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	FRAC TANK		
Lab Sample ID:	C44193-1	**Date Sampled:**	02/18/16
Matrix:	AQ - Ground Water	**Date Received:**	02/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W60271.D	1	02/22/16	CV	n/a	n/a	VW2272
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.87	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	5.4	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FRAC TANK		
Lab Sample ID:	C44193-1	**Date Sampled:**	02/18/16
Matrix:	AQ - Ground Water	**Date Received:**	02/20/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [a]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	22.1	0.50	0.30	ug/l	
108-88-3	Toluene	3.4	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	5.2	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
R5	MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 8034010289 39
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C44193

Client / Reporting Information

Company Name: AMEC F.W
Address: 4600 E Washington
City: Phoenix State: Az Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: 520 247 8736
Samplers's Name: Patrick Collin

Project Information

Project Name: Broadway Pantano Landfill
Street: Broadway Pantano
City: Tucson State: Az
Project #:
EMAIL: Alex.Yiannakakis@AMECfw.com
Client Purchase Order #:

Requested Analysis: 8260B

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MeOH	ENCORE	LAB USE ONLY
1	Frac Tank	2-18-16	1315	PC	A	3	3								

2 DAYS

Turnaround Time (Business days)

Approved By:/ Date:

- [ ] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [x] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		2/19/16 1400		2	2/19/16 1530	Fedex
3	Fed Ex	2/20/16 1020	Tomu Ishihara	4		
5						

Custody Seal #: Y

Appropriate Bottle / Pres. Y / N Headspace Y / N On Ice Y / N Cooler Temp. 4.5/4.6 4.7

Labels match Coc? Y / N Separate Receiving Check List used: Y / N

2-20-16 T.1

5.2 5

C44193: Chain of Custody

Page 1 of 2

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C44193 **Client:** AMEC FW **Project:** BROADWAY-PANTANO LANDFILL

Date / Time Received: 2/20/2016 10:20:00 AM **Delivery Method:** FedEx **Airbill #'s:** 803401028939

Cooler Temps (Initial/Adjusted): #1: (4.5/4.7);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR1;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

Accutest Laboratories
V:408.588.0200

2105 Lundy Avenue
F: 408.588.0201

San Jose, CA 95131
www/accutest.com

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2272-MB	W60260.D	1	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2272-MB	W60260.D	1	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	108%	80-123%
2037-26-5	Toluene-D8	105%	88-112%
460-00-4	4-Bromofluorobenzene	91%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2272-BS	W60257.D	1	02/22/16	CV	n/a	n/a	VW2272
VW2272-BSD	W60258.D	1	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.1	91	18.3	92	1	76-120/10
108-86-1	Bromobenzene	20	17.6	88	18.1	91	3	80-123/10
74-97-5	Bromochloromethane	20	18.5	93	18.5	93	0	79-124/10
75-27-4	Bromodichloromethane	20	18.3	92	18.4	92	1	75-121/10
75-25-2	Bromoform	20	14.3	72	15.0	75	5	62-127/10
104-51-8	n-Butylbenzene	20	19.1	96	19.9	100	4	74-129/10
135-98-8	sec-Butylbenzene	20	18.5	93	19.6	98	6	75-128/11
98-06-6	tert-Butylbenzene	20	17.9	90	18.9	95	5	74-127/11
108-90-7	Chlorobenzene	20	17.8	89	17.9	90	1	79-119/10
75-00-3	Chloroethane	20	18.2	91	17.8	89	2	60-115/14
67-66-3	Chloroform	20	17.8	89	18.1	91	2	75-122/10
95-49-8	o-Chlorotoluene	20	18.2	91	18.6	93	2	76-125/12
106-43-4	p-Chlorotoluene	20	18.1	91	18.5	93	2	76-126/11
75-15-0	Carbon disulfide	20	16.5	83	17.1	86	4	51-130/13
56-23-5	Carbon tetrachloride	20	17.8	89	18.9	95	6	72-128/13
75-34-3	1,1-Dichloroethane	20	18.7	94	18.8	94	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	16.1	81	16.8	84	4	62-125/13
563-58-6	1,1-Dichloropropene	20	18.0	90	19.1	96	6	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	16.8	84	17.6	88	5	64-129/11
106-93-4	1,2-Dibromoethane	20	18.7	94	19.0	95	2	81-124/10
107-06-2	1,2-Dichloroethane	20	18.7	94	18.7	94	0	74-122/10
78-87-5	1,2-Dichloropropane	20	19.2	96	19.3	97	1	75-123/10
142-28-9	1,3-Dichloropropane	20	19.6	98	19.7	99	1	81-127/11
594-20-7	2,2-Dichloropropane	20	17.6	88	18.4	92	4	66-130/12
124-48-1	Dibromochloromethane	20	15.1	76	15.3	77	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	21.3	107	18.9	95	12	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	19.0	95	18.9	95	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	20.1	101	20.2	101	0	76-131/10
541-73-1	m-Dichlorobenzene	20	17.8	89	18.1	91	2	79-121/10
95-50-1	o-Dichlorobenzene	20	17.6	88	17.8	89	1	79-120/10
106-46-7	p-Dichlorobenzene	20	17.5	88	17.9	90	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	16.1	81	16.5	83	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	19.6	98	19.7	99	1	73-125/10
100-41-4	Ethylbenzene	20	18.7	94	19.2	96	3	78-123/10
591-78-6	2-Hexanone	80	86.8	109	88.1	110	1	71-145/12
87-68-3	Hexachlorobutadiene	20	14.5	73	15.9	80	9	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2272-BS	W60257.D	1	02/22/16	CV	n/a	n/a	VW2272
VW2272-BSD	W60258.D	1	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	18.6	93	19.3	97	4	77-125/10
99-87-6	p-Isopropyltoluene	20	18.4	92	19.4	97	5	76-126/10
74-83-9	Methyl bromide	20	18.7	94	18.5	93	1	65-124/13
74-87-3	Methyl chloride	20	15.7	79	16.0	80	2	47-143/20
74-95-3	Methylene bromide	20	18.9	95	19.3	97	2	80-125/10
75-09-2	Methylene chloride	20	17.1	86	17.1	86	0	65-124/15
91-20-3	Naphthalene	20	18.4	92	19.4	97	5	66-120/12
103-65-1	n-Propylbenzene	20	18.1	91	19.1	96	5	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	16.4	82	16.4	82	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	18.2	91	19.1	96	5	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.5	103	20.5	103	0	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.1	96	19.5	98	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.2	86	18.1	91	5	70-128/12
96-18-4	1,2,3-Trichloropropane	20	18.9	95	19.1	96	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.1	86	17.3	87	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	18.6	93	19.1	96	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	18.4	92	19.2	96	4	79-130/10
127-18-4	Tetrachloroethylene	20	16.9	85	17.8	89	5	72-124/13
108-88-3	Toluene	20	18.1	91	18.3	92	1	78-121/10
79-01-6	Trichloroethylene	20	17.4	87	18.0	90	3	75-119/10
75-69-4	Trichlorofluoromethane	20	18.5	93	17.9	90	3	68-130/19
75-01-4	Vinyl chloride	20	20.8	104	19.6	98	6	57-137/18
1330-20-7	Xylene (total)	60	56.3	94	57.5	96	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	108%	108%	80-123%
2037-26-5	Toluene-D8	104%	105%	88-112%
460-00-4	4-Bromofluorobenzene	101%	103%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2272-LCS	W60259.D	1	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	103%	80-123%
2037-26-5	Toluene-D8	107%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44157-12MS	W60278.D	5	02/22/16	CV	n/a	n/a	VW2272
C44157-12MSD	W60279.D	5	02/22/16	CV	n/a	n/a	VW2272
C44157-12 [a]	W60270.D	5	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	C44157-12 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		100	88.3	88	100	88.1	88	0	76-120/10
108-86-1	Bromobenzene	ND		100	89.1	89	100	90.5	91	2	80-123/10
74-97-5	Bromochloromethane	ND		100	90.5	91	100	91.2	91	1	79-124/10
75-27-4	Bromodichloromethane	ND		100	90.3	90	100	90.3	90	0	75-121/10
75-25-2	Bromoform	ND		100	72.0	72	100	72.8	73	1	62-127/10
104-51-8	n-Butylbenzene	ND		100	93.6	94	100	92.8	93	1	74-129/10
135-98-8	sec-Butylbenzene	ND		100	94.0	94	100	94.1	94	0	75-128/11
98-06-6	tert-Butylbenzene	ND		100	92.8	93	100	92.4	92	0	74-127/11
108-90-7	Chlorobenzene	ND		100	89.5	90	100	89.2	89	0	79-119/10
75-00-3	Chloroethane	ND		100	84.1	84	100	82.6	83	2	60-115/14
67-66-3	Chloroform	ND		100	86.3	86	100	86.5	87	0	75-122/10
95-49-8	o-Chlorotoluene	ND		100	90.6	91	100	90.9	91	0	76-125/12
106-43-4	p-Chlorotoluene	ND		100	90.0	90	100	90.8	91	1	76-126/11
75-15-0	Carbon disulfide	ND		100	82.2	82	100	80.5	81	2	51-130/13
56-23-5	Carbon tetrachloride	ND		100	100	100	100	102	102	2	72-128/13
75-34-3	1,1-Dichloroethane	ND		100	86.2	86	100	85.7	86	1	70-121/10
75-35-4	1,1-Dichloroethylene	ND		100	82.1	82	100	82.9	83	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		100	91.4	91	100	90.3	90	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		100	85.8	86	100	86.3	86	1	64-129/11
106-93-4	1,2-Dibromoethane	ND		100	95.3	95	100	94.2	94	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		100	90.7	91	100	89.7	90	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		100	89.6	90	100	89.3	89	0	75-123/10
142-28-9	1,3-Dichloropropane	ND		100	94.5	95	100	93.3	93	1	81-127/11
594-20-7	2,2-Dichloropropane	ND		100	83.5	84	100	84.9	85	2	66-130/12
124-48-1	Dibromochloromethane	ND		100	78.1	78	100	77.5	78	1	76-124/10
75-71-8	Dichlorodifluoromethane	ND		100	86.0	86	100	81.7	82	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		100	98.9	99	100	95.3	95	4	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		100	94.0	94	100	93.0	93	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		100	87.9	88	100	89.0	89	1	79-121/10
95-50-1	o-Dichlorobenzene	ND		100	88.5	89	100	89.4	89	1	79-120/10
106-46-7	p-Dichlorobenzene	ND		100	87.6	88	100	88.1	88	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		100	80.2	80	100	79.9	80	0	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		100	91.7	92	100	91.4	91	0	73-125/10
100-41-4	Ethylbenzene	ND		100	96.7	97	100	96.1	96	1	78-123/10
591-78-6	2-Hexanone	ND		400	409	102	400	401	100	2	71-145/12
87-68-3	Hexachlorobutadiene	ND		100	73.6	74	100	78.8	79	7	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C44193
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Prudence & Broadway, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44157-12MS	W60278.D	5	02/22/16	CV	n/a	n/a	VW2272
C44157-12MSD	W60279.D	5	02/22/16	CV	n/a	n/a	VW2272
C44157-12 [a]	W60270.D	5	02/22/16	CV	n/a	n/a	VW2272

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44193-1

CAS No.	Compound	C44157-12 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		100	98.0	98	100	97.7	98	0	77-125/10
99-87-6	p-Isopropyltoluene	ND		100	93.9	94	100	93.9	94	0	76-126/10
74-83-9	Methyl bromide	ND		100	92.2	92	100	90.9	91	1	65-124/13
74-87-3	Methyl chloride	ND		100	90.4	90	100	70.8	71	24* [b]	47-143/20
74-95-3	Methylene bromide	ND		100	93.4	93	100	92.4	92	1	80-125/10
75-09-2	Methylene chloride	ND		100	81.3	81	100	80.9	81	0	65-124/15
91-20-3	Naphthalene	ND		100	92.5	93	100	96.6	97	4	66-120/12
103-65-1	n-Propylbenzene	1.4	J	100	92.4	91	100	92.8	91	0	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		100	84.8	85	100	85.0	85	0	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		100	96.6	97	100	97.0	97	0	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		100	97.2	97	100	96.9	97	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		100	93.3	93	100	92.7	93	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		100	85.4	85	100	90.9	91	6	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		100	80.2	80	100	81.9	82	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		100	84.0	84	100	87.4	87	4	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		100	93.4	93	100	93.9	94	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		100	94.2	94	100	94.7	95	1	79-130/10
127-18-4	Tetrachloroethylene	ND		100	92.2	92	100	92.5	93	0	72-124/13
108-88-3	Toluene	ND		100	91.1	91	100	91.5	92	0	78-121/10
79-01-6	Trichloroethylene	ND		100	92.1	92	100	90.3	90	2	75-119/10
75-69-4	Trichlorofluoromethane	ND		100	104	104	100	103	103	1	68-130/19
75-01-4	Vinyl chloride	ND		100	99.2	99	100	68.1	68	37* [b]	57-137/18
1330-20-7	Xylene (total)	ND		300	290	97	300	288	96	1	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C44157-12	Limits
1868-53-7	Dibromofluoromethane	104%	103%	104%	80-123%
2037-26-5	Toluene-D8	104%	104%	104%	88-112%
460-00-4	4-Bromofluorobenzene	103%	104%	98%	79-114%

(a) Dilution required due to sample foaming.
(b) RPD exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria. AZ:R5

* = Outside of Control Limits.

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway & Pantano

SGS Accutest Job Number: C44338

Sampling Date: 02/29/16

Report to:

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ATTN: Alex Yiannakakis

Total number of pages in report: **69**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Broadway & Pantano

Job No: C44338

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C44338-1	02/29/16	11:10	ERC	03/02/16	AQ	Ground Water	BP-27-320-GW
C44338-2	02/29/16	11:15	ERC	03/02/16	AQ	Ground Water	BP-27-333-GW
C44338-3	02/29/16	12:20	ERC	03/02/16	AQ	Ground Water	BP-28-320-GW
C44338-4	02/29/16	12:25	ERC	03/02/16	AQ	Ground Water	BP-28-333-GW
C44338-5	02/29/16	12:30	ERC	03/02/16	AQ	Ground Water	BP-28-345-GW
C44338-6	02/29/16	14:40	ERC	03/02/16	AQ	Ground Water	BP-26-320-GW
C44338-7	02/29/16	15:00	ERC	03/02/16	AQ	Ground Water	BP-26-333-GW
C44338-8	02/29/16	15:10	ERC	03/02/16	AQ	Ground Water	BP-26-345-GW
C44338-9	02/29/16	00:00	ERC	03/02/16	AQ	Ground Water	TB-1
C44338-10	02/29/16	14:25	ERC	03/02/16	AQ	Ground Water	BP-29-370-GW
C44338-11	02/29/16	16:50	ERC	03/02/16	AQ	Ground Water	W-274A-341-GW
C44338-12	02/29/16	17:20	ERC	03/02/16	AQ	Ground Water	BP-BATCH INJECTION-01
C44338-13	02/29/16	18:50	ERC	03/02/16	AQ	Ground Water	BP-BATCH INJECTION-02

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C44338
Site:	Broadway & Pantano	**Report Date**	3/16/2016 5:47:08 PM

13 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 02/29/2016 and were received at Accutest on 03/02/2016 properly preserved, at 3.7 Deg. C and intact. These Samples received an Accutest job number of C44338. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VU1373

- Sample(s) C44340-1MS, C44340-1MSD were used as the QC samples indicated.
- Blank Spike Recovery(s) for 1,3,5-Trimethylbenzene, Bromobenzene, m-Dichlorobenzene are outside laboratory control limits; but within marginal exceedance criteria.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, Bromobenzene, p-Isopropyltoluene, tert-Butylbenzene, Xylene (total) are outside laboratory control limits.

Matrix: AQ **Batch ID:** VU1374

- Sample(s) C44480-3MS, C44480-3MSD were used as the QC samples indicated.
- Sample(s) C44480-3MS, C44480-3MSD have surrogates outside control limits.
- Surrogate recovery(s) for C44480-3MS, C44480-3MSD for 4-Bromofluorobenzene are outside laboratory control limits due to matrix interference.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP10922

- Sample(s) C44329-3MS, C44329-3MSD, C44329-3SDL were used as the QC samples for metals.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for Manganese are outside control limits. Probable cause due to matrix interference.
- RPD(s) for Serial Dilution for Arsenic, Lead are outside control limits for sample MP10922-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- RPD(s) for Serial Dilution for Manganese are outside control limits for sample MP10922-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11008

- Sample(s) C44338-11MS, C44338-11MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C44338
Account: AMEC Foster Wheeler
Project: Broadway & Pantano
Collected: 02/29/16

3

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C44338-1	**BP-27-320-GW**					
Dichlorodifluoromethane		5.4	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		17.6	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.69	0.50		ug/l	SW846 8260B
Tetrachloroethylene		78.1	0.50		ug/l	SW846 8260B
Trichloroethylene		17.6	0.50		ug/l	SW846 8260B
Barium		324	200		ug/l	SW846 6010B
Iron		242	200		ug/l	SW846 6010B
Manganese		124	15		ug/l	SW846 6010B
C44338-2	**BP-27-333-GW**					
Dichlorodifluoromethane		5.2	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		17.5	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.61	0.50		ug/l	SW846 8260B
Tetrachloroethylene		69.6	0.50		ug/l	SW846 8260B
Trichloroethylene		16.5	0.50		ug/l	SW846 8260B
Barium		310	200		ug/l	SW846 6010B
Manganese		119	15		ug/l	SW846 6010B
C44338-3	**BP-28-320-GW**					
1,2-Dichloropropane		0.61	0.50		ug/l	SW846 8260B
Dichlorodifluoromethane		5.9	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		26.0	0.50		ug/l	SW846 8260B
p-Dichlorobenzene		0.60	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.58	0.50		ug/l	SW846 8260B
Tetrachloroethylene		77.3	0.50		ug/l	SW846 8260B
Toluene		4.3	1.0		ug/l	SW846 8260B
Trichloroethylene		19.4	0.50		ug/l	SW846 8260B
Barium		307	200		ug/l	SW846 6010B
Manganese		93.6	15		ug/l	SW846 6010B
C44338-4	**BP-28-333-GW**					
1,2-Dichloropropane		0.59	0.50		ug/l	SW846 8260B
Dichlorodifluoromethane		5.6	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		24.7	0.50		ug/l	SW846 8260B
p-Dichlorobenzene		0.52	0.50		ug/l	SW846 8260B
Tetrachloroethylene		67.4	0.50		ug/l	SW846 8260B
Toluene		4.9	1.0		ug/l	SW846 8260B
Trichloroethylene		17.8	0.50		ug/l	SW846 8260B
Barium		317	200		ug/l	SW846 6010B
Iron		263	200		ug/l	SW846 6010B

Summary of Hits

Job Number: C44338
Account: AMEC Foster Wheeler
Project: Broadway & Pantano
Collected: 02/29/16

3

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Manganese		89.9	15		ug/l	SW846 6010B
C44338-5	**BP-28-345-GW**					
1,2-Dichloropropane		0.62	0.50		ug/l	SW846 8260B
Dichlorodifluoromethane		6.5	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		28.6	0.50		ug/l	SW846 8260B
p-Dichlorobenzene		0.63	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.64	0.50		ug/l	SW846 8260B
Tetrachloroethylene		87.8	0.50		ug/l	SW846 8260B
Toluene		4.9	1.0		ug/l	SW846 8260B
Trichloroethylene		22.2	0.50		ug/l	SW846 8260B
Trichlorofluoromethane		0.50	0.50		ug/l	SW846 8260B
Barium		323	200		ug/l	SW846 6010B
Iron		651	200		ug/l	SW846 6010B
Manganese		78.3	15		ug/l	SW846 6010B
C44338-6	**BP-26-320-GW**					
Dichlorodifluoromethane		4.1	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		15.3	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.76	0.50		ug/l	SW846 8260B
Tetrachloroethylene		55.6	0.50		ug/l	SW846 8260B
Trichloroethylene		14.3	0.50		ug/l	SW846 8260B
Barium		331	200		ug/l	SW846 6010B
Iron		1220	200		ug/l	SW846 6010B
Manganese		202	15		ug/l	SW846 6010B
C44338-7	**BP-26-333-GW**					
Dichlorodifluoromethane		3.9	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		14.7	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.61	0.50		ug/l	SW846 8260B
Tetrachloroethylene		48.7	0.50		ug/l	SW846 8260B
Trichloroethylene		12.6	0.50		ug/l	SW846 8260B
Barium		310	200		ug/l	SW846 6010B
Iron		368	200		ug/l	SW846 6010B
Manganese		186	15		ug/l	SW846 6010B
C44338-8	**BP-26-345-GW**					
Dichlorodifluoromethane		3.9	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		14.5	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.55	0.50		ug/l	SW846 8260B
Tetrachloroethylene		54.5	0.50		ug/l	SW846 8260B

Summary of Hits

Job Number: C44338
Account: AMEC Foster Wheeler
Project: Broadway & Pantano
Collected: 02/29/16

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Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Trichloroethylene		13.2	0.50		ug/l	SW846 8260B
Barium		332	200		ug/l	SW846 6010B
Iron		2520	200		ug/l	SW846 6010B
Manganese		227	15		ug/l	SW846 6010B
C44338-9	**TB-1**					
No hits reported in this sample.						
C44338-10	**BP-29-370-GW**					
Carbon disulfide		2.1	1.0		ug/l	SW846 8260B
Dichlorodifluoromethane		5.1	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		14.3	0.50		ug/l	SW846 8260B
Tetrachloroethylene		81.0	0.50		ug/l	SW846 8260B
Trichloroethylene		15.7	0.50		ug/l	SW846 8260B
Barium		305	200		ug/l	SW846 6010B
Manganese		90.5	15		ug/l	SW846 6010B
C44338-11	**W-274A-341-GW**					
1,2-Dichloropropane		0.88	0.50		ug/l	SW846 8260B
Dichlorodifluoromethane		4.5	0.50		ug/l	SW846 8260B
cis-1,2-Dichloroethylene		36.0	0.50		ug/l	SW846 8260B
p-Dichlorobenzene		1.1	0.50		ug/l	SW846 8260B
trans-1,2-Dichloroethylene		0.59	0.50		ug/l	SW846 8260B
Tetrachloroethylene		104	1.3		ug/l	SW846 8260B
Trichloroethylene		30.4	0.50		ug/l	SW846 8260B
Barium		351	200		ug/l	SW846 6010B
C44338-12	**BP-BATCH INJECTION-01**					
Manganese [a]		272000	750		ug/l	SW846 6010B
C44338-13	**BP-BATCH INJECTION-02**					
Manganese		35900	30		ug/l	SW846 6010B

(a) AZ:D2

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C44338-1	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33441.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	5.4	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	17.6	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.69	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C44338-1	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	78.1	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	17.6	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	93%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C44338-1	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	324	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	242	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	124	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C44338-2	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33442.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	5.2	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	17.5	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.61	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C44338-2	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	69.6	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	16.5	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C44338-2	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	310	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	119	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C44338-3	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33443.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	0.61	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	5.9	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	26.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	0.60	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.58	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C44338-3	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	77.3	0.50	ug/l	
108-88-3	Toluene	4.3	1.0	ug/l	
79-01-6	Trichloroethylene	19.4	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C44338-3	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	307	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	93.6	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C44338-4	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33444.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	0.59	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	5.6	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	24.7	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	0.52	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C44338-4	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	67.4	0.50	ug/l	
108-88-3	Toluene	4.9	1.0	ug/l	
79-01-6	Trichloroethylene	17.8	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C44338-4	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	317	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	263	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	89.9	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C44338-5	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33445.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	0.62	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	6.5	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	28.6	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	0.63	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.64	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C44338-5	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	87.8	0.50	ug/l	
108-88-3	Toluene	4.9	1.0	ug/l	
79-01-6	Trichloroethylene	22.2	0.50	ug/l	
75-69-4	Trichlorofluoromethane	0.50	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	92%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C44338-5	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	323	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	651	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	78.3	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C44338-6	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33446.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	4.1	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	15.3	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.76	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C44338-6	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	55.6	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	14.3	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C44338-6	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	331	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	1220	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	202	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C44338-7	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33447.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	3.9	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	14.7	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.61	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C44338-7	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	48.7	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	12.6	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C44338-7	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	310	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	368	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	186	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C44338-8	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33448.D	1	03/14/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	3.9	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	14.5	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.55	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C44338-8	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	54.5	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	13.2	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C44338-8	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	332	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	2520	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	227	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C44338-9	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33439.D	1	03/13/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C44338-9	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	ND	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	92%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C44338-10	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33449.D	1	03/14/16	JC	n/a	n/a	VU1373
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	2.1	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	5.1	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	14.3	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C44338-10	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	81.0	0.50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	15.7	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C44338-10	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	305	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	90.5	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	W-274A-341-GW		
Lab Sample ID:	C44338-11	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U33450.D	1	03/14/16	JC	n/a	n/a	VU1373
Run #2	U33468.D	2.5	03/14/16	JC	n/a	n/a	VU1374

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	ug/l	
75-25-2	Bromoform	ND	0.50	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	0.50	ug/l	
75-00-3	Chloroethane	ND	0.50	ug/l	
67-66-3	Chloroform	ND	0.50	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	ug/l	
78-87-5	1,2-Dichloropropane	0.88	0.50	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	ug/l	
75-71-8	Dichlorodifluoromethane	4.5	0.50	ug/l	
156-59-2	cis-1,2-Dichloroethylene	36.0	0.50	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.59	0.50	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	W-274A-341-GW		
Lab Sample ID:	C44338-11	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway & Pantano		

VOA 8260 Special List

CAS No.	Compound	Result	RL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	104 [a]	1.3	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	30.4	0.50	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	ug/l	
75-01-4	Vinyl chloride	ND	0.50	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	106%	80-123%
2037-26-5	Toluene-D8	103%	102%	88-112%
460-00-4	4-Bromofluorobenzene	90%	90%	79-114%

(a) Result is from Run# 2

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	W-274A-341-GW		
Lab Sample ID:	C44338-11	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	351	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	< 15	15	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	03/14/16	03/14/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5654
(2) Instrument QC Batch: MA5691
(3) Prep QC Batch: MP10922
(4) Prep QC Batch: MP11008

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-BATCH INJECTION-01		
Lab Sample ID:	C44338-12	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese [a]	272000	750	ug/l	50	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5654
(2) Prep QC Batch: MP10922

(a) AZ:D2

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-BATCH INJECTION-02		
Lab Sample ID:	C44338-13	**Date Sampled:**	02/29/16
Matrix:	AQ - Ground Water	**Date Received:**	03/02/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	35900	30	ug/l	2	03/03/16	03/04/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5654
(2) Prep QC Batch: MP10922

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
D2	Sample required dilution due to high concentration of target analyte.
L2	The associated blank spike recovery was below laboratory acceptance limits.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
S11	Surrogate recovery was high. Data reported per ADEQ policy 0154.000.

1 of 2

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7757 7247 5233
Accutest Quote #
Bottle Order Control #
Accutest NC Job #: C44338

Client / Reporting Information

Company Name: AMEC FW
Address:
City: PHOENIX State: AZ Zip:
Project Contact:
Phone #: (602-410-2545
Samplers's Name: Emily Corkery

Project Information

Project Name: BROADWAY PANTANO
Street:
City: TUCSON State:
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MTK	NaHSO4	MEOH	ENCORE	8260B (VOCs)	RCRA Metals TOTAL (6010)	Total Mercury 7470
1	BP-27-320-GW	2/29/16	1110	ERC	W	4	8				1				X	X	X
2	BP-27-333-GW		1115				3				1				X	X	X
3	BP-28-320-GW		1220				3				1				X	X	X
4	BP-28-333-GW		1225				3				1				X	X	X
5	BP-28-345-GW		1230				3				1				X	X	X
6	BP-26-320-GW		1440				3				1				X	X	X
7	BP-26-333-GW		1500				3				1				X	X	X
8	BP-26-345-GW		1510				3				1				X	X	X
9	TB-1	—	—			1	1										

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [X] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	3/1/16 1340	1	2	3/1/16 1700	2 Fed-EX
3 Fed-EX	3/2/16 930	3	4		4
5		5			

Custody Seal # Intact
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 3.5/3.7 °C

A2

MM

5.2 5

C44338: Chain of Custody
Page 1 of 3

PHOENIX

CHAIN OF CUSTODY

ACCUTEST® LABORATORIES

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

2 of 2

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C44338

Client / Reporting Information

Company Name: AMEC
Address:
City: PHOENIX State: AZ Zip:
Project Contact: EMILY CORKERY
Phone #: 602-410-2545
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BROADWAY PANTANO
Street:
City: TUCSON State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NITRIC	NaHSO4	MeOH	ENCORE	8260B (VOCs)	6010 (RCRA + TOTAL MN)	7470 (MERCURY)	JUST MANGANESE
10	BP-29-370-GW	2/29/16	1425	ERC	W	4	3				1				X	X	X	
11	W-274A-341-GW	↓	1650	↓	↓	↓	3				1				X	X	X	
12	BP-BATCH INJECTION-01		1720		W	1					1							X
13	BP-BATCH INJECTION-02		1850		W	1					1							X

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [x] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [x] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		3/1/16 1300			3/1/16 1700	Fed-EX
2						
3	Fed-EX	3/2/16 7:30				
4						
5						

Custody Seal # Intact
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 3.5/3.7 °C

AZ

MA

5.2 5

C44338: Chain of Custody
Page 2 of 3

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C44338 **Client:** AMEC FW **Project:** BROADWAY PANTANO

Date / Time Received: 3/2/2016 9:30:00 AM **Delivery Method:** FedEx **Airbill #'s:** 775772475233

Cooler Temps (Initial/Adjusted): #1: (3.5/3.7);

Cooler Security	Y	N		Y	N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	N
1. Temp criteria achieved:	☑	☐
2. Therm ID:	IR1;	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	1	

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☑	☐	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments

Accutest Laboratories
V:408.588.0200

2105 Lundy Avenue
F: 408.588.0201

San Jose, CA 95131
www/accutest.com

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1373-MB	U33435.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-86-1	Bromobenzene	ND	1.0	ug/l	
74-97-5	Bromochloromethane	ND	1.0	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	ug/l	
75-25-2	Bromoform	ND	1.0	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	ug/l	
108-90-7	Chlorobenzene	ND	1.0	ug/l	
75-00-3	Chloroethane	ND	1.0	ug/l	
67-66-3	Chloroform	ND	1.0	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	ug/l	
75-15-0	Carbon disulfide	ND	1.0	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
591-78-6	2-Hexanone	ND	10	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	ug/l	

Method Blank Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1373-MB	U33435.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	Result	RL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	ug/l	
74-83-9	Methyl bromide	ND	2.0	ug/l	
74-87-3	Methyl chloride	ND	1.0	ug/l	
74-95-3	Methylene bromide	ND	1.0	ug/l	
75-09-2	Methylene chloride	ND	10	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	ND	1.0	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	ug/l	
75-01-4	Vinyl chloride	ND	1.0	ug/l	
1330-20-7	Xylene (total)	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	99%	80-123%
2037-26-5	Toluene-D8	105%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

Method Blank Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1374-MB	U33463.D	1	03/14/16	JC	n/a	n/a	VU1374

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-11

CAS No.	Compound	Result	RL	Units	Q
127-18-4	Tetrachloroethylene	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	104%	88-112%
460-00-4	4-Bromofluorobenzene	93%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1373-BS	U33430.D	1	03/13/16	JC	n/a	n/a	VU1373
VU1373-BSD	U33431.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	17.9	90	17.8	89	1	76-120/10
108-86-1	Bromobenzene	20	15.8	79* [a]	16.1	81	2	80-123/10
74-97-5	Bromochloromethane	20	18.7	94	18.8	94	1	79-124/10
75-27-4	Bromodichloromethane	20	17.8	89	18.0	90	1	75-121/10
75-25-2	Bromoform	20	18.7	94	18.4	92	2	62-127/10
104-51-8	n-Butylbenzene	20	15.7	79	15.5	78	1	74-129/10
135-98-8	sec-Butylbenzene	20	15.4	77	15.4	77	0	75-128/11
98-06-6	tert-Butylbenzene	20	15.2	76	15.4	77	1	74-127/11
108-90-7	Chlorobenzene	20	17.6	88	17.7	89	1	79-119/10
75-00-3	Chloroethane	20	18.5	93	18.0	90	3	60-115/14
67-66-3	Chloroform	20	18.6	93	18.3	92	2	75-122/10
95-49-8	o-Chlorotoluene	20	18.6	93	18.8	94	1	76-125/12
106-43-4	p-Chlorotoluene	20	17.8	89	18.2	91	2	76-126/11
75-15-0	Carbon disulfide	20	13.1	66	12.5	63	5	51-130/13
56-23-5	Carbon tetrachloride	20	18.5	93	17.9	90	3	72-128/13
75-34-3	1,1-Dichloroethane	20	18.4	92	18.1	91	2	70-121/10
75-35-4	1,1-Dichloroethylene	20	16.7	84	16.1	81	4	62-125/13
563-58-6	1,1-Dichloropropene	20	16.9	85	16.6	83	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	15.3	77	15.4	77	1	64-129/11
106-93-4	1,2-Dibromoethane	20	17.8	89	17.8	89	0	81-124/10
107-06-2	1,2-Dichloroethane	20	18.4	92	18.4	92	0	74-122/10
78-87-5	1,2-Dichloropropane	20	18.3	92	18.4	92	1	75-123/10
142-28-9	1,3-Dichloropropane	20	18.9	95	19.0	95	1	81-127/11
594-20-7	2,2-Dichloropropane	20	16.8	84	16.4	82	2	66-130/12
124-48-1	Dibromochloromethane	20	18.0	90	18.0	90	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	19.1	96	16.9	85	12	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	18.8	94	18.7	94	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	18.4	92	18.6	93	1	76-131/10
541-73-1	m-Dichlorobenzene	20	15.5	78* [a]	15.8	79	2	79-121/10
95-50-1	o-Dichlorobenzene	20	16.0	80	16.3	82	2	79-120/10
106-46-7	p-Dichlorobenzene	20	15.9	80	16.1	81	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	16.2	81	15.6	78	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.0	90	18.1	91	1	73-125/10
100-41-4	Ethylbenzene	20	17.6	88	17.5	88	1	78-123/10
591-78-6	2-Hexanone	80	75.8	95	73.9	92	3	71-145/12
87-68-3	Hexachlorobutadiene	20	15.6	78	15.7	79	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1373-BS	U33430.D	1	03/13/16	JC	n/a	n/a	VU1373
VU1373-BSD	U33431.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	17.4	87	17.3	87	1	77-125/10
99-87-6	p-Isopropyltoluene	20	15.2	76	15.3	77	1	76-126/10
74-83-9	Methyl bromide	20	18.2	91	17.7	89	3	65-124/13
74-87-3	Methyl chloride	20	22.5	113	21.5	108	5	47-143/20
74-95-3	Methylene bromide	20	19.1	96	19.2	96	1	80-125/10
75-09-2	Methylene chloride	20	18.0	90	17.8	89	1	65-124/15
91-20-3	Naphthalene	20	16.4	82	17.2	86	5	66-120/12
103-65-1	n-Propylbenzene	20	15.2	76	15.3	77	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.2	91	18.3	92	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	18.2	91	17.8	89	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	17.6	88	17.6	88	0	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.2	96	19.2	96	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	16.8	84	17.4	87	4	70-128/12
96-18-4	1,2,3-Trichloropropane	20	17.1	86	16.8	84	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	15.9	80	16.3	82	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	15.3	77	15.5	78	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	15.3	77* [a]	15.5	78* [a]	1	79-130/10
127-18-4	Tetrachloroethylene	20	17.4	87	16.7	84	4	72-124/13
108-88-3	Toluene	20	17.2	86	17.3	87	1	78-121/10
79-01-6	Trichloroethylene	20	17.6	88	17.4	87	1	75-119/10
75-69-4	Trichlorofluoromethane	20	19.4	97	18.3	92	6	68-130/19
75-01-4	Vinyl chloride	20	22.8	114	21.3	107	7	57-137/18
1330-20-7	Xylene (total)	60	51.4	86	51.3	86	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	107%	105%	80-123%
2037-26-5	Toluene-D8	103%	104%	88-112%
460-00-4	4-Bromofluorobenzene	102%	102%	79-114%

(a) Outside laboratory control limits; but within marginal exceedance criteria. AZ:L2

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1374-BS	U33460.D	1	03/14/16	JC	n/a	n/a	VU1374
VU1374-BSD	U33461.D	1	03/14/16	JC	n/a	n/a	VU1374

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
127-18-4	Tetrachloroethylene	20	16.0	80	16.2	81	1	72-124/13

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	112%	105%	80-123%
2037-26-5	Toluene-D8	102%	103%	88-112%
460-00-4	4-Bromofluorobenzene	101%	102%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1373-LCS	U33434.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	104%	80-123%
2037-26-5	Toluene-D8	104%	88-112%
460-00-4	4-Bromofluorobenzene	97%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1374-LCS	U33462.D	1	03/14/16	JC	n/a	n/a	VU1374

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	106%	80-123%
2037-26-5	Toluene-D8	104%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44340-1MS	U33451.D	1	03/14/16	JC	n/a	n/a	VU1373
C44340-1MSD	U33452.D	1	03/14/16	JC	n/a	n/a	VU1373
C44340-1	U33436.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	C44340-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	1.0	U	20	18.6	93	20	18.4	92	1	76-120/10
108-86-1	Bromobenzene	1.0	U	20	15.8	79* [a]	20	15.9	80	1	80-123/10
74-97-5	Bromochloromethane	1.0	U	20	18.4	92	20	18.3	92	1	79-124/10
75-27-4	Bromodichloromethane	1.0	U	20	17.5	88	20	17.5	88	0	75-121/10
75-25-2	Bromoform	1.0	U	20	15.8	79	20	15.6	78	1	62-127/10
104-51-8	n-Butylbenzene	2.0	U	20	15.8	79	20	15.9	80	1	74-129/10
135-98-8	sec-Butylbenzene	2.0	U	20	15.6	78	20	15.9	80	2	75-128/11
98-06-6	tert-Butylbenzene	2.0	U	20	14.5	73* [b]	20	14.9	75	3	74-127/11
108-90-7	Chlorobenzene	1.0	U	20	17.7	89	20	17.8	89	1	79-119/10
75-00-3	Chloroethane	1.0	U	20	19.2	96	20	18.9	95	2	60-115/14
67-66-3	Chloroform	1.0	U	20	18.8	94	20	18.6	93	1	75-122/10
95-49-8	o-Chlorotoluene	2.0	U	20	20.1	101	20	20.3	102	1	76-125/12
106-43-4	p-Chlorotoluene	2.0	U	20	17.9	90	20	18.2	91	2	76-126/11
75-15-0	Carbon disulfide	1.0	U	20	11.2	56	20	11.1	56	1	51-130/13
56-23-5	Carbon tetrachloride	1.0	U	20	19.6	98	20	19.7	99	1	72-128/13
75-34-3	1,1-Dichloroethane	1.0	U	20	18.8	94	20	18.6	93	1	70-121/10
75-35-4	1,1-Dichloroethylene	1.0	U	20	16.8	84	20	16.9	85	1	62-125/13
563-58-6	1,1-Dichloropropene	1.0	U	20	17.5	88	20	17.6	88	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	2.0	U	20	15.1	76	20	15.4	77	2	64-129/11
106-93-4	1,2-Dibromoethane	1.0	U	20	17.6	88	20	17.6	88	0	81-124/10
107-06-2	1,2-Dichloroethane	1.0	U	20	18.9	95	20	18.7	94	1	74-122/10
78-87-5	1,2-Dichloropropane	1.0	U	20	18.6	93	20	18.7	94	1	75-123/10
142-28-9	1,3-Dichloropropane	1.0	U	20	19.0	95	20	19.0	95	0	81-127/11
594-20-7	2,2-Dichloropropane	1.0	U	20	15.1	76	20	15.1	76	0	66-130/12
124-48-1	Dibromochloromethane	1.0	U	20	16.8	84	20	16.6	83	1	76-124/10
75-71-8	Dichlorodifluoromethane	1.0	U	20	22.2	111	20	21.7	109	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	1.0	U	20	18.8	94	20	18.8	94	0	75-128/10
10061-01-5	cis-1,3-Dichloropropene	1.0	U	20	16.9	85	20	16.5	83	2	76-131/10
541-73-1	m-Dichlorobenzene	1.0	U	20	15.8	79	20	15.9	80	1	79-121/10
95-50-1	o-Dichlorobenzene	1.0	U	20	16.4	82	20	16.2	81	1	79-120/10
106-46-7	p-Dichlorobenzene	1.0	U	20	16.2	81	20	16.2	81	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	1.0	U	20	15.7	79	20	15.6	78	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	1.0	U	20	16.2	81	20	16.0	80	1	73-125/10
100-41-4	Ethylbenzene	1.0	U	20	17.1	86	20	17.2	86	1	78-123/10
591-78-6	2-Hexanone	10	U	80	76.5	96	80	76.1	95	1	71-145/12
87-68-3	Hexachlorobutadiene	2.0	U	20	16.3	82	20	16.5	83	1	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44340-1MS	U33451.D	1	03/14/16	JC	n/a	n/a	VU1373
C44340-1MSD	U33452.D	1	03/14/16	JC	n/a	n/a	VU1373
C44340-1	U33436.D	1	03/13/16	JC	n/a	n/a	VU1373

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-9, C44338-10, C44338-11

CAS No.	Compound	C44340-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	1.0 U		20	17.3	87	20	17.3	87	0	77-125/10
99-87-6	p-Isopropyltoluene	2.0 U		20	13.9	70* [b]	20	14.1	71* [b]	1	76-126/10
74-83-9	Methyl bromide	2.0 U		20	18.4	92	20	17.9	90	3	65-124/13
74-87-3	Methyl chloride	0.34	J	20	25.1	124	20	24.0	118	4	47-143/20
74-95-3	Methylene bromide	1.0 U		20	19.7	99	20	19.2	96	3	80-125/10
75-09-2	Methylene chloride	10 U		20	18.0	90	20	17.8	89	1	65-124/15
91-20-3	Naphthalene	5.0 U		20	16.3	82	20	17.3	87	6	66-120/12
103-65-1	n-Propylbenzene	2.0 U		20	14.9	75	20	15.2	76	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	1.0 U		20	18.4	92	20	18.2	91	1	79-126/10
71-55-6	1,1,1-Trichloroethane	1.0 U		20	19.1	96	20	18.9	95	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		20	17.6	88	20	17.5	88	1	78-127/10
79-00-5	1,1,2-Trichloroethane	1.0 U		20	19.6	98	20	19.4	97	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	2.0 U		20	16.8	84	20	17.5	88	4	70-128/12
96-18-4	1,2,3-Trichloropropane	2.0 U		20	16.3	82	20	16.2	81	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	2.0 U		20	15.9	80	20	16.3	82	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	2.0 U		20	9.5	48* [b]	20	9.7	49* [b]	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	2.0 U		20	10.2	51* [a]	20	10.5	53* [a]	3	79-130/10
127-18-4	Tetrachloroethylene	1.0 U		20	17.3	87	20	17.5	88	1	72-124/13
108-88-3	Toluene	1.0 U		20	16.6	83	20	16.6	83	0	78-121/10
79-01-6	Trichloroethylene	1.0 U		20	18.1	91	20	18.1	91	0	75-119/10
75-69-4	Trichlorofluoromethane	1.0 U		20	20.8	104	20	20.4	102	2	68-130/19
75-01-4	Vinyl chloride	1.0 U		20	25.2	126	20	24.5	123	3	57-137/18
1330-20-7	Xylene (total)	2.0 U		60	44.1	74* [b]	60	43.9	73* [b]	0	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C44340-1	Limits
1868-53-7	Dibromofluoromethane	106%	105%	98%	80-123%
2037-26-5	Toluene-D8	101%	101%	104%	88-112%
460-00-4	4-Bromofluorobenzene	101%	100%	92%	79-114%

(a) Outside laboratory control limits. AZ:L2
(b) Outside laboratory control limits. AZ:M2

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C44338
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C44480-3MS	U33481.D	25	03/14/16	JC	n/a	n/a	VU1374
C44480-3MSD	U33482.D	25	03/14/16	JC	n/a	n/a	VU1374
C44480-3	U33472.D	25	03/14/16	JC	n/a	n/a	VU1374

The QC reported here applies to the following samples: **Method:** SW846 8260B

C44338-11

CAS No.	Compound	C44480-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
127-18-4	Tetrachloroethylene	25	U	500	386	77	500	395	79	2	72-124/13

CAS No.	Surrogate Recoveries	MS	MSD	C44480-3	Limits
1868-53-7	Dibromofluoromethane	109%	109%	109%	80-123%
2037-26-5	Toluene-D8	101%	102%	104%	88-112%
460-00-4	4-Bromofluorobenzene	115%* [a]	115%* [a]	113%	79-114%

(a) Outside control limits due to matrix interference. AZ:S11

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10922
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/03/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5	2.4	<10
Barium	200	.2	.5	0.20	<200
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3	-0.20	<2.0
Calcium	5000	28	69		
Chromium	10	.4	.6	0.10	<10
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	0.30	<200
Lead	10	1	1.7	-0.50	<10
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.20	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3	-3.2	<10
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5	0.0	<5.0
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP10922: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11, C44338-12, C44338-13

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10922
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/03/16

Metal	C44329-3 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum	anr				
Antimony	anr				
Arsenic	4.1	489	500	97.0	75-125
Barium	134	622	500	97.6	75-125
Beryllium	anr				
Boron	anr				
Cadmium	0.0	488	500	97.6	75-125
Calcium	anr				
Chromium	9.1	506	500	99.4	75-125
Cobalt	anr				
Copper	anr				
Iron	0.0	12400	12500	99.2	75-125
Lead	5.2	486	500	96.2	75-125
Lithium					
Magnesium	anr				
Manganese	226	520	500	58.8N(a)	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	0.0	482	500	96.4	75-125
Silicon					
Silver	0.0	481	500	96.2	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP10922: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11, C44338-12, C44338-13

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10922
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/03/16

Metal	C44329-3 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony	anr					
Arsenic	4.1	486	500	96.4	0.6	20
Barium	134	617	500	96.6	0.8	20
Beryllium	anr					
Boron	anr					
Cadmium	0.0	486	500	97.2	0.4	20
Calcium	anr					
Chromium	9.1	502	500	98.6	0.8	20
Cobalt	anr					
Copper	anr					
Iron	0.0	12300	12500	98.4	0.8	20
Lead	5.2	484	500	95.8	0.4	20
Lithium						
Magnesium	anr					
Manganese	226	518	500	58.4N(a)	0.4	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	0.0	479	500	95.8	0.6	20
Silicon						
Silver	0.0	477	500	95.4	0.8	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP10922: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11, C44338-12, C44338-13

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10922
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/03/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	474	500	94.8	80-120
Barium	486	500	97.2	80-120
Beryllium	anr			
Boron	anr			
Cadmium	483	500	96.6	80-120
Calcium	anr			
Chromium	501	500	100.2	80-120
Cobalt	anr			
Copper	anr			
Iron	12500	12500	100.0	80-120
Lead	478	500	95.6	80-120
Lithium				
Magnesium	anr			
Manganese	506	500	101.2	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	470	500	94.0	80-120
Silicon				
Silver	471	500	94.2	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10922: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11, C44338-12, C44338-13

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10922
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/03/16

Metal	C44329-3 Original	SDL 1:5	%DIF	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	4.10	0.00	100.0(a)	0-10
Barium	134	134	0.1	0-10
Beryllium	anr			
Boron	anr			
Cadmium	0.00	0.00	NC	0-10
Calcium	anr			
Chromium	9.10	9.50	4.4	0-10
Cobalt	anr			
Copper	anr			
Iron	0.00	0.00	NC	0-10
Lead	5.20	0.00	100.0(a)	0-10
Lithium				
Magnesium	anr			
Manganese	226	0.00	100.0*(b	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP10922: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11, C44338-12, C44338-13

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
(b) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP11008
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/14/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.01	0.015	<0.20

Associated samples MP11008: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1

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MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP11008
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/14/16

Metal	C44338-11 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.015	2.5	2	124.3	75-125

Associated samples MP11008: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP11008
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/14/16

Metal	C44338-11 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.015	2.0	2	99.3	22.2	30

Associated samples MP11008: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C44338
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP11008
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 03/14/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.0	2	100.0	85-115

Associated samples MP11008: C44338-1, C44338-2, C44338-3, C44338-4, C44338-5, C44338-6, C44338-7, C44338-8, C44338-10, C44338-11

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway & Pantano

SGS Accutest Job Number: C44477

Sampling Date: 03/01/16

Report to:

AMEC Foster Wheeler
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ATTN: Alex Yiannakakis

Total number of pages in report: 17

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Broadway & Pantano

Job No: C44477

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C44477-1	03/01/16	16:10	CM	03/04/16	AQ	Ground Water	BP-27-GW

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C44477
Site:	Broadway & Pantano	**Report Date**	3/12/2016 1:49:46 AM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 03/01/2016 and were received at Accutest on 03/04/2016 properly preserved, at 4.4 Deg. C and intact. These Samples received an Accutest job number of C44477. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP10977

- Sample(s) C44615-2MS, C44615-2MSD, C44615-2SDL were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C44477
Account: AMEC Foster Wheeler
Project: Broadway & Pantano
Collected: 03/01/16

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Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C44477-1	**BP-27-GW**					
Manganese [a]		42200	75		ug/l	SW846 6010B

(a) AZ:D2

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-GW		
Lab Sample ID:	C44477-1	**Date Sampled:**	03/01/16
Matrix:	AQ - Ground Water	**Date Received:**	03/04/16
		Percent Solids:	n/a
Project:	Broadway & Pantano		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese [a]	42200	75	ug/l	5	03/10/16	03/10/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5676
(2) Prep QC Batch: MP10977

(a) AZ:D2

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C44477
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway & Pantano

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
D2	Sample required dilution due to high concentration of target analyte.

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7757 9369 3762
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C 44477

Client / Reporting Information

Company Name: AMEC
Address:
City: Phoenix State: AZ Zip:
Project Contact: Emily Corkery
Phone #: 602-410-2545
Sampler's Name: Chuck Mason

Project Information

Project Name: Broadway Pantano
Street:
City: Tucson State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: Manganese

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	Na2S2O3	MEOH	EnCore	Manganese	LAB USE ONLY
1	BP-27-GW	03/01/16	1610	CM	W	1			X						X	

Turnaround Time (Business days): 10 Day; 5 Day; 3 Day; 2 Day; 1 Day; Same Day
Approved By / Date:

Data Deliverable Information: Commercial "A" - Results only; Commercial "B" - Results with QC summaries; Commerical "B+" - Results, QC, and chromatograms; FULT1 - Level 4 data package; EDF for Geotracker; EDD Format; Provide EDF Global ID; Provide EDF Logcode:

Comments / Remarks

Emergency T/A data available VIA Lablink

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 CM	03/03/16 1215	1	2	3/3/16 1700	2 FED-EX
Relinquished by: FEDX	Date Time: 03/4/16 0930	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # INTACT	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N; Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y / N	Cooler Temp. 4.2/4.4

AZ

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: C44477 **Client:** AMEC **Project:** BROADWAY PANTANO

Date / Time Received: 3/4/2016 9:30:00 AM **Delivery Method:** FedEx **Airbill #'s:** 775793693762

Cooler Temps (Initial/Adjusted): #1: (4.2/4.4);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR1;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

Accutest Laboratories
V:408.588.0200

2105 Lundy Avenue
F: 408.588.0201

San Jose, CA 95131
www/accutest.com

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C44477
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10977
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/10/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11		
Lead	10	1	1.7		
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.40	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP10977: C44477-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44477
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10977
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/10/16

Metal	C44615-2 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium	anr				
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron					
Lead	anr				
Lithium					
Magnesium					
Manganese	2340	2850	500	102.0	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium	anr				
Tin	anr				
Titanium	anr				
Vanadium	anr				
Zinc	anr				

Associated samples MP10977: C44477-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44477
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10977
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/10/16

Metal	C44615-2 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron						
Lead	anr					
Lithium						
Magnesium						
Manganese	2340	2820	500	96.0	1.1	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium	anr					
Tin	anr					
Titanium	anr					
Vanadium	anr					
Zinc	anr					

Associated samples MP10977: C44477-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C44477
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10977
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/10/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	517	500	103.4	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin	anr			
Titanium	anr			
Vanadium	anr			
Zinc	anr			

Associated samples MP10977: C44477-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C44477
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway & Pantano

QC Batch ID: MP10977
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/10/16

Metal	C44615-2 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	2340	2450	4.6	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin	anr			
Titanium	anr			
Vanadium	anr			
Zinc	anr			

Associated samples MP10977: C44477-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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e-Hardcopy 2.0
Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C44969

Sampling Date: 03/11/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **16**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Test results relate only to samples analyzed.

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C44969

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C44969-1	03/11/16	14:47	CAM	03/17/16	AQ	Ground Water	BP.ISCO-TANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C44969
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	3/24/2016 11:02:51 P

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 03/11/2016 and were received at Accutest on 03/17/2016 properly preserved, at 3.1 Deg. C and intact. These Samples received an Accutest job number of C44969. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11047

- Sample(s) C44960-2MS, C44960-2MSD, C44960-2SDL were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C44969
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 03/11/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C44969-1	**BP.ISCO-TANK**					
Manganese		3560000	3000		ug/l	SW846 6010B

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP.ISCO-TANK		
Lab Sample ID:	C44969-1	**Date Sampled:**	03/11/16
Matrix:	AQ - Ground Water	**Date Received:**	03/17/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	3560000	3000	ug/l	200	03/21/16	03/22/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5708
(2) Prep QC Batch: MP11047

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

PHOENIX

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7826 1094 5717
Accutest Quote #
Bottle Order Control #
Accutest NC Job #: C C44969

Client / Reporting Information

Company Name: AMEC FW
Address: 4000 E Washington
City: Phoenix State: Az Zip:
Project Contact: Emily Corkery
Phone #: 602-410-2545
Samplers's Name: Chuck Mason

Project Information

Project Name: Broadway Pantano
Street:
City: Tucson State: Az
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: X Manganese

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	Manganese	LAB USE ONLY
1	BP-ISCO-tank	03/11/16	1447	CAM	W	1									X	

Turnaround Time (Business days)

Approved By / Date:

- 10 Day
- 5 Day
- 3 Day
- 2 Day
- 1 Day
- Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- Commercial "A" - Results only
- Commercial "B" - Results with QC summaries
- Commerical "B4" - Results, QC, and chromatograms
- FULT1 - Level 4 data package
- EDF for Geotracker — EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler	Date Time	Received By	Relinquished By	Date Time	Received By
1	CM	03/16/16 1010	Julie Smith	Julie Smith	3/16/16 1400	Fedex
2						
3	FEDX	3/17/16 0940	Lee Sa			
4						
5						

Custody Seal # INTACT
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
Ontce Y / N
Cooler Temp. 2.9/3.1

C44969: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C44969 **Client:** AMEC FW **Project:** BROADWAY PANTARO

Date / Time Received: 3/17/2016 9:40:00 AM **Delivery Method:** FedEx **Airbill #'s:** 782610965717

Cooler Temps (Initial/Adjusted): #1: (2.9/3.1);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR1;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

5.1

5

C44969: Chain of Custody

Page 2 of 2

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C44969
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11047
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/21/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11		
Lead	10	1	1.7		
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.30	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11047: C44969-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44969
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11047 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 03/21/16

Metal	C44960-2 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium	anr				
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron					
Lead	anr				
Lithium					
Magnesium					
Manganese	10.3	536	500	105.1	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium	anr				
Tin	anr				
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP11047: C44969-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C44969
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11047 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 03/21/16

Metal	C44960-2 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron						
Lead	anr					
Lithium						
Magnesium						
Manganese	10.3	542	500	106.3	1.1	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium	anr					
Tin	anr					
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP11047: C44969-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C44969
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11047
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/21/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	541	500	108.2	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin	anr			
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP11047: C44969-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C44969
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11047
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/21/16

Metal	C44960-2 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	10.3	11.2	8.7	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin	anr			
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP11047: C44969-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45177

Sampling Date: 03/28/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **69**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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Test results relate only to samples analyzed.

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45177

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45177-1	03/28/16	11:10	CM	03/30/16	AQ	Ground Water	BP.26.333.GW
C45177-2	03/28/16	11:10	CM	03/30/16	AQ	Ground Water	BP.26.345.GW
C45177-3	03/28/16	12:05	CM	03/30/16	AQ	Ground Water	BP.28.333.GW
C45177-4	03/28/16	12:20	CM	03/30/16	AQ	Ground Water	BP.28.345.GW
C45177-5	03/28/16	13:10	CM	03/30/16	AQ	Ground Water	BP.27.333.GW
C45177-6	03/28/16	17:00	CM	03/30/16	AQ	Ground Water	BP.29.SP.GW
C45177-7	03/28/16	09:22	CM	03/30/16	AQ	Ground Water	BP.WR.274A.341.GW
C45177-8	03/28/16	00:00	CM	03/30/16	AQ	Trip Blank Water	TRIP BLANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45177
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	4/12/2016 10:33:17 P

7 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 03/28/2016 and were received at Accutest on 03/30/2016 properly preserved, at 1.9 Deg. C and intact. These Samples received an Accutest job number of C45177. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1490

- Sample(s) C45171-3MS, C45171-3MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Trichloroethylene are outside control limits due to high level in sample relative to spike amount.
- C45177-5: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45177-4: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45177-3: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45177-2: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45177-1: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45177-6: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1492

- Sample(s) C45198-2MS, C45198-2MSD were used as the QC samples indicated.

Matrix: AQ **Batch ID:** VU1398

- Sample(s) C45212-9MS, C45212-9MSD were used as the QC samples indicated.

Matrix: AQ **Batch ID:** VV1354

- Sample(s) C45103-3MS, C45103-3MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Trichlorofluoromethane are outside laboratory control limits.
- RPD(s) for MSD for Trichlorofluoromethane are outside laboratory control limits for sample C45103-3MSD.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11106

- Sample(s) C45177-2MS, C45177-2MSD, C45177-2SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Lead are outside control limits for sample MP11106-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11126

- Sample(s) C45201-1MS, C45201-1MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45177
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 03/28/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45177-1	**BP.26.333.GW**					
Benzene [a]		0.47 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		5.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		16.6	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.49 J	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		69.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		16.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B
Barium		325	200		ug/l	SW846 6010B
Iron		830	200		ug/l	SW846 6010B
Manganese		98.2	15		ug/l	SW846 6010B
C45177-2	**BP.26.345.GW**					
Benzene [a]		0.47 J	1.0	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		5.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		16.7	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.34 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		62.5	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		15.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Barium		338	200		ug/l	SW846 6010B
Iron		2240	200		ug/l	SW846 6010B
Manganese		123	15		ug/l	SW846 6010B
C45177-3	**BP.28.333.GW**					
Benzene [a]		0.67 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.36 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.67	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		7.8	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		30.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.88	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [b]		0.74	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		78.7	1.0	0.60	ug/l	SW846 8260B
Trichloroethylene [b]		25.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.56	0.50	0.20	ug/l	SW846 8260B
Barium		332	200		ug/l	SW846 6010B

Summary of Hits

Job Number: C45177
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 03/28/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Iron		497	200		ug/l	SW846 6010B
Manganese		53.6	15		ug/l	SW846 6010B
C45177-4	**BP.28.345.GW**					
Benzene [a]		0.72 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.67	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		8.4	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		31.3	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.89	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [b]		0.79	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		83.1	1.0	0.60	ug/l	SW846 8260B
Trichloroethylene [b]		26.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.62	0.50	0.20	ug/l	SW846 8260B
Barium		333	200		ug/l	SW846 6010B
Iron		747	200		ug/l	SW846 6010B
Manganese		49.1	15		ug/l	SW846 6010B
C45177-5	**BP.27.333.GW**					
Benzene [a]		0.53 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		6.9	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		5.9	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.60	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		77.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		8.5	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.55	0.50	0.20	ug/l	SW846 8260B
Barium		290	200		ug/l	SW846 6010B
Manganese		1390	15		ug/l	SW846 6010B
C45177-6	**BP.29.SP.GW**					
Benzene [a]		0.39 J	1.0	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.21 J	1.0	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		5.2	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		13.2	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.33 J	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.31 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		67.1	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		13.6	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C45177
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 03/28/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Barium		312	200		ug/l	SW846 6010B
Manganese		95.1	15		ug/l	SW846 6010B
C45177-7	**BP.WR.274A.341.GW**					
Benzene [c]		0.55 J	2.0	0.40	ug/l	SW846 8260B
Carbon disulfide [c]		1.6 J	2.0	0.40	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.70 J	1.0	0.40	ug/l	SW846 8260B
Dichlorodifluoromethane		3.0	1.0	0.40	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		26.7	1.0	0.40	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.88 J	1.0	0.40	ug/l	SW846 8260B
Tetrachloroethylene		103	1.0	0.60	ug/l	SW846 8260B
Trichloroethylene		22.7	1.0	0.40	ug/l	SW846 8260B
Barium		367	200		ug/l	SW846 6010B
C45177-8	**TRIP BLANK**					

No hits reported in this sample.

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time. AZ:E4
(b) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(c) AZ:E4

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45177-1	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39154.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.47	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.21	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.35	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	16.6	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.49	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene [b]	0.30	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45177-1	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	69.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	16.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.43	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45177-1	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	325	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	830	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	98.2	15	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5746
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45177-2	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39155.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.47	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.35	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	16.7	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.43	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene [b]	0.34	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45177-2	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	62.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	15.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.40	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%		80-123%
2037-26-5	Toluene-D8	96%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45177-2	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	338	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	2240	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	123	15	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5746
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45177-3	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39156.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2	R39189.D	2	04/07/16	CV	n/a	n/a	VR1492

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.67	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.36	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.21	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.67	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	7.8	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	30.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.88	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.74	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45177-3	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	78.7 [c]	1.0	0.60	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	25.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.56	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%	97%	80-123%
2037-26-5	Toluene-D8	97%	96%	88-112%
460-00-4	4-Bromofluorobenzene	88%	87%	79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45177-3	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	332	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	497	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	53.6	15	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5746
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45177-4	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39157.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2	R39190.D	2	04/07/16	CV	n/a	n/a	VR1492

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.72	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.35	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.67	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	8.4	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	31.3	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.89	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	0.79	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45177-4	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	83.1 [c]	1.0	0.60	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	26.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.62	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%	98%	80-123%
2037-26-5	Toluene-D8	96%	96%	88-112%
460-00-4	4-Bromofluorobenzene	88%	87%	79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45177-4	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	333	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	747	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	49.1	15	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5746
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45177-5	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39158.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.53	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.27	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.42	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	6.9	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	5.9	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.60	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45177-5	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	77.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	8.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.55	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	96%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45177-5	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	290	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	1390	15	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	03/31/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5746
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.29.SP.GW		
Lab Sample ID:	C45177-6	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39159.D	1	04/06/16	CV	n/a	n/a	VR1490
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.39	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.21	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.29	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	13.2	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.33	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene [b]	0.31	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.SP.GW		
Lab Sample ID:	C45177-6	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	67.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	13.6	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.43	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	95%		88-112%
460-00-4	4-Bromofluorobenzene	89%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.SP.GW		
Lab Sample ID:	C45177-6	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	312	200	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	95.1	15	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5748
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP.WR.274A.341.GW		
Lab Sample ID:	C45177-7	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U34063.D	2	04/08/16	MV	n/a	n/a	VU1398
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [a]	0.55	2.0	0.40	ug/l	J
108-86-1	Bromobenzene	ND	2.0	0.40	ug/l	
74-97-5	Bromochloromethane	ND	2.0	0.40	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.40	ug/l	
75-25-2	Bromoform	ND	1.0	0.44	ug/l	
104-51-8	n-Butylbenzene	ND	4.0	0.40	ug/l	
135-98-8	sec-Butylbenzene	ND	4.0	0.40	ug/l	
98-06-6	tert-Butylbenzene	ND	4.0	0.56	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.40	ug/l	
75-00-3	Chloroethane	ND	1.0	0.40	ug/l	
67-66-3	Chloroform	ND	1.0	0.40	ug/l	
95-49-8	o-Chlorotoluene	ND	4.0	0.40	ug/l	
106-43-4	p-Chlorotoluene	ND	4.0	0.52	ug/l	
75-15-0	Carbon disulfide [a]	1.6	2.0	0.40	ug/l	J
56-23-5	Carbon tetrachloride	ND	1.0	0.40	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.40	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.40	ug/l	
563-58-6	1,1-Dichloropropene	ND	2.0	0.40	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	4.0	0.80	ug/l	
106-93-4	1,2-Dibromoethane	ND	2.0	0.40	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.40	ug/l	
78-87-5	1,2-Dichloropropane [a]	0.70	1.0	0.40	ug/l	J
142-28-9	1,3-Dichloropropane	ND	2.0	0.40	ug/l	
594-20-7	2,2-Dichloropropane	ND	2.0	0.40	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
75-71-8	Dichlorodifluoromethane	3.0	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	26.7	1.0	0.40	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.40	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.40	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.40	ug/l	
106-46-7	p-Dichlorobenzene [a]	0.88	1.0	0.40	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.40	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.WR.274A.341.GW		
Lab Sample ID:	C45177-7	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	2.0	0.40	ug/l	
591-78-6	2-Hexanone	ND	20	4.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.0	0.40	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.40	ug/l	
99-87-6	p-Isopropyltoluene	ND	4.0	0.40	ug/l	
74-83-9	Methyl bromide	ND	4.0	0.40	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.60	ug/l	
74-95-3	Methylene bromide	ND	2.0	0.40	ug/l	
75-09-2	Methylene chloride	ND	10	4.0	ug/l	
91-20-3	Naphthalene	ND	10	1.0	ug/l	
103-65-1	n-Propylbenzene	ND	4.0	0.40	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	2.0	0.60	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.40	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.44	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	4.0	0.40	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	4.0	0.40	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.0	0.40	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	4.0	0.40	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	4.0	0.40	ug/l	
127-18-4	Tetrachloroethylene	103	1.0	0.60	ug/l	
108-88-3	Toluene	ND	2.0	0.40	ug/l	
79-01-6	Trichloroethylene	22.7	1.0	0.40	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.40	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.40	ug/l	
1330-20-7	Xylene (total)	ND	4.0	0.92	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.WR.274A.341.GW		
Lab Sample ID:	C45177-7	**Date Sampled:**	03/28/16
Matrix:	AQ - Ground Water	**Date Received:**	03/30/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	367	200	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	< 15	15	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/04/16	04/04/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	03/31/16	04/01/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5748
(2) Instrument QC Batch: MA5752
(3) Prep QC Batch: MP11106
(4) Prep QC Batch: MP11126

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45177-8	**Date Sampled:**	03/28/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V32797.D	1	04/06/16	KZ	n/a	n/a	VV1354
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45177-8	**Date Sampled:**	03/28/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	03/30/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		80-123%
2037-26-5	Toluene-D8	110%		88-112%
460-00-4	4-Bromofluorobenzene	106%		79-114%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R9	Sample RPD exceeded the laboratory acceptance limit.

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 7827 0311 3732
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C: CU5177

Client / Reporting Information

Company Name: AMECFW
Address: 4600 E. Washington Ave
City / State / Zip: Phoenix AZ 85
Project Contact: Emily Corkery
Phone #: 602.410.2545
Samplers's Name: Chuck Mason

Project Information

Project Name: BP ISCO
Street:
City: Tucson State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	Na2S2O3	NaHSO4	MEOH	EnCore	8260B (VOCs)	6010 (RCRA + Total met MN)	7470 (mercury)
1	BP.26.333.GW	03/29/16	1100	CAM	W	4	3				1				X	X	X
2	BP.26.345.GW	↓	1110	↓	↓	4	3				1				X	X	X
3	BP.28.333.GW		1205			4	3				1				X	X	X
4	BP.28.345.GW		1220			4	3				1				X	X	X
5	BP.27.333.GW		1310			4	3				1				X	X	X
6	BP.29.SP.GW	↓	1700			4	3				1				X	X	X
A2 3130 7	~~BP WR 274A 341 GW~~	~~03/29/16~~															
7	BP WR 274A.341.GW	03/29/16	0922	↓	↓	4	3				1				X	X	X
8	TRIP BLANK					2									X		

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:
- 10 Day
- 5 Day
- 3 Day
- 2 Day
- 1 Day
- Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- Commercial "A" - Results only
- Commerical "B" - Results with QC summaries
- Commerical "B+" - Results, QC, and chromatograms
- FULT1 - Level 4 data package
- EDF for Geotracker — EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

All Analytical = VOCs (8260B) & RCRA Metals + Total Fe and Mn (6010) & Mercury (7470)

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 CAM	03/29/16 1530	1 [signature]	2 [signature]	3/29/16 1730	2 Fedex A2
Relinquished by: 3 Fedex	Date Time: 3/30/16 09:35	Received By: 3 Ali Zeighami	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # Y	Appropriate Bottle / Pres. Y/N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y/N; Cooler Temp. 1.7/1.9

B

5.2 5

SGS Accutest Sample Receipt Summary

Job Number: C45177 **Client:** AMEC FW **Project:** BP-ISCO

Date / Time Received: 3/30/2016 9:35:00 AM **Delivery Method:** FedEx **Airbill #'s:** 782703113732

Cooler Temps (Initial/Adjusted): #1: (1.7/1.9);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR1;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y or N	N/A
1. Trip Blank present / cooler:	☑ ☐	☐
2. Trip Blank listed on COC:	☐ ☑	☐
3. Samples preserved properly:	☑ ☐	
4. VOCs headspace free:	☑ ☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☑ ☐

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y or N	N/A
1. Analysis requested is clear:	☑ ☐	
2. Bottles received for unspecified tests	☐ ☑	
3. Sufficient volume recvd for analysis:	☑ ☐	
4. Compositing instructions clear:	☐ ☐	☑
5. Filtering instructions clear:	☐ ☐	☑

Comments
Per Client:
Standard TAT
Add Trip Blank to be analyzed for VOCs(8260B)
Total Metals - RCRA 8 + Fe & Mn

C45177: Chain of Custody
Page 2 of 2

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1354-MB	V32793.D	1	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1354-MB	V32793.D	1	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	95%	80-123%
2037-26-5	Toluene-D8	109%	88-112%
460-00-4	4-Bromofluorobenzene	107%	79-114%

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1490-MB	R39151.D	1	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1490-MB	R39151.D	1	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	88%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	91%	79-114%

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1492-MB	R39183.D	1	04/07/16	CV	n/a	n/a	VR1492

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-3, C45177-4

CAS No.	Compound	Result	RL	MDL	Units	Q
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	94%	80-123%
2037-26-5	Toluene-D8	96%	88-112%
460-00-4	4-Bromofluorobenzene	90%	79-114%

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1398-MB	U34056.D	1	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1398-MB	U34056.D	1	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	99%	80-123%
2037-26-5	Toluene-D8	103%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1354-BS	V32790.D	1	04/06/16	KZ	n/a	n/a	VV1354
VV1354-BSD	V32791.D	1	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	16.9	85	17.3	87	2	76-120/10
108-86-1	Bromobenzene	20	18.1	91	18.5	93	2	80-123/10
74-97-5	Bromochloromethane	20	17.3	87	17.8	89	3	79-124/10
75-27-4	Bromodichloromethane	20	16.4	82	16.7	84	2	75-121/10
75-25-2	Bromoform	20	15.1	76	15.2	76	1	62-127/10
104-51-8	n-Butylbenzene	20	17.7	89	17.9	90	1	74-129/10
135-98-8	sec-Butylbenzene	20	17.5	88	17.8	89	2	75-128/11
98-06-6	tert-Butylbenzene	20	17.4	87	17.6	88	1	74-127/11
108-90-7	Chlorobenzene	20	17.1	86	17.3	87	1	79-119/10
75-00-3	Chloroethane	20	17.5	88	17.8	89	2	60-115/14
67-66-3	Chloroform	20	15.9	80	16.4	82	3	75-122/10
95-49-8	o-Chlorotoluene	20	16.8	84	17.2	86	2	76-125/12
106-43-4	p-Chlorotoluene	20	17.0	85	17.3	87	2	76-126/11
75-15-0	Carbon disulfide	20	15.2	76	15.4	77	1	51-130/13
56-23-5	Carbon tetrachloride	20	16.5	83	16.7	84	1	72-128/13
75-34-3	1,1-Dichloroethane	20	16.4	82	17.0	85	4	70-121/10
75-35-4	1,1-Dichloroethylene	20	16.4	82	16.4	82	0	62-125/13
563-58-6	1,1-Dichloropropene	20	16.7	84	16.5	83	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	14.9	75	15.2	76	2	64-129/11
106-93-4	1,2-Dibromoethane	20	17.6	88	18.0	90	2	81-124/10
107-06-2	1,2-Dichloroethane	20	15.9	80	16.0	80	1	74-122/10
78-87-5	1,2-Dichloropropane	20	17.3	87	17.2	86	1	75-123/10
142-28-9	1,3-Dichloropropane	20	18.0	90	18.3	92	2	81-127/11
594-20-7	2,2-Dichloropropane	20	17.1	86	17.0	85	1	66-130/12
124-48-1	Dibromochloromethane	20	16.2	81	16.4	82	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	16.6	83	16.7	84	1	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	16.9	85	17.2	86	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	17.8	89	18.0	90	1	76-131/10
541-73-1	m-Dichlorobenzene	20	17.9	90	18.1	91	1	79-121/10
95-50-1	o-Dichlorobenzene	20	17.5	88	17.9	90	2	79-120/10
106-46-7	p-Dichlorobenzene	20	17.9	90	18.0	90	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	15.2	76	15.6	78	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	16.7	84	17.0	85	2	73-125/10
100-41-4	Ethylbenzene	20	17.6	88	17.6	88	0	78-123/10
591-78-6	2-Hexanone	80	78.9	99	81.3	102	3	71-145/12
87-68-3	Hexachlorobutadiene	20	17.9	90	17.9	90	0	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1354-BS	V32790.D	1	04/06/16	KZ	n/a	n/a	VV1354
VV1354-BSD	V32791.D	1	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	17.0	85	17.2	86	1	77-125/10
99-87-6	p-Isopropyltoluene	20	17.7	89	17.8	89	1	76-126/10
74-83-9	Methyl bromide	20	16.3	82	16.9	85	4	65-124/13
74-87-3	Methyl chloride	20	21.0	105	21.2	106	1	47-143/20
74-95-3	Methylene bromide	20	16.9	85	17.4	87	3	80-125/10
75-09-2	Methylene chloride	20	16.7	84	17.1	86	2	65-124/15
91-20-3	Naphthalene	20	16.8	84	17.7	89	5	66-120/12
103-65-1	n-Propylbenzene	20	17.4	87	17.4	87	0	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	16.9	85	17.1	86	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	16.6	83	16.9	85	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	17.5	88	17.9	90	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	17.2	86	17.7	89	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	18.1	91	18.8	94	4	70-128/12
96-18-4	1,2,3-Trichloropropane	20	14.8	74	16.2	81	9	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.7	89	18.2	91	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	17.4	87	17.7	89	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	17.2	86	17.6	88	2	79-130/10
127-18-4	Tetrachloroethylene	20	17.0	85	17.2	86	1	72-124/13
108-88-3	Toluene	20	17.3	87	17.5	88	1	78-121/10
79-01-6	Trichloroethylene	20	17.2	86	17.5	88	2	75-119/10
75-69-4	Trichlorofluoromethane	20	16.8	84	17.3	87	3	68-130/19
75-01-4	Vinyl chloride	20	18.4	92	18.7	94	2	57-137/18
1330-20-7	Xylene (total)	60	52.5	88	52.3	87	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	97%	99%	80-123%
2037-26-5	Toluene-D8	101%	100%	88-112%
460-00-4	4-Bromofluorobenzene	96%	95%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1490-BS	R39148.D	1	04/06/16	CV	n/a	n/a	VR1490
VR1490-BSD	R39149.D	1	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.5	93	18.8	94	2	76-120/10
108-86-1	Bromobenzene	20	18.9	95	18.9	95	0	80-123/10
74-97-5	Bromochloromethane	20	18.0	90	18.1	91	1	79-124/10
75-27-4	Bromodichloromethane	20	18.1	91	18.4	92	2	75-121/10
75-25-2	Bromoform	20	16.6	83	17.0	85	2	62-127/10
104-51-8	n-Butylbenzene	20	19.2	96	19.3	97	1	74-129/10
135-98-8	sec-Butylbenzene	20	19.0	95	19.1	96	1	75-128/11
98-06-6	tert-Butylbenzene	20	18.1	91	17.9	90	1	74-127/11
108-90-7	Chlorobenzene	20	17.9	90	18.4	92	3	79-119/10
75-00-3	Chloroethane	20	17.4	87	17.4	87	0	60-115/14
67-66-3	Chloroform	20	17.6	88	17.7	89	1	75-122/10
95-49-8	o-Chlorotoluene	20	17.7	89	18.7	94	5	76-125/12
106-43-4	p-Chlorotoluene	20	18.0	90	18.2	91	1	76-126/11
75-15-0	Carbon disulfide	20	15.6	78	15.8	79	1	51-130/13
56-23-5	Carbon tetrachloride	20	19.1	96	19.8	99	4	72-128/13
75-34-3	1,1-Dichloroethane	20	17.7	89	17.9	90	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	16.6	83	17.1	86	3	62-125/13
563-58-6	1,1-Dichloropropene	20	18.2	91	18.6	93	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	18.0	90	18.4	92	2	64-129/11
106-93-4	1,2-Dibromoethane	20	18.5	93	19.0	95	3	81-124/10
107-06-2	1,2-Dichloroethane	20	18.2	91	18.4	92	1	74-122/10
78-87-5	1,2-Dichloropropane	20	18.7	94	19.1	96	2	75-123/10
142-28-9	1,3-Dichloropropane	20	18.9	95	19.3	97	2	81-127/11
594-20-7	2,2-Dichloropropane	20	17.9	90	18.0	90	1	66-130/12
124-48-1	Dibromochloromethane	20	16.5	83	17.0	85	3	76-124/10
75-71-8	Dichlorodifluoromethane	20	13.9	70	13.9	70	0	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	17.9	90	18.1	91	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	17.9	90	18.2	91	2	76-131/10
541-73-1	m-Dichlorobenzene	20	18.4	92	18.5	93	1	79-121/10
95-50-1	o-Dichlorobenzene	20	18.5	93	18.4	92	1	79-120/10
106-46-7	p-Dichlorobenzene	20	18.2	91	18.2	91	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	15.9	80	16.0	80	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	16.6	83	17.0	85	2	73-125/10
100-41-4	Ethylbenzene	20	18.7	94	19.2	96	3	78-123/10
591-78-6	2-Hexanone	80	86.0	108	88.7	111	3	71-145/12
87-68-3	Hexachlorobutadiene	20	19.1	96	19.6	98	3	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1490-BS	R39148.D	1	04/06/16	CV	n/a	n/a	VR1490
VR1490-BSD	R39149.D	1	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	18.7	94	19.3	97	3	77-125/10
99-87-6	p-Isopropyltoluene	20	19.3	97	19.5	98	1	76-126/10
74-83-9	Methyl bromide	20	15.6	78	15.5	78	1	65-124/13
74-87-3	Methyl chloride	20	17.6	88	18.1	91	3	47-143/20
74-95-3	Methylene bromide	20	18.6	93	19.0	95	2	80-125/10
75-09-2	Methylene chloride	20	17.4	87	17.7	89	2	65-124/15
91-20-3	Naphthalene	20	19.6	98	20.0	100	2	66-120/12
103-65-1	n-Propylbenzene	20	18.4	92	18.6	93	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.5	93	19.0	95	3	79-126/10
71-55-6	1,1,1-Trichloroethane	20	18.3	92	18.7	94	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	18.4	92	18.6	93	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	18.6	93	18.8	94	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	19.0	95	19.1	96	1	70-128/12
96-18-4	1,2,3-Trichloropropane	20	18.3	92	18.8	94	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.2	86	17.3	87	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	18.6	93	18.8	94	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.1	96	19.3	97	1	79-130/10
127-18-4	Tetrachloroethylene	20	20.1	101	20.6	103	2	72-124/13
108-88-3	Toluene	20	18.0	90	18.6	93	3	78-121/10
79-01-6	Trichloroethylene	20	18.8	94	19.2	96	2	75-119/10
75-69-4	Trichlorofluoromethane	20	17.5	88	17.7	89	1	68-130/19
75-01-4	Vinyl chloride	20	18.0	90	17.8	89	1	57-137/18
1330-20-7	Xylene (total)	60	55.7	93	57.1	95	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	92%	91%	80-123%
2037-26-5	Toluene-D8	96%	96%	88-112%
460-00-4	4-Bromofluorobenzene	95%	97%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1492-BS	R39180.D	1	04/07/16	CV	n/a	n/a	VR1492
VR1492-BSD	R39181.D	1	04/07/16	CV	n/a	n/a	VR1492

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-3, C45177-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
127-18-4	Tetrachloroethylene	20	20.1	101	20.1	101	0	72-124/13

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	94%	89%	80-123%
2037-26-5	Toluene-D8	95%	98%	88-112%
460-00-4	4-Bromofluorobenzene	97%	96%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1398-BS	U34053.D	1	04/08/16	MV	n/a	n/a	VU1398
VU1398-BSD	U34054.D	1	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.1	91	17.9	90	1	76-120/10
108-86-1	Bromobenzene	20	16.9	85	16.8	84	1	80-123/10
74-97-5	Bromochloromethane	20	19.0	95	18.4	92	3	79-124/10
75-27-4	Bromodichloromethane	20	17.8	89	17.7	89	1	75-121/10
75-25-2	Bromoform	20	19.2	96	18.8	94	2	62-127/10
104-51-8	n-Butylbenzene	20	16.5	83	16.3	82	1	74-129/10
135-98-8	sec-Butylbenzene	20	16.2	81	16.0	80	1	75-128/11
98-06-6	tert-Butylbenzene	20	16.1	81	15.8	79	2	74-127/11
108-90-7	Chlorobenzene	20	18.3	92	18.1	91	1	79-119/10
75-00-3	Chloroethane	20	17.0	85	17.4	87	2	60-115/14
67-66-3	Chloroform	20	17.7	89	17.5	88	1	75-122/10
95-49-8	o-Chlorotoluene	20	19.6	98	19.3	97	2	76-125/12
106-43-4	p-Chlorotoluene	20	18.7	94	18.5	93	1	76-126/11
75-15-0	Carbon disulfide	20	14.8	74	14.3	72	3	51-130/13
56-23-5	Carbon tetrachloride	20	18.6	93	18.1	91	3	72-128/13
75-34-3	1,1-Dichloroethane	20	17.6	88	17.3	87	2	70-121/10
75-35-4	1,1-Dichloroethylene	20	16.1	81	15.7	79	3	62-125/13
563-58-6	1,1-Dichloropropene	20	17.4	87	17.0	85	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	15.6	78	15.6	78	0	64-129/11
106-93-4	1,2-Dibromoethane	20	18.7	94	18.4	92	2	81-124/10
107-06-2	1,2-Dichloroethane	20	18.5	93	18.3	92	1	74-122/10
78-87-5	1,2-Dichloropropane	20	18.5	93	18.3	92	1	75-123/10
142-28-9	1,3-Dichloropropane	20	19.2	96	19.0	95	1	81-127/11
594-20-7	2,2-Dichloropropane	20	16.5	83	16.1	81	2	66-130/12
124-48-1	Dibromochloromethane	20	18.4	92	18.2	91	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	16.8	84	16.3	82	3	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	18.3	92	18.2	91	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	18.8	94	18.6	93	1	76-131/10
541-73-1	m-Dichlorobenzene	20	16.8	84	16.6	83	1	79-121/10
95-50-1	o-Dichlorobenzene	20	16.8	84	16.7	84	1	79-120/10
106-46-7	p-Dichlorobenzene	20	16.9	85	16.8	84	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	15.8	79	15.5	78	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.1	91	18.0	90	1	73-125/10
100-41-4	Ethylbenzene	20	18.3	92	18.0	90	2	78-123/10
591-78-6	2-Hexanone	80	82.7	103	81.2	102	2	71-145/12
87-68-3	Hexachlorobutadiene	20	16.5	83	16.4	82	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1398-BS	U34053.D	1	04/08/16	MV	n/a	n/a	VU1398
VU1398-BSD	U34054.D	1	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	18.0	90	17.7	89	2	77-125/10
99-87-6	p-Isopropyltoluene	20	16.3	82	16.0	80	2	76-126/10
74-83-9	Methyl bromide	20	16.9	85	17.0	85	1	65-124/13
74-87-3	Methyl chloride	20	19.6	98	19.6	98	0	47-143/20
74-95-3	Methylene bromide	20	19.5	98	19.3	97	1	80-125/10
75-09-2	Methylene chloride	20	17.4	87	17.2	86	1	65-124/15
91-20-3	Naphthalene	20	17.0	85	17.7	89	4	66-120/12
103-65-1	n-Propylbenzene	20	16.2	81	15.9	80	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.4	92	18.2	91	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	17.7	89	17.2	86	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	17.6	88	17.3	87	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.3	97	19.1	96	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.6	88	18.2	91	3	70-128/12
96-18-4	1,2,3-Trichloropropane	20	17.0	85	16.9	85	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.2	86	17.1	86	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	16.3	82	16.1	81	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	16.4	82	16.1	81	2	79-130/10
127-18-4	Tetrachloroethylene	20	18.6	93	18.1	91	3	72-124/13
108-88-3	Toluene	20	17.9	90	17.7	89	1	78-121/10
79-01-6	Trichloroethylene	20	18.3	92	18.1	91	1	75-119/10
75-69-4	Trichlorofluoromethane	20	18.4	92	18.5	93	1	68-130/19
75-01-4	Vinyl chloride	20	20.0	100	20.0	100	0	57-137/18
1330-20-7	Xylene (total)	60	54.1	90	53.4	89	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	99%	99%	80-123%
2037-26-5	Toluene-D8	100%	101%	88-112%
460-00-4	4-Bromofluorobenzene	101%	102%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1490-LCS	R39150.D	1	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	91%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	92%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1398-LCS	U34059.D	1	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	96%	80-123%
2037-26-5	Toluene-D8	102%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45103-3MS	V32812.D	100	04/06/16	KZ	n/a	n/a	VV1354
C45103-3MSD	V32813.D	100	04/06/16	KZ	n/a	n/a	VV1354
C45103-3 [a]	V32798.D	100	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	C45103-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		2000	1710	86	2000	1710	86	0	76-120/10
108-86-1	Bromobenzene	ND		2000	1870	94	2000	1880	94	1	80-123/10
74-97-5	Bromochloromethane	ND		2000	1730	87	2000	1780	89	3	79-124/10
75-27-4	Bromodichloromethane	ND		2000	1670	84	2000	1690	85	1	75-121/10
75-25-2	Bromoform	ND		2000	1530	77	2000	1520	76	1	62-127/10
104-51-8	n-Butylbenzene	106		2000	1790	84	2000	1790	84	0	74-129/10
135-98-8	sec-Butylbenzene	ND		2000	1770	89	2000	1760	88	1	75-128/11
98-06-6	tert-Butylbenzene	ND		2000	1840	92	2000	1870	94	2	74-127/11
108-90-7	Chlorobenzene	ND		2000	1730	87	2000	1780	89	3	79-119/10
75-00-3	Chloroethane	ND		2000	1630	82	2000	1690	85	4	60-115/14
67-66-3	Chloroform	ND		2000	1610	81	2000	1650	83	2	75-122/10
95-49-8	o-Chlorotoluene	ND		2000	1760	88	2000	1680	84	5	76-125/12
106-43-4	p-Chlorotoluene	ND		2000	1730	87	2000	1730	87	0	76-126/11
75-15-0	Carbon disulfide	ND		2000	1470	74	2000	1450	73	1	51-130/13
56-23-5	Carbon tetrachloride	ND		2000	1620	81	2000	1640	82	1	72-128/13
75-34-3	1,1-Dichloroethane	ND		2000	1670	84	2000	1710	86	2	70-121/10
75-35-4	1,1-Dichloroethylene	ND		2000	1570	79	2000	1550	78	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		2000	1650	83	2000	1650	83	0	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		2000	1530	77	2000	1570	79	3	64-129/11
106-93-4	1,2-Dibromoethane	ND		2000	1790	90	2000	1840	92	3	81-124/10
107-06-2	1,2-Dichloroethane	ND		2000	1620	81	2000	1620	81	0	74-122/10
78-87-5	1,2-Dichloropropane	ND		2000	1740	87	2000	1750	88	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		2000	1820	91	2000	1860	93	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		2000	1440	72	2000	1490	75	3	66-130/12
124-48-1	Dibromochloromethane	ND		2000	1630	82	2000	1670	84	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		2000	1040	52	2000	1270	64	20	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		2000	1690	85	2000	1720	86	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		2000	1770	89	2000	1740	87	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		2000	1800	90	2000	1830	92	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		2000	1770	89	2000	1810	91	2	79-120/10
106-46-7	p-Dichlorobenzene	ND		2000	1810	91	2000	1840	92	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		2000	1490	75	2000	1490	75	0	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		2000	1620	81	2000	1680	84	4	73-125/10
100-41-4	Ethylbenzene	22.8		2000	1760	87	2000	1820	90	3	78-123/10
591-78-6	2-Hexanone	ND		8000	8210	103	8000	8480	106	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		2000	1680	84	2000	1680	84	0	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45103-3MS	V32812.D	100	04/06/16	KZ	n/a	n/a	VV1354
C45103-3MSD	V32813.D	100	04/06/16	KZ	n/a	n/a	VV1354
C45103-3 [a]	V32798.D	100	04/06/16	KZ	n/a	n/a	VV1354

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-8

CAS No.	Compound	C45103-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		2000	1700	85	2000	1740	87	2	77-125/10
99-87-6	p-Isopropyltoluene	ND		2000	1780	89	2000	1760	88	1	76-126/10
74-83-9	Methyl bromide	ND		2000	1570	79	2000	1570	79	0	65-124/13
74-87-3	Methyl chloride	ND		2000	2050	103	2000	2120	106	3	47-143/20
74-95-3	Methylene bromide	ND		2000	1760	88	2000	1740	87	1	80-125/10
75-09-2	Methylene chloride	ND		2000	1660	83	2000	1690	85	2	65-124/15
91-20-3	Naphthalene	184		2000	1890	85	2000	1940	88	3	66-120/12
103-65-1	n-Propylbenzene	ND		2000	1740	87	2000	1750	88	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		2000	1690	85	2000	1730	87	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		2000	1630	82	2000	1690	85	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		2000	1810	91	2000	1830	92	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		2000	1760	88	2000	1830	92	4	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		2000	1850	93	2000	1900	95	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		2000	1630	82	2000	1480	74	10	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		2000	1760	88	2000	1790	90	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	596		2000	2240	82	2000	2320	86	4	76-124/10
108-67-8	1,3,5-Trimethylbenzene	463		2000	2130	83	2000	2200	87	3	79-130/10
127-18-4	Tetrachloroethylene	ND		2000	1680	84	2000	1730	87	3	72-124/13
108-88-3	Toluene	ND		2000	1730	87	2000	1780	89	3	78-121/10
79-01-6	Trichloroethylene	ND		2000	1740	87	2000	1750	88	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		2000	1200	60* [b]	2000	1490	75	22* [c]	68-130/19
75-01-4	Vinyl chloride	ND		2000	1600	80	2000	1690	85	5	57-137/18
1330-20-7	Xylene (total)	222		6000	5400	86	6000	5570	89	3	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45103-3	Limits
1868-53-7	Dibromofluoromethane	98%	99%	97%	80-123%
2037-26-5	Toluene-D8	99%	100%	107%	88-112%
460-00-4	4-Bromofluorobenzene	95%	97%	102%	79-114%

(a) AZ:D2
(b) Outside laboratory control limits. AZ:M2
(c) Outside laboratory control limits. AZ:R9

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45171-3MS	R39171.D	50	04/06/16	CV	n/a	n/a	VR1490
C45171-3MSD	R39172.D	50	04/07/16	CV	n/a	n/a	VR1490
C45171-3	R39161.D	50	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	C45171-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		1000	959	96	1000	918	92	4	76-120/10
108-86-1	Bromobenzene	ND		1000	949	95	1000	958	96	1	80-123/10
74-97-5	Bromochloromethane	ND		1000	898	90	1000	870	87	3	79-124/10
75-27-4	Bromodichloromethane	ND		1000	900	90	1000	870	87	3	75-121/10
75-25-2	Bromoform	ND		1000	754	75	1000	747	75	1	62-127/10
104-51-8	n-Butylbenzene	ND		1000	961	96	1000	960	96	0	74-129/10
135-98-8	sec-Butylbenzene	ND		1000	958	96	1000	955	96	0	75-128/11
98-06-6	tert-Butylbenzene	ND		1000	888	89	1000	886	89	0	74-127/11
108-90-7	Chlorobenzene	ND		1000	931	93	1000	919	92	1	79-119/10
75-00-3	Chloroethane	ND		1000	846	85	1000	819	82	3	60-115/14
67-66-3	Chloroform	22.0	J	1000	906	88	1000	879	86	3	75-122/10
95-49-8	o-Chlorotoluene	ND		1000	923	92	1000	926	93	0	76-125/12
106-43-4	p-Chlorotoluene	ND		1000	930	93	1000	931	93	0	76-126/11
75-15-0	Carbon disulfide	ND		1000	706	71	1000	652	65	8	51-130/13
56-23-5	Carbon tetrachloride	ND		1000	968	97	1000	923	92	5	72-128/13
75-34-3	1,1-Dichloroethane	ND		1000	896	90	1000	867	87	3	70-121/10
75-35-4	1,1-Dichloroethylene	38.9	J	1000	853	81	1000	817	78	4	62-125/13
563-58-6	1,1-Dichloropropene	ND		1000	927	93	1000	891	89	4	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		1000	878	88	1000	880	88	0	64-129/11
106-93-4	1,2-Dibromoethane	ND		1000	940	94	1000	929	93	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		1000	931	93	1000	899	90	3	74-122/10
78-87-5	1,2-Dichloropropane	ND		1000	965	97	1000	939	94	3	75-123/10
142-28-9	1,3-Dichloropropane	ND		1000	977	98	1000	962	96	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		1000	794	79	1000	774	77	3	66-130/12
124-48-1	Dibromochloromethane	ND		1000	792	79	1000	792	79	0	76-124/10
75-71-8	Dichlorodifluoromethane	ND		1000	700	70	1000	642	64	9	26-163/26
156-59-2	cis-1,2-Dichloroethylene	363		1000	1240	88	1000	1220	86	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		1000	871	87	1000	854	85	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		1000	937	94	1000	938	94	0	79-121/10
95-50-1	o-Dichlorobenzene	ND		1000	939	94	1000	939	94	0	79-120/10
106-46-7	p-Dichlorobenzene	ND		1000	926	93	1000	921	92	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		1000	791	79	1000	760	76	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		1000	824	82	1000	822	82	0	73-125/10
100-41-4	Ethylbenzene	ND		1000	975	98	1000	955	96	2	78-123/10
591-78-6	2-Hexanone	ND		4000	4490	112	4000	4370	109	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		1000	891	89	1000	915	92	3	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45171-3MS	R39171.D	50	04/06/16	CV	n/a	n/a	VR1490
C45171-3MSD	R39172.D	50	04/07/16	CV	n/a	n/a	VR1490
C45171-3	R39161.D	50	04/06/16	CV	n/a	n/a	VR1490

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6

CAS No.	Compound	C45171-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		1000	985	99	1000	956	96	3	77-125/10
99-87-6	p-Isopropyltoluene	ND		1000	979	98	1000	968	97	1	76-126/10
74-83-9	Methyl bromide	ND		1000	759	76	1000	751	75	1	65-124/13
74-87-3	Methyl chloride	ND		1000	818	82	1000	866	87	6	47-143/20
74-95-3	Methylene bromide	ND		1000	959	96	1000	926	93	4	80-125/10
75-09-2	Methylene chloride	ND		1000	880	88	1000	855	86	3	65-124/15
91-20-3	Naphthalene	ND		1000	967	97	1000	992	99	3	66-120/12
103-65-1	n-Propylbenzene	ND		1000	933	93	1000	930	93	0	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		1000	954	95	1000	947	95	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		1000	904	90	1000	872	87	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		1000	939	94	1000	939	94	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		1000	964	96	1000	950	95	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		1000	910	91	1000	965	97	6	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		1000	955	96	1000	930	93	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		1000	826	83	1000	852	85	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		1000	947	95	1000	952	95	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		1000	961	96	1000	967	97	1	79-130/10
127-18-4	Tetrachloroethylene	57.1		1000	1000	94	1000	981	92	2	72-124/13
108-88-3	Toluene	ND		1000	932	93	1000	915	92	2	78-121/10
79-01-6	Trichloroethylene	2500		1000	3190	69* [a]	1000	3310	81	4	75-119/10
75-69-4	Trichlorofluoromethane	ND		1000	816	82	1000	783	78	4	68-130/19
75-01-4	Vinyl chloride	ND		1000	887	89	1000	826	83	7	57-137/18
1330-20-7	Xylene (total)	ND		3000	2920	97	3000	2850	95	2	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45171-3	Limits
1868-53-7	Dibromofluoromethane	92%	91%	97%	80-123%
2037-26-5	Toluene-D8	97%	98%	97%	88-112%
460-00-4	4-Bromofluorobenzene	97%	96%	88%	79-114%

(a) Outside control limits due to high level in sample relative to spike amount. AZ:M3

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45198-2MS	R39203.D	25	04/07/16	CV	n/a	n/a	VR1492
C45198-2MSD	R39204.D	25	04/07/16	CV	n/a	n/a	VR1492
C45198-2 [a]	R39194.D	25	04/07/16	CV	n/a	n/a	VR1492

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-3, C45177-4

CAS No.	Compound	C45198-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
127-18-4	Tetrachloroethylene	ND		500	458	92	500	462	92	1	72-124/13

CAS No.	Surrogate Recoveries	MS	MSD	C45198-2	Limits
1868-53-7	Dibromofluoromethane	94%	91%		80-123%
2037-26-5	Toluene-D8	95%	97%		88-112%
460-00-4	4-Bromofluorobenzene	95%	94%		79-114%

(a) Sample used for QC purposes only.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45212-9MS	U34075.D	10	04/08/16	MV	n/a	n/a	VU1398
C45212-9MSD	U34076.D	10	04/08/16	MV	n/a	n/a	VU1398
C45212-9 [a]	U34069.D	10	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	C45212-9 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		200	184	92	200	186	93	1	76-120/10
108-86-1	Bromobenzene	ND		200	167	84	200	171	86	2	80-123/10
74-97-5	Bromochloromethane	ND		200	191	96	200	191	96	0	79-124/10
75-27-4	Bromodichloromethane	ND		200	174	87	200	175	88	1	75-121/10
75-25-2	Bromoform	ND		200	152	76	200	154	77	1	62-127/10
104-51-8	n-Butylbenzene	ND		200	161	81	200	166	83	3	74-129/10
135-98-8	sec-Butylbenzene	ND		200	158	79	200	163	82	3	75-128/11
98-06-6	tert-Butylbenzene	ND		200	157	79	200	160	80	2	74-127/11
108-90-7	Chlorobenzene	ND		200	184	92	200	184	92	0	79-119/10
75-00-3	Chloroethane	ND		200	179	90	200	180	90	1	60-115/14
67-66-3	Chloroform	ND		200	184	92	200	183	92	1	75-122/10
95-49-8	o-Chlorotoluene	ND		200	193	97	200	187	94	3	76-125/12
106-43-4	p-Chlorotoluene	ND		200	185	93	200	188	94	2	76-126/11
75-15-0	Carbon disulfide	ND		200	128	64	200	127	64	1	51-130/13
56-23-5	Carbon tetrachloride	ND		200	182	91	200	188	94	3	72-128/13
75-34-3	1,1-Dichloroethane	ND		200	181	91	200	182	91	1	70-121/10
75-35-4	1,1-Dichloroethylene	ND		200	160	80	200	162	81	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		200	172	86	200	176	88	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		200	151	76	200	158	79	5	64-129/11
106-93-4	1,2-Dibromoethane	ND		200	187	94	200	189	95	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		200	191	96	200	192	96	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		200	187	94	200	189	95	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		200	194	97	200	194	97	0	81-127/11
594-20-7	2,2-Dichloropropane	ND		200	159	80	200	160	80	1	66-130/12
124-48-1	Dibromochloromethane	ND		200	166	83	200	166	83	0	76-124/10
75-71-8	Dichlorodifluoromethane	ND		200	189	95	200	184	92	3	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		200	188	94	200	189	95	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		200	176	88	200	177	89	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		200	167	84	200	169	85	1	79-121/10
95-50-1	o-Dichlorobenzene	ND		200	167	84	200	171	86	2	79-120/10
106-46-7	p-Dichlorobenzene	ND		200	169	85	200	172	86	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		200	158	79	200	159	80	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		200	170	85	200	172	86	1	73-125/10
100-41-4	Ethylbenzene	ND		200	182	91	200	185	93	2	78-123/10
591-78-6	2-Hexanone	ND		800	856	107	800	857	107	0	71-145/12
87-68-3	Hexachlorobutadiene	ND		200	155	78	200	164	82	6	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45177
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45212-9MS	U34075.D	10	04/08/16	MV	n/a	n/a	VU1398
C45212-9MSD	U34076.D	10	04/08/16	MV	n/a	n/a	VU1398
C45212-9 [a]	U34069.D	10	04/08/16	MV	n/a	n/a	VU1398

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45177-7

CAS No.	Compound	C45212-9 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		200	178	89	200	182	91	2	77-125/10
99-87-6	p-Isopropyltoluene	ND		200	157	79	200	163	82	4	76-126/10
74-83-9	Methyl bromide	ND		200	176	88	200	177	89	1	65-124/13
74-87-3	Methyl chloride	ND		200	229	115	200	223	112	3	47-143/20
74-95-3	Methylene bromide	ND		200	202	101	200	202	101	0	80-125/10
75-09-2	Methylene chloride	ND		200	179	90	200	178	89	1	65-124/15
91-20-3	Naphthalene	ND		200	166	83	200	183	92	10	66-120/12
103-65-1	n-Propylbenzene	ND		200	158	79	200	163	82	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		200	185	93	200	186	93	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		200	177	89	200	179	90	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		200	179	90	200	183	92	2	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		200	201	101	200	201	101	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		200	169	85	200	183	92	8	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		200	156	78	200	158	79	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		200	165	83	200	174	87	5	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		200	160	80	200	164	82	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		200	159	80	200	163	82	2	79-130/10
127-18-4	Tetrachloroethylene	ND		200	181	91	200	185	93	2	72-124/13
108-88-3	Toluene	ND		200	178	89	200	181	91	2	78-121/10
79-01-6	Trichloroethylene	ND		200	183	92	200	185	93	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		200	192	96	200	191	96	1	68-130/19
75-01-4	Vinyl chloride	ND		200	227	114	200	226	113	0	57-137/18
1330-20-7	Xylene (total)	ND		600	538	90	600	545	91	1	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45212-9	Limits
1868-53-7	Dibromofluoromethane	103%	101%	100%	80-123%
2037-26-5	Toluene-D8	101%	100%	102%	88-112%
460-00-4	4-Bromofluorobenzene	101%	100%	93%	79-114%

(a) Dilution required due to nature of sample matrix.

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11106
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/31/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5	-0.20	<10
Barium	200	.2	.5	0.0	<200
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3	0.0	<2.0
Calcium	5000	28	69		
Chromium	10	.4	.6	-0.10	<10
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	33.1	<200
Lead	10	1	1.7	-0.50	<10
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.10	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3	-0.40	<10
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5	0.40	<5.0
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11106: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11106
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/31/16

Metal	C45177-2 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	0.0	506	500	101.2	75-125
Barium	338	846	500	101.6	75-125
Beryllium					
Boron					
Cadmium	0.0	518	500	103.6	75-125
Calcium					
Chromium	3.2	521	500	103.6	75-125
Cobalt					
Copper					
Iron	2240	15300	12500	104.5	75-125
Lead	5.0	500	500	99.0	75-125
Lithium					
Magnesium					
Manganese	123	644	500	104.2	75-125
Molybdenum					
Nickel					
Potassium					
Selenium	0.0	501	500	100.2	75-125
Silicon					
Silver	0.0	494	500	98.8	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP11106: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11106
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/31/16

Metal	C45177-2 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	0.0	506	500	101.2	0.0	20
Barium	338	847	500	101.8	0.1	20
Beryllium						
Boron						
Cadmium	0.0	523	500	104.6	1.0	20
Calcium						
Chromium	3.2	522	500	103.8	0.2	20
Cobalt						
Copper						
Iron	2240	15300	12500	104.5	0.0	20
Lead	5.0	505	500	100.0	1.0	20
Lithium						
Magnesium						
Manganese	123	646	500	104.6	0.3	20
Molybdenum						
Nickel						
Potassium						
Selenium	0.0	505	500	101.0	0.8	20
Silicon						
Silver	0.0	496	500	99.2	0.4	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP11106: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11106
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/31/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	506	500	101.2	80-120
Barium	514	500	102.8	80-120
Beryllium				
Boron				
Cadmium	519	500	103.8	80-120
Calcium				
Chromium	534	500	106.8	80-120
Cobalt				
Copper				
Iron	13500	12500	108.0	80-120
Lead	499	500	99.8	80-120
Lithium				
Magnesium				
Manganese	544	500	108.8	80-120
Molybdenum				
Nickel				
Potassium				
Selenium	503	500	100.6	80-120
Silicon				
Silver	492	500	98.4	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11106: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11106
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 03/31/16

Metal	C45177-2 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	0.00	0.00	NC	0-10
Barium	338	349	3.1	0-10
Beryllium				
Boron				
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	3.20	3.10	3.1	0-10
Cobalt				
Copper				
Iron	2240	2340	4.1	0-10
Lead	5.00	13.4	168.0(a)	0-10
Lithium				
Magnesium				
Manganese	123	130	5.9	0-10
Molybdenum				
Nickel				
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11106: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11126 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/04/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.01	-0.0037	<0.20

Associated samples MP11126: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11126
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 04/04/16

Metal	C45201-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0	2.2	2	110.0	75-125

Associated samples MP11126: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11126
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 04/04/16

Metal	C45201-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0	2.3	2	115.0	4.4	30

Associated samples MP11126: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45177
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11126
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 04/04/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	1.9	2	95.0	85-115

Associated samples MP11126: C45177-1, C45177-2, C45177-3, C45177-4, C45177-5, C45177-6, C45177-7

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.3

7

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e-Hardcopy 2.0
Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45223

Sampling Date: 04/01/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **16**

NELAP ACCREDITED TNI LABORATORY

James J. Rhudy
Lab Director

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45223

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45223-1	04/01/16	12:10	CAM	04/02/16	AQ	Ground Water	BP-ISCO 6.5K TANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45223
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	4/6/2016 5:29:24 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 04/01/2016 and were received at Accutest on 04/02/2016 properly preserved, at 3.3 Deg. C and intact. These Samples received an Accutest job number of C45223. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11124

- Sample(s) C45205-1MS, C45205-1MSD, C45205-1SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Manganese are outside control limits for sample MP11124-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45223
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/01/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45223-1	**BP-ISCO 6.5K TANK**					
Manganese		1060000	750		ug/l	SW846 6010B

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-ISCO 6.5K TANK		
Lab Sample ID:	C45223-1	**Date Sampled:**	04/01/16
Matrix:	AQ - Ground Water	**Date Received:**	04/02/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	1060000	750	ug/l	50	04/04/16	04/06/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5759
(2) Prep QC Batch: MP11124

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7827 2937 3424
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C45223

Client / Reporting Information

Company Name: AMECFW
Address: 4600 E. Washington Ave
City: Phoenix State: AZ Zip:
Project Contact: Emily Corkery
Phone #: 602.416.2545
Samplers's Name: Chuck Mason

Project Information

Project Name: BP-ISCO
Street:
City: Tucson State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: 6010 (4 hrs) Mn

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	Na2S2O3	NaHSO4	MeOH	ENCORE	6010 (4 hrs) Mn	LAB USE ONLY
1	BP-ISCO 6.5K tank	4/1/16	1210	CM	W	1									X	Dilute Sample

2 DAYS

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [x] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULL1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	04/01/16 1400	1	2	4/1/16 1600	2 Fedex
Relinquished by: Fedex	Date Time: 4/2/16 09:40	Received By: Ali Zeighami	Relinquished By:	Date Time:	Received By:
3		3	4		4
Relinquished by:	Date Time:	Received By:	Custody Seal # Y	Appropriate Bottle / Pres. Y / N	Headspace Y / N
5		5		Labels match Coc? Y / N	Separate Receiving Check List used: Y / N

On Ice: Y / N Cooler Temp: 3.1/3.3 °C

AZ TN

C45223: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C45223 **Client:** AMECFW **Project:** BP-ISCO

Date / Time Received: 4/2/2016 9:40:00 AM **Delivery Method:** FedEx **Airbill #'s:** 782729373424

Cooler Temps (Initial/Adjusted): #1: (3.1/3.3);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR1;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

5.1

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C45223: Chain of Custody

Page 2 of 2

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45223
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11124
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/04/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11		
Lead	10	1	1.7		
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.60	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11124: C45223-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45223
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11124 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/04/16

Metal	C45205-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium	anr				
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron					
Lead	anr				
Lithium					
Magnesium					
Manganese	9.9	539	500	105.8	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP11124: C45223-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45223
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11124 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/04/16

Metal	C45205-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron						
Lead	anr					
Lithium						
Magnesium						
Manganese	9.9	545	500	107.0	1.1	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP11124: C45223-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45223
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11124
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/04/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	543	500	108.6	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP11124: C45223-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45223
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11124 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/04/16

Metal	C45205-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese	9.90	12.8	29.3 (a)	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP11124: C45223-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45346

Sampling Dates: 04/08/16 - 04/11/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **76**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45346

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45346-1	04/11/16	09:15	EC	04/13/16	AQ	Ground Water	BP-27-320-GW
C45346-2	04/11/16	09:20	EC	04/13/16	AQ	Ground Water	BP-27-333-GW
C45346-3	04/11/16	09:45	EC	04/13/16	AQ	Ground Water	BP-28-333-GW
C45346-4	04/11/16	09:30	EC	04/13/16	AQ	Ground Water	BP-28-345-GW
C45346-5	04/11/16	08:45	EC	04/13/16	AQ	Ground Water	BP-26-333-GW
C45346-6	04/11/16	09:00	EC	04/13/16	AQ	Ground Water	BP-26-345-GW
C45346-7	04/11/16	10:50	EC	04/13/16	AQ	Ground Water	BP-29-370-GW
C45346-8	04/11/16	10:30	EC	04/13/16	AQ	Ground Water	WR-274A-341-GW
C45346-9	04/08/16	11:28	EC	04/13/16	AQ	Ground Water	BP-26-320-GW
C45346-10	04/08/16	11:33	EC	04/13/16	AQ	Ground Water	BP-26-345-GW
C45346-11	04/08/16	11:26	EC	04/13/16	AQ	Ground Water	BP-26-333-GW
C45346-12	04/08/16	09:58	EC	04/13/16	AQ	Ground Water	WR-274A-341-GW
C45346-15	04/11/16	00:00	EC	04/13/16	AQ	Trip Blank Water	TB-1

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45346
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	4/22/2016 12:33:27 A

12 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected between 04/08/2016 and 04/11/2016 and were received at Accutest on 04/13/2016 properly preserved, at 2.3 Deg. C and intact. These Samples received an Accutest job number of C45346. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VQ1499

- Sample(s) C45302-10MS, C45302-10MSD were used as the QC samples indicated.
- Sample(s) C45346-1, C45346-2, C45346-5 have for Methyl chloride an ICV recovery outside of laboratory control limits (high bias); analyte not detected in samples.
- RPD(s) for BSD for Naphthalene, 1,2-Dibromo-3-chloropropane exceeded laboratory acceptance limit; BS/BSD recoveries met acceptance criteria.
- Matrix Spike Recovery(s) for Trichloroethylene, Bromoform are outside control limits. Probable cause due to matrix interference and/or high level in sample relative to spike amount.
- Sample C45302-10MSD has surrogate (Dibromofluoromethane) outside laboratory control limits.
- RPD(s) for MSD for Bromoform, Dibromochloromethane are outside laboratory control limits for sample C45302-10MSD.
- C45346-1: (pH=5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-2: (pH=5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-5: (pH=5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1506

- Sample(s) C45389-5MS, C45389-5MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Trichloroethylene are outside control limits due to high level in sample relative to spike amount.
- C45346-15: (pH=03) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-8: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-6: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-7: (pH=07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1508

- C45346-3: (pH=5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45346-4: (pH=5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11163

- Sample(s) C45346-1MS, C45346-1MSD, C45346-1SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Iron are outside control limits for sample MP11163-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11180

- Sample(s) C45346-8MS, C45346-8MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45346
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/08/16 thru 04/11/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45346-1	**BP-27-320-GW**					
Benzene [a]		0.73 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.39 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.80	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		25.4	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.82	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.49 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		69.8	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		20.0	0.50	0.20	ug/l	SW846 8260B
Barium		345	200		ug/l	SW846 6010B
Manganese		106	15		ug/l	SW846 6010B
C45346-2	**BP-27-333-GW**					
Benzene [a]		0.73 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.83	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		25.6	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.81	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.48 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		70.4	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		20.0	0.50	0.20	ug/l	SW846 8260B
Barium		344	200		ug/l	SW846 6010B
Manganese		112	15		ug/l	SW846 6010B
C45346-3	**BP-28-333-GW**					
Benzene [a]		0.47 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.32 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.64	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.2	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		20.2	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.79	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		72.4	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		19.8	0.50	0.20	ug/l	SW846 8260B
Barium		336	200		ug/l	SW846 6010B
Iron		754	200		ug/l	SW846 6010B
Manganese		49.4	15		ug/l	SW846 6010B

Summary of Hits

Job Number: C45346
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/08/16 thru 04/11/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45346-4	**BP-28-345-GW**					
Benzene [a]		0.56 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.37 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		22.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.78	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		73.8	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		20.8	0.50	0.20	ug/l	SW846 8260B
Barium		347	200		ug/l	SW846 6010B
Iron		565	200		ug/l	SW846 6010B
Manganese		64.1	15		ug/l	SW846 6010B
C45346-5	**BP-26-333-GW**					
Benzene [a]		0.50 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.53	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		3.5	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		12.7	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.62	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		65.3	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		13.3	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.31 J	0.50	0.20	ug/l	SW846 8260B
Barium		332	200		ug/l	SW846 6010B
Iron		1290	200		ug/l	SW846 6010B
Manganese		402	15		ug/l	SW846 6010B
C45346-6	**BP-26-345-GW**					
Benzene [c]		0.45 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.47 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		3.4	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		12.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.50	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		57.1	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		12.8	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.34 J	0.50	0.20	ug/l	SW846 8260B
Barium		328	200		ug/l	SW846 6010B
Iron		584	200		ug/l	SW846 6010B
Manganese		340	15		ug/l	SW846 6010B

Summary of Hits

Job Number: C45346
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/08/16 thru 04/11/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45346-7	**BP-29-370-GW**					
Benzene [c]		0.39 J	1.0	0.20	ug/l	SW846 8260B
Carbon disulfide [d]		1.6	1.0	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.21 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		5.0	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		11.3	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.35 J	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [c]		0.44 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		73.9	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		15.1	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Barium		326	200		ug/l	SW846 6010B
Manganese		69.9	15		ug/l	SW846 6010B
C45346-8	**WR-274A-341-GW**					
Benzene [c]		0.73 J	2.0	0.40	ug/l	SW846 8260B
Chloroform [c]		0.43 J	1.0	0.40	ug/l	SW846 8260B
Carbon disulfide [c]		1.0 J	2.0	0.40	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.76 J	1.0	0.40	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		4.6	1.0	0.40	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		25.7	1.0	0.40	ug/l	SW846 8260B
p-Dichlorobenzene [d]		1.1	1.0	0.40	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [c]		0.54 J	1.0	0.40	ug/l	SW846 8260B
Tetrachloroethylene [d]		111	1.0	0.60	ug/l	SW846 8260B
Trichloroethylene [d]		25.0	1.0	0.40	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.52 J	1.0	0.40	ug/l	SW846 8260B
Barium		349	200		ug/l	SW846 6010B
Manganese		26.5	15		ug/l	SW846 6010B
C45346-9	**BP-26-320-GW**					
Manganese		270	15		ug/l	SW846 6010B
C45346-10	**BP-26-345-GW**					
Manganese		295	15		ug/l	SW846 6010B
C45346-11	**BP-26-333-GW**					
Manganese		303	15		ug/l	SW846 6010B

Summary of Hits

Job Number: C45346
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/08/16 thru 04/11/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45346-12	**WR-274A-341-GW**					
Manganese		62.2	15		ug/l	SW846 6010B
C45346-15	**TB-1**					

No hits reported in this sample.

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time. AZ:E4
(b) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(c) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time. AZ:E4
(d) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45346-1	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	Q34277.D	1	04/18/16	MV	n/a	n/a	VQ1499
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.73	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.39	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.29	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.80	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	25.4	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.82	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene [b]	0.49	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45346-1	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	69.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	20.0	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	107%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4
(c) Associated ICV recovery outside of laboratory control limits (high bias); analyte not detected in sample. AZ: N1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45346-1	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	345	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	106	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45346-2	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	Q34278.D	1	04/18/16	MV	n/a	n/a	VQ1499
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.73	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.40	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.83	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	25.6	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.81	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene [b]	0.48	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45346-2	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	70.4	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	20.0	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	107%		88-112%
460-00-4	4-Bromofluorobenzene	102%		79-114%

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4
(c) Associated ICV recovery outside of laboratory control limits (high bias); analyte not detected in sample. AZ: N1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45346-2	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	344	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	112	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45346-3	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39581.D	1	04/21/16	CV	n/a	n/a	VR1508
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.47	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.35	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.32	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.64	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	20.2	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.79	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45346-3	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	72.4	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	19.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-123%
2037-26-5	Toluene-D8	108%		88-112%
460-00-4	4-Bromofluorobenzene	97%		79-114%

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45346-3	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	336	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	754	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	49.4	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C45346-4	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39582.D	1	04/21/16	CV	n/a	n/a	VR1508
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.56	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.37	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.27	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.70	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	22.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.78	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C45346-4	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	73.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	20.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-123%
2037-26-5	Toluene-D8	108%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-345-GW		
Lab Sample ID:	C45346-4	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	347	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	565	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	64.1	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45346-5	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	Q34281.D	1	04/18/16	MV	n/a	n/a	VQ1499
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.50	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.53	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	3.5	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	12.7	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.62	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45346-5	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	65.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	13.3	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.31	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	107%		88-112%
460-00-4	4-Bromofluorobenzene	102%		79-114%

(a) (pH= 5) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4
(c) Associated ICV recovery outside of laboratory control limits (high bias); analyte not detected in sample. AZ: N1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45346-5	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	332	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	1290	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	402	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C45346-6	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39527.D	1	04/19/16	CV	n/a	n/a	VR1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.45	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.47	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	3.4	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	12.0	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.50	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C45346-6	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	57.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	12.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.34	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%		80-123%
2037-26-5	Toluene-D8	100%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C45346-6	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	328	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	584	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	340	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45346-7	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39528.D	1	04/19/16	CV	n/a	n/a	VR1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.39	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	1.6	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.21	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	11.3	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.35	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene [b]	0.44	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45346-7	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	73.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	15.1	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.42	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45346-7	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	326	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	69.9	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45346-8	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39529.D	2	04/19/16	CV	n/a	n/a	VR1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.73	2.0	0.40	ug/l	J
108-86-1	Bromobenzene	ND	2.0	0.40	ug/l	
74-97-5	Bromochloromethane	ND	2.0	0.40	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.40	ug/l	
75-25-2	Bromoform	ND	1.0	0.44	ug/l	
104-51-8	n-Butylbenzene	ND	4.0	0.40	ug/l	
135-98-8	sec-Butylbenzene	ND	4.0	0.40	ug/l	
98-06-6	tert-Butylbenzene	ND	4.0	0.56	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.40	ug/l	
75-00-3	Chloroethane	ND	1.0	0.40	ug/l	
67-66-3	Chloroform [b]	0.43	1.0	0.40	ug/l	J
95-49-8	o-Chlorotoluene	ND	4.0	0.40	ug/l	
106-43-4	p-Chlorotoluene	ND	4.0	0.52	ug/l	
75-15-0	Carbon disulfide [b]	1.0	2.0	0.40	ug/l	J
56-23-5	Carbon tetrachloride	ND	1.0	0.40	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.40	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.40	ug/l	
563-58-6	1,1-Dichloropropene	ND	2.0	0.40	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	4.0	0.80	ug/l	
106-93-4	1,2-Dibromoethane	ND	2.0	0.40	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.40	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.76	1.0	0.40	ug/l	J
142-28-9	1,3-Dichloropropane	ND	2.0	0.40	ug/l	
594-20-7	2,2-Dichloropropane	ND	2.0	0.40	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.40	ug/l	
75-71-8	Dichlorodifluoromethane	4.6	1.0	0.40	ug/l	
156-59-2	cis-1,2-Dichloroethylene	25.7	1.0	0.40	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.40	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.40	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.40	ug/l	
106-46-7	p-Dichlorobenzene	1.1	1.0	0.40	ug/l	
156-60-5	trans-1,2-Dichloroethylene [b]	0.54	1.0	0.40	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45346-8	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	2.0	0.40	ug/l	
591-78-6	2-Hexanone	ND	20	4.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.0	0.40	ug/l	
98-82-8	Isopropylbenzene	ND	2.0	0.40	ug/l	
99-87-6	p-Isopropyltoluene	ND	4.0	0.40	ug/l	
74-83-9	Methyl bromide	ND	4.0	0.40	ug/l	
74-87-3	Methyl chloride	ND	2.0	0.60	ug/l	
74-95-3	Methylene bromide	ND	2.0	0.40	ug/l	
75-09-2	Methylene chloride	ND	10	4.0	ug/l	
91-20-3	Naphthalene	ND	10	1.0	ug/l	
103-65-1	n-Propylbenzene	ND	4.0	0.40	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	2.0	0.60	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.40	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.40	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.44	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	4.0	0.40	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	4.0	0.40	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.0	0.40	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	4.0	0.40	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	4.0	0.40	ug/l	
127-18-4	Tetrachloroethylene	111	1.0	0.60	ug/l	
108-88-3	Toluene	ND	2.0	0.40	ug/l	
79-01-6	Trichloroethylene	25.0	1.0	0.40	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.52	1.0	0.40	ug/l	J
75-01-4	Vinyl chloride	ND	1.0	0.40	ug/l	
1330-20-7	Xylene (total)	ND	4.0	0.92	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

(a) (pH= 07) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45346-8	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	349	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	26.5	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury	< 0.20	0.20	ug/l	1	04/18/16	04/18/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5782
(2) Instrument QC Batch: MA5792
(3) Prep QC Batch: MP11163
(4) Prep QC Batch: MP11180

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45346-9	**Date Sampled:**	04/08/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	270	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-345-GW		
Lab Sample ID:	C45346-10	**Date Sampled:**	04/08/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	295	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45346-11	**Date Sampled:**	04/08/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	303	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45346-12	**Date Sampled:**	04/08/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	62.2	15	ug/l	1	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C45346-15	**Date Sampled:**	04/11/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39522.D	1	04/19/16	CV	n/a	n/a	VR1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C45346-15	**Date Sampled:**	04/11/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/13/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	93%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	92%		79-114%

(a) (pH= 03) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
N1	See case narrative.
R7	LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R9	Sample RPD exceeded the laboratory acceptance limit.

1 of 2

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 7768 9040 9993
Accutest Quote #:
Bottle Order Control #:
Accutest NC Job #: C: C45346

Client / Reporting Information

Company Name: AMEC, FW
Address:
City / State / Zip:
Project Contact: ALEX V.
Phone #: 520-247-8736
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BROADWAY PANTANO ISCO
Street:
City / State:
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	ZnAc/NaOH	NaHSO4	MeOH	ENCORE	8260B	6010 (RCRA + TOTAL + Mn)	7470 (MERCURY)	JUST MANGANESE
1	BP-27-320-GW	4/11/16	0915	ERC	W	4			1		3				X	X	X	
2	BP-27-333-GW		0920						1		3				X	X	X	
3	BP-28-333-GW		0945						1		3				X	X	X	
4	BP-28-345-GW		0930						1		3				X	X	X	
5	BP-26-333-GW		0845						1		3				X	X	X	
6	BP-26-345-GW		0900						1		3				X	X	X	
7	BP-29-370-GW		1050						1		3				X	X	X	
8	WR-274A-341-GW		1020						1		3				X	X	X	
9	BP-26-320-GW	4/8/16	1128	CAM		1			1									X
10	BP-26-345-GW	4/8/16	1133	CAM		1			1									X

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		4/12/16 1300			4/12/16 1700	Fed-Ex
2						
3	FEDEX	4/13/16 0930				
4						
5						

Custody Seal #: INTACT
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp.: 2.1/2.3

PHOENIX

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

2.02

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C C45346

Client / Reporting Information

Company Name: AMEC FW
Address:
City / State / Zip:
Project Contact: ALEX Y.
Phone #:
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BROADWAY DANTANO ISCOLY
Street:
City / State:
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: JUST MANGANESE 8260B

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI- Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaHSO4	MEOH	EnCORE	Mn	8260B	LAB USE ONLY
11	BP-26-333-GW	4/8/16	1126	CAM	W	1			1					X		
12	BWR-274A-341-GW	↓	0958	↓	↓	1			1					X		
13	BP-27-INJECTION-1	4/11/16	1533	ERC	↓	1			1					X	24 HOUR TAT	
14	BP-27-INJECTION-2	↓	1657	↓	↓	1			1					X	24 HOUR TAT	
15	TB-1	—	—							2						
	~~TB-2~~ ERC	—	—													

TODAY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day - 3 SAMPLES
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [X] 1 Day - 2 SAMPLES
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	4/12/16 1300	1	2	4-12-16 1700	2 Fed-Ex
Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
3 FEDX	4/13/16 0900	3	4		4
Relinquished by:	Date Time:	Received By:	Custody Seal #	Appropriate Bottle / Pres. Y / N	Headspace Y / N	On Ice Y / N	Cooler Temp.
5		5	INTACT	Labels match Coc? Y / N	Separate Receiving Check List used: Y / N		2.1/2.3

A2
B

5.2 5

C45346: Chain of Custody
Page 2 of 4

SGS Accutest Sample Receipt Summary

Job Number: C45346 **Client:** AMEC FW **Project:** BOADWAY PANTANO

Date / Time Received: 4/13/2016 9:10:00 AM **Delivery Method:** FedEx **Airbill #'s:** 776090409993

Cooler Temps (Initial/Adjusted): #1: (2.1/2.3);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Cooler temp verification:	IR Gun
3. Cooler media:	Ice (Bag)
4. No, Coolers	1

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☑	☐	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☐ ☑

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments For sample WR-274A-341-GW, the collection time on the COC is 10:20 but the bottle is labeled as 10:30

5.2

5

C45346: Chain of Custody

Page 3 of 4

Sample Receipt Summary - Problem Resolution

Accutest Job Number: C45346

CSR: Elvin Kumar **Response Date:** 4/14/2016

Response: Per Client, the correct collection time is on the bottles = 10:30

C45346: Chain of Custody
Page 4 of 4

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VQ1499-MB	Q34266.D	1	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VQ1499-MB	Q34266.D	1	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	80-123%
2037-26-5	Toluene-D8	105%	88-112%
460-00-4	4-Bromofluorobenzene	102%	79-114%

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1506-MB	R39517.D	1	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1506-MB	R39517.D	1	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	94%	80-123%
2037-26-5	Toluene-D8	101%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1508-MB	R39577.D	1	04/21/16	CV	n/a	n/a	VR1508

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-3, C45346-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1508-MB	R39577.D	1	04/21/16	CV	n/a	n/a	VR1508

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-3, C45346-4

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	100%	80-123%
2037-26-5	Toluene-D8	108%	88-112%
460-00-4	4-Bromofluorobenzene	99%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VQ1499-BS	Q34263.D	1	04/18/16	MV	n/a	n/a	VQ1499
VQ1499-BSD	Q34264.D	1	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	17.4	87	16.8	84	4	76-120/10
108-86-1	Bromobenzene	20	17.3	87	17.2	86	1	80-123/10
74-97-5	Bromochloromethane	20	18.0	90	17.6	88	2	79-124/10
75-27-4	Bromodichloromethane	20	17.4	87	17.1	86	2	75-121/10
75-25-2	Bromoform	20	13.4	67	13.6	68	1	62-127/10
104-51-8	n-Butylbenzene	20	17.2	86	17.0	85	1	74-129/10
135-98-8	sec-Butylbenzene	20	17.0	85	16.9	85	1	75-128/11
98-06-6	tert-Butylbenzene	20	16.1	81	16.7	84	4	74-127/11
108-90-7	Chlorobenzene	20	17.8	89	17.2	86	3	79-119/10
75-00-3	Chloroethane	20	20.1	101	19.9	100	1	60-115/14
67-66-3	Chloroform	20	17.9	90	17.4	87	3	75-122/10
95-49-8	o-Chlorotoluene	20	16.4	82	15.9	80	3	76-125/12
106-43-4	p-Chlorotoluene	20	19.1	96	18.9	95	1	76-126/11
75-15-0	Carbon disulfide	20	11.9	60	11.3	57	5	51-130/13
56-23-5	Carbon tetrachloride	20	17.0	85	16.0	80	6	72-128/13
75-34-3	1,1-Dichloroethane	20	17.9	90	17.5	88	2	70-121/10
75-35-4	1,1-Dichloroethylene	20	14.4	72	13.6	68	6	62-125/13
563-58-6	1,1-Dichloropropene	20	16.5	83	15.9	80	4	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	13.6	68	15.9	80	16* [a]	64-129/11
106-93-4	1,2-Dibromoethane	20	18.1	91	17.5	88	3	81-124/10
107-06-2	1,2-Dichloroethane	20	18.4	92	17.6	88	4	74-122/10
78-87-5	1,2-Dichloropropane	20	18.8	94	17.8	89	5	75-123/10
142-28-9	1,3-Dichloropropane	20	19.4	97	18.6	93	4	81-127/11
594-20-7	2,2-Dichloropropane	20	17.0	85	16.1	81	5	66-130/12
124-48-1	Dibromochloromethane	20	16.8	84	16.8	84	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	17.0	85	16.4	82	4	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	18.1	91	17.7	89	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	18.9	95	18.5	93	2	76-131/10
541-73-1	m-Dichlorobenzene	20	17.3	87	17.0	85	2	79-121/10
95-50-1	o-Dichlorobenzene	20	17.6	88	17.1	86	3	79-120/10
106-46-7	p-Dichlorobenzene	20	17.5	88	17.2	86	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	14.9	75	14.4	72	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.4	92	18.3	92	1	73-125/10
100-41-4	Ethylbenzene	20	17.9	90	17.2	86	4	78-123/10
591-78-6	2-Hexanone	80	87.3	109	84.4	106	3	71-145/12
87-68-3	Hexachlorobutadiene	20	15.9	80	16.1	81	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VQ1499-BS	Q34263.D	1	04/18/16	MV	n/a	n/a	VQ1499
VQ1499-BSD	Q34264.D	1	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	17.6	88	16.8	84	5	77-125/10
99-87-6	p-Isopropyltoluene	20	16.8	84	16.8	84	0	76-126/10
74-83-9	Methyl bromide	20	18.3	92	18.2	91	1	65-124/13
74-87-3	Methyl chloride	20	20.5	103	20.5	103	0	47-143/20
74-95-3	Methylene bromide	20	18.5	93	17.9	90	3	80-125/10
75-09-2	Methylene chloride	20	17.0	85	16.2	81	5	65-124/15
91-20-3	Naphthalene	20	14.9	75	18.4	92	21* [a]	66-120/12
103-65-1	n-Propylbenzene	20	17.2	86	16.7	84	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.1	91	17.3	87	5	79-126/10
71-55-6	1,1,1-Trichloroethane	20	17.5	88	16.7	84	5	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	18.9	95	18.3	92	3	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.1	96	18.6	93	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	15.5	78	16.8	84	8	70-128/12
96-18-4	1,2,3-Trichloropropane	20	18.5	93	17.9	90	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	16.4	82	16.6	83	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	17.4	87	16.9	85	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	17.4	87	17.1	86	2	79-130/10
127-18-4	Tetrachloroethylene	20	16.5	83	16.1	81	2	72-124/13
108-88-3	Toluene	20	17.7	89	17.0	85	4	78-121/10
79-01-6	Trichloroethylene	20	17.2	86	16.6	83	4	75-119/10
75-69-4	Trichlorofluoromethane	20	19.9	100	19.4	97	3	68-130/19
75-01-4	Vinyl chloride	20	20.6	103	20.3	102	1	57-137/18
1330-20-7	Xylene (total)	60	53.5	89	51.4	86	4	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	105%	107%	80-123%
2037-26-5	Toluene-D8	103%	104%	88-112%
460-00-4	4-Bromofluorobenzene	104%	103%	79-114%

(a) RPD exceeded laboratory acceptance limit; BS/BSD recoveries met acceptance criteria. AZ:R7

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1506-BS	R39513.D	1	04/19/16	CV	n/a	n/a	VR1506
VR1506-BSD	R39514.D	1	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.9	105	21.2	106	1	76-120/10
108-86-1	Bromobenzene	20	21.0	105	21.1	106	0	80-123/10
74-97-5	Bromochloromethane	20	21.2	106	21.2	106	0	79-124/10
75-27-4	Bromodichloromethane	20	20.8	104	20.9	105	0	75-121/10
75-25-2	Bromoform	20	18.1	91	18.3	92	1	62-127/10
104-51-8	n-Butylbenzene	20	19.1	96	19.9	100	4	74-129/10
135-98-8	sec-Butylbenzene	20	21.5	108	22.2	111	3	75-128/11
98-06-6	tert-Butylbenzene	20	24.6	123	22.0	110	11	74-127/11
108-90-7	Chlorobenzene	20	20.4	102	20.5	103	0	79-119/10
75-00-3	Chloroethane	20	20.4	102	20.5	103	0	60-115/14
67-66-3	Chloroform	20	20.4	102	20.8	104	2	75-122/10
95-49-8	o-Chlorotoluene	20	21.0	105	21.2	106	1	76-125/12
106-43-4	p-Chlorotoluene	20	21.0	105	21.8	109	4	76-126/11
75-15-0	Carbon disulfide	20	18.3	92	18.8	94	3	51-130/13
56-23-5	Carbon tetrachloride	20	21.9	110	22.8	114	4	72-128/13
75-34-3	1,1-Dichloroethane	20	21.0	105	21.2	106	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	20.6	103	21.3	107	3	62-125/13
563-58-6	1,1-Dichloropropene	20	20.7	104	21.3	107	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	18.5	93	19.2	96	4	64-129/11
106-93-4	1,2-Dibromoethane	20	21.6	108	21.7	109	0	81-124/10
107-06-2	1,2-Dichloroethane	20	21.2	106	21.0	105	1	74-122/10
78-87-5	1,2-Dichloropropane	20	21.3	107	21.4	107	0	75-123/10
142-28-9	1,3-Dichloropropane	20	21.8	109	21.9	110	0	81-127/11
594-20-7	2,2-Dichloropropane	20	21.5	108	22.0	110	2	66-130/12
124-48-1	Dibromochloromethane	20	18.3	92	18.3	92	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	19.0	95	18.7	94	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.4	107	21.6	108	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.9	100	20.0	100	1	76-131/10
541-73-1	m-Dichlorobenzene	20	20.7	104	21.0	105	1	79-121/10
95-50-1	o-Dichlorobenzene	20	20.7	104	20.9	105	1	79-120/10
106-46-7	p-Dichlorobenzene	20	20.3	102	20.6	103	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.2	96	19.7	99	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.7	94	18.6	93	1	73-125/10
100-41-4	Ethylbenzene	20	21.3	107	21.8	109	2	78-123/10
591-78-6	2-Hexanone	80	86.1	108	88.0	110	2	71-145/12
87-68-3	Hexachlorobutadiene	20	20.5	103	21.4	107	4	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1506-BS	R39513.D	1	04/19/16	CV	n/a	n/a	VR1506
VR1506-BSD	R39514.D	1	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	21.5	108	21.8	109	1	77-125/10
99-87-6	p-Isopropyltoluene	20	19.0	95	19.5	98	3	76-126/10
74-83-9	Methyl bromide	20	18.8	94	18.9	95	1	65-124/13
74-87-3	Methyl chloride	20	19.8	99	19.6	98	1	47-143/20
74-95-3	Methylene bromide	20	21.7	109	21.6	108	0	80-125/10
75-09-2	Methylene chloride	20	19.6	98	19.6	98	0	65-124/15
91-20-3	Naphthalene	20	19.1	96	19.7	99	3	66-120/12
103-65-1	n-Propylbenzene	20	20.9	105	21.5	108	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	21.7	109	21.8	109	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	21.6	108	22.2	111	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.8	109	22.1	111	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	21.1	106	21.1	106	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	21.3	107	21.7	109	2	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.4	107	21.7	109	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.3	92	18.8	94	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	21.5	108	22.0	110	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	21.8	109	22.4	112	3	79-130/10
127-18-4	Tetrachloroethylene	20	22.6	113	23.1	116	2	72-124/13
108-88-3	Toluene	20	20.7	104	21.0	105	1	78-121/10
79-01-6	Trichloroethylene	20	21.0	105	21.6	108	3	75-119/10
75-69-4	Trichlorofluoromethane	20	21.5	108	21.7	109	1	68-130/19
75-01-4	Vinyl chloride	20	22.2	111	22.1	111	0	57-137/18
1330-20-7	Xylene (total)	60	63.7	106	64.5	108	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	99%	99%	80-123%
2037-26-5	Toluene-D8	100%	99%	88-112%
460-00-4	4-Bromofluorobenzene	101%	101%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1508-BS	R39574.D	1	04/21/16	CV	n/a	n/a	VR1508
VR1508-BSD	R39575.D	1	04/21/16	CV	n/a	n/a	VR1508

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-3, C45346-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.8	104	20.9	105	0	76-120/10
108-86-1	Bromobenzene	20	20.3	102	20.5	103	1	80-123/10
74-97-5	Bromochloromethane	20	21.0	105	20.7	104	1	79-124/10
75-27-4	Bromodichloromethane	20	20.3	102	20.3	102	0	75-121/10
75-25-2	Bromoform	20	16.0	80	16.3	82	2	62-127/10
104-51-8	n-Butylbenzene	20	19.3	97	19.8	99	3	74-129/10
135-98-8	sec-Butylbenzene	20	21.6	108	22.2	111	3	75-128/11
98-06-6	tert-Butylbenzene	20	24.4	122	25.3	127	4	74-127/11
108-90-7	Chlorobenzene	20	19.8	99	19.9	100	1	79-119/10
75-00-3	Chloroethane	20	20.4	102	19.5	98	5	60-115/14
67-66-3	Chloroform	20	20.7	104	20.5	103	1	75-122/10
95-49-8	o-Chlorotoluene	20	20.3	102	20.9	105	3	76-125/12
106-43-4	p-Chlorotoluene	20	21.1	106	21.0	105	0	76-126/11
75-15-0	Carbon disulfide	20	18.9	95	19.2	96	2	51-130/13
56-23-5	Carbon tetrachloride	20	22.6	113	23.3	117	3	72-128/13
75-34-3	1,1-Dichloroethane	20	21.5	108	21.3	107	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	21.5	108	21.9	110	2	62-125/13
563-58-6	1,1-Dichloropropene	20	21.2	106	21.6	108	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	17.3	87	17.5	88	1	64-129/11
106-93-4	1,2-Dibromoethane	20	20.4	102	20.6	103	1	81-124/10
107-06-2	1,2-Dichloroethane	20	20.5	103	20.5	103	0	74-122/10
78-87-5	1,2-Dichloropropane	20	20.9	105	20.9	105	0	75-123/10
142-28-9	1,3-Dichloropropane	20	20.7	104	20.7	104	0	81-127/11
594-20-7	2,2-Dichloropropane	20	22.2	111	22.2	111	0	66-130/12
124-48-1	Dibromochloromethane	20	17.1	86	17.2	86	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	18.7	94	16.9	85	10	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.7	109	21.4	107	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.3	97	19.4	97	1	76-131/10
541-73-1	m-Dichlorobenzene	20	20.2	101	20.3	102	0	79-121/10
95-50-1	o-Dichlorobenzene	20	20.0	100	20.2	101	1	79-120/10
106-46-7	p-Dichlorobenzene	20	19.8	99	20.0	100	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.9	100	20.0	100	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	17.7	89	17.8	89	1	73-125/10
100-41-4	Ethylbenzene	20	21.1	106	21.4	107	1	78-123/10
591-78-6	2-Hexanone	80	80.7	101	81.4	102	1	71-145/12
87-68-3	Hexachlorobutadiene	20	20.8	104	21.6	108	4	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1508-BS	R39574.D	1	04/21/16	CV	n/a	n/a	VR1508
VR1508-BSD	R39575.D	1	04/21/16	CV	n/a	n/a	VR1508

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-3, C45346-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	21.4	107	21.8	109	2	77-125/10
99-87-6	p-Isopropyltoluene	20	19.1	96	19.5	98	2	76-126/10
74-83-9	Methyl bromide	20	18.6	93	18.0	90	3	65-124/13
74-87-3	Methyl chloride	20	20.1	101	18.8	94	7	47-143/20
74-95-3	Methylene bromide	20	20.6	103	20.8	104	1	80-125/10
75-09-2	Methylene chloride	20	19.7	99	19.3	97	2	65-124/15
91-20-3	Naphthalene	20	18.3	92	18.4	92	1	66-120/12
103-65-1	n-Propylbenzene	20	21.0	105	21.5	108	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.9	105	21.2	106	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	22.5	113	22.8	114	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.7	104	21.0	105	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.0	100	20.1	101	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	20.6	103	20.6	103	0	70-128/12
96-18-4	1,2,3-Trichloropropane	20	20.2	101	20.4	102	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.8	89	18.0	90	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	21.2	106	21.5	108	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	21.7	109	22.1	111	2	79-130/10
127-18-4	Tetrachloroethylene	20	23.0	115	22.2	111	4	72-124/13
108-88-3	Toluene	20	20.5	103	20.7	104	1	78-121/10
79-01-6	Trichloroethylene	20	21.3	107	21.6	108	1	75-119/10
75-69-4	Trichlorofluoromethane	20	21.4	107	20.0	100	7	68-130/19
75-01-4	Vinyl chloride	20	22.3	112	20.7	104	7	57-137/18
1330-20-7	Xylene (total)	60	62.6	104	63.6	106	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	109%	108%	80-123%
2037-26-5	Toluene-D8	106%	105%	88-112%
460-00-4	4-Bromofluorobenzene	107%	107%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VQ1499-LCS	Q34265.D	1	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	106%	88-112%
460-00-4	4-Bromofluorobenzene	103%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1506-LCS	R39516.D	1	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	98%	80-123%
2037-26-5	Toluene-D8	100%	88-112%
460-00-4	4-Bromofluorobenzene	97%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1508-LCS	R39576.D	1	04/21/16	CV	n/a	n/a	VR1508

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-3, C45346-4

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	105%	80-123%
2037-26-5	Toluene-D8	108%	88-112%
460-00-4	4-Bromofluorobenzene	103%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45302-10MS	Q34282.D	100	04/18/16	MV	n/a	n/a	VQ1499
C45302-10MSD	Q34283.D	100	04/18/16	MV	n/a	n/a	VQ1499
C45302-10	Q34276.D	100	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	C45302-10 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		2000	2090	105	2000	2050	103	2	76-120/10
108-86-1	Bromobenzene	ND		2000	2010	101	2000	1970	99	2	80-123/10
74-97-5	Bromochloromethane	ND		2000	2410	121	2000	2430	122	1	79-124/10
75-27-4	Bromodichloromethane	ND		2000	1990	100	2000	2050	103	3	75-121/10
75-25-2	Bromoform	ND		2000	988	49* [a]	2000	1380	69	33* [b]	62-127/10
104-51-8	n-Butylbenzene	ND		2000	1900	95	2000	1870	94	2	74-129/10
135-98-8	sec-Butylbenzene	ND		2000	1810	91	2000	1780	89	2	75-128/11
98-06-6	tert-Butylbenzene	ND		2000	1820	91	2000	1780	89	2	74-127/11
108-90-7	Chlorobenzene	ND		2000	2060	103	2000	1990	100	3	79-119/10
75-00-3	Chloroethane	ND		2000	2130	107	2000	2230	112	5	60-115/14
67-66-3	Chloroform	43.0	J	2000	2380	117	2000	2370	116	0	75-122/10
95-49-8	o-Chlorotoluene	ND		2000	1880	94	2000	1810	91	4	76-125/12
106-43-4	p-Chlorotoluene	ND		2000	2230	112	2000	2150	108	4	76-126/11
75-15-0	Carbon disulfide	ND		2000	1680	84	2000	1730	87	3	51-130/13
56-23-5	Carbon tetrachloride	ND		2000	1860	93	2000	1790	90	4	72-128/13
75-34-3	1,1-Dichloroethane	ND		2000	2390	120	2000	2380	119	0	70-121/10
75-35-4	1,1-Dichloroethylene	ND		2000	1960	98	2000	1950	98	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		2000	1890	95	2000	1830	92	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		2000	1590	80	2000	1730	87	8	64-129/11
106-93-4	1,2-Dibromoethane	ND		2000	2130	107	2000	2100	105	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		2000	2300	115	2000	2230	112	3	74-122/10
78-87-5	1,2-Dichloropropane	ND		2000	2300	115	2000	2230	112	3	75-123/10
142-28-9	1,3-Dichloropropane	ND		2000	2280	114	2000	2200	110	4	81-127/11
594-20-7	2,2-Dichloropropane	ND		2000	2020	101	2000	1960	98	3	66-130/12
124-48-1	Dibromochloromethane	ND		2000	1580	79	2000	1810	91	14* [b]	76-124/10
75-71-8	Dichlorodifluoromethane	ND		2000	2000	100	2000	1870	94	7	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		2000	2390	120	2000	2400	120	0	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		2000	2210	111	2000	2240	112	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		2000	2040	102	2000	1980	99	3	79-121/10
95-50-1	o-Dichlorobenzene	ND		2000	2090	105	2000	2010	101	4	79-120/10
106-46-7	p-Dichlorobenzene	ND		2000	2070	104	2000	2010	101	3	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		2000	1970	99	2000	2000	100	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		2000	2060	103	2000	2080	104	1	73-125/10
100-41-4	Ethylbenzene	ND		2000	2010	101	2000	1930	97	4	78-123/10
591-78-6	2-Hexanone	ND		8000	9800	123	8000	9450	118	4	71-145/12
87-68-3	Hexachlorobutadiene	ND		2000	1650	83	2000	1670	84	1	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45302-10MS	Q34282.D	100	04/18/16	MV	n/a	n/a	VQ1499
C45302-10MSD	Q34283.D	100	04/18/16	MV	n/a	n/a	VQ1499
C45302-10	Q34276.D	100	04/18/16	MV	n/a	n/a	VQ1499

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-1, C45346-2, C45346-5

CAS No.	Compound	C45302-10 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		2000	1920	96	2000	1860	93	3	77-125/10
99-87-6	p-Isopropyltoluene	ND		2000	1850	93	2000	1820	91	2	76-126/10
74-83-9	Methyl bromide	ND		2000	1940	97	2000	2050	103	6	65-124/13
74-87-3	Methyl chloride	ND		2000	2430	122	2000	2360	118	3	47-143/20
74-95-3	Methylene bromide	ND		2000	2320	116	2000	2270	114	2	80-125/10
75-09-2	Methylene chloride	ND		2000	2310	116	2000	2340	117	1	65-124/15
91-20-3	Naphthalene	ND		2000	1880	94	2000	1940	97	3	66-120/12
103-65-1	n-Propylbenzene	ND		2000	1890	95	2000	1830	92	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		2000	2060	103	2000	2010	101	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		2000	2130	107	2000	2130	107	0	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		2000	2250	113	2000	2190	110	3	78-127/10
79-00-5	1,1,2-Trichloroethane	110		2000	2360	113	2000	2270	108	4	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		2000	1840	92	2000	1870	94	2	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		2000	2210	111	2000	2190	110	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		2000	1960	98	2000	1940	97	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		2000	2010	101	2000	1940	97	4	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		2000	1960	98	2000	1910	96	3	79-130/10
127-18-4	Tetrachloroethylene	69.1	J	2000	1840	89	2000	1790	86	3	72-124/13
108-88-3	Toluene	ND		2000	1980	99	2000	1920	96	3	78-121/10
79-01-6	Trichloroethylene	6370		2000	9170	140* [c]	2000	8340	99	9	75-119/10
75-69-4	Trichlorofluoromethane	23.5	J	2000	2030	100	2000	2110	104	4	68-130/19
75-01-4	Vinyl chloride	ND		2000	2170	109	2000	2250	113	4	57-137/18
1330-20-7	Xylene (total)	ND		6000	6090	102	6000	5860	98	4	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45302-10	Limits
1868-53-7	Dibromofluoromethane	119%	124%* [d]	108%	80-123%
2037-26-5	Toluene-D8	101%	100%	105%	88-112%
460-00-4	4-Bromofluorobenzene	105%	105%	102%	79-114%

(a) Outside laboratory control limits. AZ:M2
(b) Outside laboratory control limits. AZ:R9
(c) Outside control limits due to high level in sample relative to spike amount. AZ:M3
(d) Outside laboratory control limits.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45389-5MS	R39536.D	500	04/19/16	CV	n/a	n/a	VR1506
C45389-5MSD	R39537.D	500	04/19/16	CV	n/a	n/a	VR1506
C45389-5	R39533.D	500	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	C45389-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		10000	10900	109	10000	10400	104	5	76-120/10
108-86-1	Bromobenzene	ND		10000	10700	107	10000	10500	105	2	80-123/10
74-97-5	Bromochloromethane	ND		10000	10900	109	10000	10700	107	2	79-124/10
75-27-4	Bromodichloromethane	ND		10000	10800	108	10000	10500	105	3	75-121/10
75-25-2	Bromoform	ND		10000	8950	90	10000	8660	87	3	62-127/10
104-51-8	n-Butylbenzene	ND		10000	10100	101	10000	9160	92	10	74-129/10
135-98-8	sec-Butylbenzene	ND		10000	11300	113	10000	10400	104	8	75-128/11
98-06-6	tert-Butylbenzene	ND		10000	11000	110	10000	10200	102	8	74-127/11
108-90-7	Chlorobenzene	ND		10000	10500	105	10000	10100	101	4	79-119/10
75-00-3	Chloroethane	ND		10000	10200	102	10000	10300	103	1	60-115/14
67-66-3	Chloroform	ND		10000	10700	107	10000	10300	103	4	75-122/10
95-49-8	o-Chlorotoluene	ND		10000	11100	111	10000	10600	106	5	76-125/12
106-43-4	p-Chlorotoluene	ND		10000	10500	105	10000	10300	103	2	76-126/11
75-15-0	Carbon disulfide	ND		10000	9620	96	10000	9010	90	7	51-130/13
56-23-5	Carbon tetrachloride	ND		10000	11300	113	10000	10600	106	6	72-128/13
75-34-3	1,1-Dichloroethane	ND		10000	11000	110	10000	10600	106	4	70-121/10
75-35-4	1,1-Dichloroethylene	140		10000	10800	107	10000	10300	102	5	62-125/13
563-58-6	1,1-Dichloropropene	ND		10000	10700	107	10000	10100	101	6	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		10000	9230	92	10000	8830	88	4	64-129/11
106-93-4	1,2-Dibromoethane	ND		10000	10800	108	10000	10600	106	2	81-124/10
107-06-2	1,2-Dichloroethane	ND		10000	10900	109	10000	10600	106	3	74-122/10
78-87-5	1,2-Dichloropropane	ND		10000	11200	112	10000	10800	108	4	75-123/10
142-28-9	1,3-Dichloropropane	ND		10000	11000	110	10000	10800	108	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		10000	10200	102	10000	9650	97	6	66-130/12
124-48-1	Dibromochloromethane	ND		10000	9300	93	10000	9060	91	3	76-124/10
75-71-8	Dichlorodifluoromethane	ND		10000	9050	91	10000	9210	92	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	778		10000	11900	111	10000	11600	108	3	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		10000	10100	101	10000	9830	98	3	76-131/10
541-73-1	m-Dichlorobenzene	ND		10000	10600	106	10000	10300	103	3	79-121/10
95-50-1	o-Dichlorobenzene	ND		10000	10600	106	10000	10300	103	3	79-120/10
106-46-7	p-Dichlorobenzene	ND		10000	10500	105	10000	10100	101	4	79-120/10
156-60-5	trans-1,2-Dichloroethylene	176		10000	10200	100	10000	9760	96	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		10000	9250	93	10000	9120	91	1	73-125/10
100-41-4	Ethylbenzene	ND		10000	11000	110	10000	10500	105	5	78-123/10
591-78-6	2-Hexanone	ND		40000	43000	108	40000	42200	106	2	71-145/12
87-68-3	Hexachlorobutadiene	ND		10000	10700	107	10000	9560	96	11	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45346
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45389-5MS	R39536.D	500	04/19/16	CV	n/a	n/a	VR1506
C45389-5MSD	R39537.D	500	04/19/16	CV	n/a	n/a	VR1506
C45389-5	R39533.D	500	04/19/16	CV	n/a	n/a	VR1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45346-6, C45346-7, C45346-8, C45346-15

CAS No.	Compound	C45389-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		10000	11100	111	10000	10500	105	6	77-125/10
99-87-6	p-Isopropyltoluene	ND		10000	9920	99	10000	9180	92	8	76-126/10
74-83-9	Methyl bromide	ND		10000	9440	94	10000	9540	95	1	65-124/13
74-87-3	Methyl chloride	ND		10000	10400	104	10000	10300	103	1	47-143/20
74-95-3	Methylene bromide	ND		10000	11000	110	10000	10700	107	3	80-125/10
75-09-2	Methylene chloride	ND		10000	10200	102	10000	9880	99	3	65-124/15
91-20-3	Naphthalene	ND		10000	9530	95	10000	9290	93	3	66-120/12
103-65-1	n-Propylbenzene	ND		10000	10800	108	10000	10200	102	6	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		10000	11100	111	10000	10800	108	3	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		10000	11100	111	10000	10600	106	5	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		10000	10900	109	10000	10800	108	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		10000	10800	108	10000	10500	105	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		10000	10600	106	10000	10300	103	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		10000	10600	106	10000	10500	105	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		10000	9230	92	10000	8800	88	5	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		10000	11100	111	10000	10600	106	5	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		10000	11300	113	10000	10700	107	5	79-130/10
127-18-4	Tetrachloroethylene	3740		10000	14600	109	10000	13600	99	7	72-124/13
108-88-3	Toluene	ND		10000	10700	107	10000	10400	104	3	78-121/10
79-01-6	Trichloroethylene	43800		10000	56400	126* [a]	10000	55500	117	2	75-119/10
75-69-4	Trichlorofluoromethane	ND		10000	10300	103	10000	10400	104	1	68-130/19
75-01-4	Vinyl chloride	ND		10000	11000	110	10000	10900	109	1	57-137/18
1330-20-7	Xylene (total)	ND		30000	32800	109	30000	31500	105	4	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45389-5	Limits
1868-53-7	Dibromofluoromethane	100%	100%	101%	80-123%
2037-26-5	Toluene-D8	99%	99%	100%	88-112%
460-00-4	4-Bromofluorobenzene	100%	100%	92%	79-114%

(a) Outside control limits due to high level in sample relative to spike amount. AZ:M3

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5	-0.40	<10
Barium	200	.2	.5	0.0	<200
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3	0.10	<2.0
Calcium	5000	28	69		
Chromium	10	.4	.6	-1.0	<10
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	-2.6	<200
Lead	10	1	1.7	-0.40	<10
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.10	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3	-0.50	<10
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5	-0.40	<5.0
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11163: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8, C45346-9, C45346-10, C45346-11, C45346-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	0.0	528	500	105.6	75-125
Barium	345	905	500	112.0	75-125
Beryllium					
Boron					
Cadmium	0.0	537	500	107.4	75-125
Calcium					
Chromium	0.0	535	500	107.0	75-125
Cobalt					
Copper					
Iron	59.1	13900	12500	110.7	75-125
Lead	0.0	531	500	106.2	75-125
Lithium					
Magnesium					
Manganese	106	642	500	107.2	75-125
Molybdenum					
Nickel					
Potassium					
Selenium	0.0	531	500	106.2	75-125
Silicon					
Silver	0.0	515	500	103.0	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP11163: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8, C45346-9, C45346-10, C45346-11, C45346-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	0.0	514	500	102.8	2.7	20
Barium	345	881	500	107.2	2.7	20
Beryllium						
Boron						
Cadmium	0.0	521	500	104.2	3.0	20
Calcium						
Chromium	0.0	520	500	104.0	2.8	20
Cobalt						
Copper						
Iron	59.1	13400	12500	106.7	3.7	20
Lead	0.0	514	500	102.8	3.3	20
Lithium						
Magnesium						
Manganese	106	626	500	104.0	2.5	20
Molybdenum						
Nickel						
Potassium						
Selenium	0.0	513	500	102.6	3.4	20
Silicon						
Silver	0.0	501	500	100.2	2.8	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP11163: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8, C45346-9, C45346-10, C45346-11, C45346-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	490	500	98.0	80-120
Barium	527	500	105.4	80-120
Beryllium				
Boron				
Cadmium	502	500	100.4	80-120
Calcium				
Chromium	511	500	102.2	80-120
Cobalt				
Copper				
Iron	13100	12500	104.8	80-120
Lead	502	500	100.4	80-120
Lithium				
Magnesium				
Manganese	514	500	102.8	80-120
Molybdenum				
Nickel				
Potassium				
Selenium	491	500	98.2	80-120
Silicon				
Silver	478	500	95.6	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11163: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8, C45346-9, C45346-10, C45346-11, C45346-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	0.00	0.00	NC	0-10
Barium	345	359	4.1	0-10
Beryllium				
Boron				
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	0.00	0.00	NC	0-10
Cobalt				
Copper				
Iron	59.1	80.9	36.9 (a)	0-10
Lead	0.00	0.00	NC	0-10
Lithium				
Magnesium				
Manganese	106	111	4.8	0-10
Molybdenum				
Nickel				
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11163: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8, C45346-9, C45346-10, C45346-11, C45346-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11180 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/18/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.02	-0.027	<0.20

Associated samples MP11180: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.2.1
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MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11180
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 04/18/16

Metal	C45346-8 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0	2.1	2	105.0	75-125

Associated samples MP11180: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11180 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/18/16

Metal	C45346-8 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0	2.0	2	100.0	4.9	30

Associated samples MP11180: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45346
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11180
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 04/18/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.1	2	105.0	85-115

Associated samples MP11180: C45346-1, C45346-2, C45346-3, C45346-4, C45346-5, C45346-6, C45346-7, C45346-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45346R

Sampling Date: 04/11/16

Report to:

AMEC Foster Wheeler
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Phoenix, AZ 85034
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ATTN: Alex Yiannakakis

Total number of pages in report: **20**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45346R

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45346-13R	04/11/16	15:33	EC	04/13/16	AQ	Ground Water	BP-27-INJECTION-1
C45346-14R	04/11/16	16:57	EC	04/13/16	AQ	Ground Water	BP-27-INJECTION-2

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45346R
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	4/14/2016 8:06:55 PM

2 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 04/11/2016 and were received at Accutest on 04/13/2016 properly preserved, at 2.3 Deg. C and intact. These Samples received an Accutest job number of C45346R. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11163

- Sample(s) C45346-1MS, C45346-1MSD, C45346-1SDL were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45346R
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/11/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45346-13R	**BP-27-INJECTION-1**					
Manganese [a]		33600	75		ug/l	SW846 6010B
C45346-14R	**BP-27-INJECTION-2**					
Manganese [a]		33100	75		ug/l	SW846 6010B

(a) AZ:D2

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-INJECTION-1		
Lab Sample ID:	C45346-13R	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese [a]	33600	75	ug/l	5	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

(a) AZ:D2

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-INJECTION-2		
Lab Sample ID:	C45346-14R	**Date Sampled:**	04/11/16
Matrix:	AQ - Ground Water	**Date Received:**	04/13/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese [a]	33100	75	ug/l	5	04/13/16	04/13/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5782
(2) Prep QC Batch: MP11163

(a) AZ:D2

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45346R
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
D2	Sample required dilution due to high concentration of target analyte.

1 of 2

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 7768 9040 9993
Accutest Quote #:
Bottle Order Control #:
Accutest NC Job #: C C45346

Client / Reporting Information

Company Name: AMEC, FW
Address:
City / State / Zip:
Project Contact: ALEX V.
Phone #: 520-247-8736
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BROADWAY PANTANO ISCO
Street:
City / State:
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	ZnAc/NaOH	NaHSO4	MeOH	ENCORE	8260B	6010 (RCRA + TOTAL + Mn)	7470 (MERCURY)	JUST MANGANESE
1	BP-27-320-GW	4/11/16	0915	ERC	W	4			1		3				X	X	X	
2	BP-27-333-GW		0920						1		3				X	X	X	
3	BP-28-333-GW		0945						1		3				X	X	X	
4	BP-28-345-GW		0930						1		3				X	X	X	
5	BP-26-333-GW		0845						1		3				X	X	X	
6	BP-26-345-GW		0900						1		3				X	X	X	
7	BP-29-370-GW		1050						1		3				X	X	X	
8	WR-274A-341-GW		1020						1		3				X	X	X	
9	BP-26-320-GW	4/8/16	1128	CAM		1			1									X
10	BP-26-345-GW	4/8/16	1133	CAM		1			1									X

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished By:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		4/12/16 1300			4/12/16 1700	Fed-Ex
2						
3	FEDEX	4/13/16 0930				
4						
5						

Custody Seal #: INTACT
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 2.1/2.3

C45346R: Chain of Custody
Page 1 of 4

PHOENIX

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

2.02

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C C45346

Client / Reporting Information

Company Name: AMEC FW
Address:
City / State / Zip:
Project Contact: ALEX Y.
Phone #:
Samplers' Name: EMILY CORKERY

Project Information

Project Name: BROADWAY DANTANO ISCOLY
Street:
City / State:
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: JUST MANGANESE 8260B

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI- Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaHSO4	MEOH	EnCORE	Mn	8260B	LAB USE ONLY
11	BP-26-333-GW	4/8/16	1126	CAM	W	1			1					X		
12	BWR-274A-341-GW	↓	0958	↓	↓	1			1					X		
13	BP-27-INJECTION-1	4/11/16	1533	ERC	↓	1			1					X	24 HOUR TAT	
14	BP-27-INJECTION-2	↓	1657	↓	↓	1			1					X	24 HOUR TAT	
15	TB-1	—	—							2						
	~~TB-2~~ ERC	—	—													

TODAY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day - 3 SAMPLES
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [X] 1 Day - 2 SAMPLES
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	4/12/16 1300	1	2	4-12-16 1700	2 Fed-Ex
Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
3 FEDX	4/13/16 0900	3	4		4
Relinquished by:	Date Time:	Received By:	Custody Seal #	Appropriate Bottle / Pres. Y / N	Headspace Y / N	On Ice Y / N	Cooler Temp.
5		5	INTACT	Labels match Coc? Y / N	Separate Receiving Check List used: Y / N		2.1/2.3

A2 B

5.2 5

C45346R: Chain of Custody
Page 2 of 4

SGS Accutest Sample Receipt Summary

Job Number: C45346 **Client:** AMEC FW **Project:** BOADWAY PANTANO

Date / Time Received: 4/13/2016 9:10:00 AM **Delivery Method:** FedEx **Airbill #'s:** 776090409993

Cooler Temps (Initial/Adjusted): #1: (2.1/2.3);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Cooler temp verification:	IR Gun
3. Cooler media:	Ice (Bag)
4. No, Coolers	1

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☑	☐	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☐ ☑

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Comments For sample WR-274A-341-GW, the collection time on the COC is 10:20 but the bottle is labeled as 10:30

Sample Receipt Summary - Problem Resolution

Accutest Job Number: C45346

CSR: Elvin Kumar **Response Date:** 4/14/2016

Response: Per Client, the correct collection time is on the bottles = 10:30

C45346R: Chain of Custody
Page 4 of 4

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45346R
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11		
Lead	10	1	1.7		
Lithium	50	1.1	2.9		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.10	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11163: C45346-13R, C45346-14R

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346R
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt					
Copper					
Iron	anr				
Lead	anr				
Lithium					
Magnesium					
Manganese	106	642	500	107.2	75-125
Molybdenum					
Nickel					
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP11163: C45346-13R, C45346-14R

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45346R
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	anr					
Beryllium						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper						
Iron	anr					
Lead	anr					
Lithium						
Magnesium						
Manganese	106	626	500	104.0	2.5	20
Molybdenum						
Nickel						
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP11163: C45346-13R, C45346-14R

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45346R
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 04/13/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron	anr			
Lead	anr			
Lithium				
Magnesium				
Manganese	514	500	102.8	80-120
Molybdenum				
Nickel				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11163: C45346-13R, C45346-14R

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45346R
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11163 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 04/13/16

Metal	C45346-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper				
Iron	anr			
Lead	anr			
Lithium				
Magnesium				
Manganese	106	111	4.8	0-10
Molybdenum				
Nickel				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11163: C45346-13R, C45346-14R

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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e-Hardcopy 2.0
Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45583

Sampling Date: 04/22/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **50**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45583

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45583-1	04/22/16	11:15	CAM	04/27/16	AQ	Ground Water	BP.27.INJECTION
C45583-2	04/22/16	11:20	CAM	04/27/16	AQ	Ground Water	WR.274A.341.GW
C45583-3	04/22/16	11:50	CAM	04/27/16	AQ	Ground Water	BP.26.333.GW
C45583-4	04/22/16	11:55	CAM	04/27/16	AQ	Ground Water	BP.26.345.GW
C45583-5	04/22/16	13:20	CAM	04/27/16	AQ	Ground Water	BP.28.345.GW
C45583-6	04/22/16	13:28	CAM	04/27/16	AQ	Ground Water	BP.28.355.GW
C45583-7	04/22/16	14:45	CAM	04/27/16	AQ	Ground Water	BP.29.370.GW
C45583-8	04/22/16	00:00	CAM	04/27/16	AQ	Trip Blank Water	TRIP BLANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45583
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	5/6/2016 7:32:52 PM

7 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 04/22/2016 and were received at Accutest on 04/27/2016 properly preserved, at 2.7 Deg. C and intact. These Samples received an Accutest job number of C45583. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1520

- Sample(s) C45456-19MS, C45456-19MSD were used as the QC samples indicated.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,1-Dichloroethane, Bromochloromethane, Bromoform, Chloroform, Dibromochloromethane are outside control limits. Probable cause due to matrix interference.
- RPD(s) for MSD for Bromodichloromethane, Bromoform, Dibromochloromethane are outside control limits for sample C45456-19MSD.
- C45583-4: (pH=6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45583-3: (pH=6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45583-1: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1524

- Sample(s) C45514-12MS, C45514-12MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Dibromochloromethane are outside control limits. Probable cause due to matrix interference.
- C45583-2: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VU1412

- Sample(s) C45514-18MS, C45514-18MSD were used as the QC samples indicated.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for cis-1,2-Dichloroethylene, Trichloroethylene are outside control limits. Probable cause due to matrix interference and/or high level in sample relative to spike amount.
- RPD(s) for MSD for Dichlorodifluoromethane, Trichlorofluoromethane are outside control limits for sample C45514-18MSD.
- C45583-7: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45583-6: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45583-5: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45583
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/22/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45583-1	**BP.27.INJECTION**					
Benzene [a]		0.84 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.49 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.36 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.90	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		5.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		16.8	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.3	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		81.3	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		16.7	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.51	0.50	0.20	ug/l	SW846 8260B
C45583-2	**WR.274A.341.GW**					
Benzene [a]		0.54 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.34 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.36 J	1.0	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.64	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.4	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		11.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.89	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		45.5	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		10.2	0.50	0.20	ug/l	SW846 8260B
C45583-3	**BP.26.333.GW**					
Benzene [c]		0.67 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.47 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.34 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.80	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		2.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		1.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.98	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		46.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		2.8	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.31 J	0.50	0.20	ug/l	SW846 8260B
C45583-4	**BP.26.345.GW**					
Benzene [c]		0.64 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.45 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.34 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.79	0.50	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C45583
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/22/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Dichlorodifluoromethane [d]		2.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		3.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.97	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		48.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		4.6	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.28 J	0.50	0.20	ug/l	SW846 8260B
C45583-5	**BP.28.345.GW**					
Benzene [a]		0.65 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.37 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.69	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.6	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.84	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		0.77	0.50	0.30	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
C45583-6	**BP.28.355.GW**					
Benzene [a]		0.64 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.36 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.76	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [a]		0.46 J	0.50	0.30	ug/l	SW846 8260B
C45583-7	**BP.29.370.GW**					
Carbon disulfide [b]		2.1	1.0	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		4.5	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		32.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		5.9	0.50	0.20	ug/l	SW846 8260B
C45583-8	**TRIP BLANK**					

No hits reported in this sample.

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(c) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding

Summary of Hits

Job Number: C45583
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/22/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method

time. AZ:E4

(d) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP.27.INJECTION		
Lab Sample ID:	C45583-1	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39851.D	1	05/03/16	CV	n/a	n/a	VR1520
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.84	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.49	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.36	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.90	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	16.8	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.3	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.INJECTION		
Lab Sample ID:	C45583-1	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	81.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	16.7	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.51	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45583-2	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39900.D	1	05/05/16	CV	n/a	n/a	VR1524
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.54	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.34	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.36	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.21	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.64	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.4	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	11.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.89	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45583-2	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	45.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	10.2	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-123%
2037-26-5	Toluene-D8	92%		88-112%
460-00-4	4-Bromofluorobenzene	84%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45583-3	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39853.D	1	05/03/16	CV	n/a	n/a	VR1520
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.67	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.47	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.34	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.80	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	1.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.98	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45583-3	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	46.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	2.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.31	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-123%
2037-26-5	Toluene-D8	96%		88-112%
460-00-4	4-Bromofluorobenzene	89%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45583-4	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R39854.D	1	05/03/16	CV	n/a	n/a	VR1520
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.64	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.45	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.34	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.79	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	3.0	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.97	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45583-4	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	48.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	4.6	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.28	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-123%
2037-26-5	Toluene-D8	96%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45583-5	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34454.D	1	05/05/16	KZ	n/a	n/a	VU1412
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.65	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.37	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.69	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.6	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.84	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45583-5	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	0.77	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.21	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.355.GW		
Lab Sample ID:	C45583-6	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34455.D	1	05/05/16	KZ	n/a	n/a	VU1412
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.64	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.36	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.27	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.70	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.5	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.76	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.355.GW		
Lab Sample ID:	C45583-6	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene [b]	0.46	0.50	0.30	ug/l	J
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45583-7	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34456.D	1	05/05/16	KZ	n/a	n/a	VU1412
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	2.1	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	4.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45583-7	**Date Sampled:**	04/22/16
Matrix:	AQ - Ground Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	32.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	5.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	102%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45583-8	**Date Sampled:**	04/22/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	U34452.D	1	05/05/16	KZ	n/a	n/a	VU1412
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45583-8	**Date Sampled:**	04/22/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	04/27/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R9	Sample RPD exceeded the laboratory acceptance limit.

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7762 0146 0344
Accutest Quote #
Bottle Order Control #
Accutest NC Job #: C C45583

Client / Reporting Information

Company Name: AMEC FW
Address: 4600 E Washington st. #600
City: Phoenix State: Az Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: 520.247.8736
Samplers's Name: Chuck Mason

Project Information

Project Name: Broadway Pantano ISCO
Street:
City: Tucson State: Az
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: 8260B

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI- Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	None	NaHSO4	MEOH	EnCore	8260B	LAB USE ONLY
1	BP-27-Injection	4/22/16	1115	CAM	W	3					X				X	
2	WR-274A-341-GW	↓	1120	↓	↓	↓					↓				↓	
3	BP-26-333-GW		1150													
4	BP-26-345-GW		1155													
5	BP-28-345-GW		1320													
6	BP-28-355-GW		1328													
7	BP-29-370-GW	↓	1445	↓	↓	↓					↓				↓	
8	Trip blank	↓									↓				↓	

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [x] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

AZ

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	[signature]	04/26/16 1135	[signature]	[signature]	4/26/16 1700	2 Fed-Ex
3	Fed-Ex	4/28/16 1030	[signature]	4	Date/Time:	4
5			5			

Custody Seal # INTACT
Appropriate Bottle / Pres. Y / N
Headspace Y / N
On Ice Y / N
Labels match Coc? Y / N
Separate Receiving Check List used: Y / N
Cooler Temp 2.5 / 2.7 °C

UJ

5.2 5

C45583: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C45583 **Client:** AMEC FW **Project:** BROADWAY PANTANO

Date / Time Received: 4/27/2016 10:20:00 AM **Delivery Method:** FedEx **Airbill #'s:** 776201460344

Cooler Temps (Initial/Adjusted): #1: (2.5/2.7);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR1;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y or N	N/A
1. Trip Blank present / cooler:	☐ ☐	☑
2. Trip Blank listed on COC:	☐ ☐	☑
3. Samples preserved properly:	☑ ☐	
4. VOCs headspace free:	☐ ☐	☑

Comments

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☑ ☐

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y or N	N/A
1. Analysis requested is clear:	☑ ☐	
2. Bottles received for unspecified tests	☐ ☑	
3. Sufficient volume recvd for analysis:	☑ ☐	
4. Compositing instructions clear:	☐ ☐	☑
5. Filtering instructions clear:	☐ ☐	☑

C45583: Chain of Custody
Page 2 of 2

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1520-MB	R39835.D	1	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1520-MB	R39835.D	1	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	92%	79-114%

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1412-MB	U34451.D	1	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1412-MB	U34451.D	1	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	95%	80-123%
2037-26-5	Toluene-D8	102%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1524-MB	R39897.D	1	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1524-MB	R39897.D	1	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	93%	88-112%
460-00-4	4-Bromofluorobenzene	87%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1520-BS	R39832.D	1	05/03/16	CV	n/a	n/a	VR1520
VR1520-BSD	R39833.D	1	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	21.3	107	21.1	106	1	76-120/10
108-86-1	Bromobenzene	20	21.0	105	20.6	103	2	80-123/10
74-97-5	Bromochloromethane	20	22.1	111	22.0	110	0	79-124/10
75-27-4	Bromodichloromethane	20	21.3	107	21.1	106	1	75-121/10
75-25-2	Bromoform	20	16.7	84	16.5	83	1	62-127/10
104-51-8	n-Butylbenzene	20	19.2	96	18.8	94	2	74-129/10
135-98-8	sec-Butylbenzene	20	21.0	105	20.8	104	1	75-128/11
98-06-6	tert-Butylbenzene	20	20.3	102	20.7	104	2	74-127/11
108-90-7	Chlorobenzene	20	20.2	101	20.1	101	0	79-119/10
75-00-3	Chloroethane	20	19.4	97	19.1	96	2	60-115/14
67-66-3	Chloroform	20	21.6	108	21.4	107	1	75-122/10
95-49-8	o-Chlorotoluene	20	20.8	104	20.7	104	0	76-125/12
106-43-4	p-Chlorotoluene	20	21.3	107	20.9	105	2	76-126/11
75-15-0	Carbon disulfide	20	18.0	90	17.5	88	3	51-130/13
56-23-5	Carbon tetrachloride	20	21.6	108	21.4	107	1	72-128/13
75-34-3	1,1-Dichloroethane	20	22.0	110	21.7	109	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	20.4	102	20.2	101	1	62-125/13
563-58-6	1,1-Dichloropropene	20	20.4	102	20.3	102	0	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	17.8	89	17.1	86	4	64-129/11
106-93-4	1,2-Dibromoethane	20	21.4	107	21.4	107	0	81-124/10
107-06-2	1,2-Dichloroethane	20	21.7	109	21.5	108	1	74-122/10
78-87-5	1,2-Dichloropropane	20	21.8	109	21.6	108	1	75-123/10
142-28-9	1,3-Dichloropropane	20	21.8	109	21.8	109	0	81-127/11
594-20-7	2,2-Dichloropropane	20	22.3	112	21.9	110	2	66-130/12
124-48-1	Dibromochloromethane	20	17.8	89	17.6	88	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	13.7	69	12.7	64	8	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	22.6	113	22.3	112	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.9	100	19.8	99	1	76-131/10
541-73-1	m-Dichlorobenzene	20	20.8	104	20.5	103	1	79-121/10
95-50-1	o-Dichlorobenzene	20	20.8	104	20.5	103	1	79-120/10
106-46-7	p-Dichlorobenzene	20	20.5	103	20.1	101	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.9	100	19.6	98	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.3	92	18.1	91	1	73-125/10
100-41-4	Ethylbenzene	20	21.1	106	21.1	106	0	78-123/10
591-78-6	2-Hexanone	80	86.4	108	84.0	105	3	71-145/12
87-68-3	Hexachlorobutadiene	20	21.5	108	21.4	107	0	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1520-BS	R39832.D	1	05/03/16	CV	n/a	n/a	VR1520
VR1520-BSD	R39833.D	1	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	21.2	106	21.0	105	1	77-125/10
99-87-6	p-Isopropyltoluene	20	18.7	94	18.5	93	1	76-126/10
74-83-9	Methyl bromide	20	18.1	91	17.8	89	2	65-124/13
74-87-3	Methyl chloride	20	18.2	91	17.3	87	5	47-143/20
74-95-3	Methylene bromide	20	22.0	110	21.7	109	1	80-125/10
75-09-2	Methylene chloride	20	20.5	103	20.4	102	0	65-124/15
91-20-3	Naphthalene	20	18.9	95	18.5	93	2	66-120/12
103-65-1	n-Propylbenzene	20	20.7	104	20.5	103	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	21.5	108	21.4	107	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	22.1	111	21.9	110	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	22.1	111	21.5	108	3	78-127/10
79-00-5	1,1,2-Trichloroethane	20	21.3	107	21.2	106	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	21.2	106	21.2	106	0	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.4	107	20.8	104	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.4	92	18.3	92	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	21.4	107	21.2	106	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	21.6	108	21.4	107	1	79-130/10
127-18-4	Tetrachloroethylene	20	19.5	98	19.4	97	1	72-124/13
108-88-3	Toluene	20	20.6	103	20.4	102	1	78-121/10
79-01-6	Trichloroethylene	20	21.1	106	21.0	105	0	75-119/10
75-69-4	Trichlorofluoromethane	20	18.3	92	18.3	92	0	68-130/19
75-01-4	Vinyl chloride	20	19.9	100	19.4	97	3	57-137/18
1330-20-7	Xylene (total)	60	63.0	105	62.8	105	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	104%	104%	80-123%
2037-26-5	Toluene-D8	97%	98%	88-112%
460-00-4	4-Bromofluorobenzene	100%	100%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1412-BS	U34448.D	1	05/05/16	KZ	n/a	n/a	VU1412
VU1412-BSD	U34449.D	1	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.2	101	20.1	101	0	76-120/10
108-86-1	Bromobenzene	20	20.5	103	20.5	103	0	80-123/10
74-97-5	Bromochloromethane	20	21.4	107	21.3	107	0	79-124/10
75-27-4	Bromodichloromethane	20	20.2	101	19.9	100	1	75-121/10
75-25-2	Bromoform	20	17.6	88	17.0	85	3	62-127/10
104-51-8	n-Butylbenzene	20	20.3	102	20.4	102	0	74-129/10
135-98-8	sec-Butylbenzene	20	20.1	101	20.1	101	0	75-128/11
98-06-6	tert-Butylbenzene	20	20.0	100	20.0	100	0	74-127/11
108-90-7	Chlorobenzene	20	19.9	100	19.7	99	1	79-119/10
75-00-3	Chloroethane	20	21.3	107	21.8	109	2	60-115/14
67-66-3	Chloroform	20	20.5	103	20.2	101	1	75-122/10
95-49-8	o-Chlorotoluene	20	18.0	90	19.8	99	10	76-125/12
106-43-4	p-Chlorotoluene	20	20.0	100	20.1	101	0	76-126/11
75-15-0	Carbon disulfide	20	20.6	103	20.3	102	1	51-130/13
56-23-5	Carbon tetrachloride	20	20.9	105	21.0	105	0	72-128/13
75-34-3	1,1-Dichloroethane	20	20.6	103	20.4	102	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	21.0	105	20.9	105	0	62-125/13
563-58-6	1,1-Dichloropropene	20	19.8	99	19.9	100	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	21.4	107	21.0	105	2	64-129/11
106-93-4	1,2-Dibromoethane	20	21.2	106	20.4	102	4	81-124/10
107-06-2	1,2-Dichloroethane	20	20.6	103	20.3	102	1	74-122/10
78-87-5	1,2-Dichloropropane	20	20.4	102	20.3	102	0	75-123/10
142-28-9	1,3-Dichloropropane	20	21.3	107	20.7	104	3	81-127/11
594-20-7	2,2-Dichloropropane	20	20.3	102	20.1	101	1	66-130/12
124-48-1	Dibromochloromethane	20	21.5	108	20.8	104	3	76-124/10
75-71-8	Dichlorodifluoromethane	20	24.1	121	26.0	130	8	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.3	107	21.3	107	0	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	21.7	109	21.5	108	1	76-131/10
541-73-1	m-Dichlorobenzene	20	19.9	100	20.0	100	1	79-121/10
95-50-1	o-Dichlorobenzene	20	20.1	101	20.0	100	0	79-120/10
106-46-7	p-Dichlorobenzene	20	19.9	100	19.8	99	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.3	97	19.3	97	0	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	21.0	105	20.3	102	3	73-125/10
100-41-4	Ethylbenzene	20	20.6	103	20.1	101	2	78-123/10
591-78-6	2-Hexanone	80	87.3	109	82.7	103	5	71-145/12
87-68-3	Hexachlorobutadiene	20	19.4	97	19.7	99	2	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1412-BS	U34448.D	1	05/05/16	KZ	n/a	n/a	VU1412
VU1412-BSD	U34449.D	1	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.3	102	19.9	100	2	77-125/10
99-87-6	p-Isopropyltoluene	20	20.4	102	20.4	102	0	76-126/10
74-83-9	Methyl bromide	20	20.3	102	20.4	102	0	65-124/13
74-87-3	Methyl chloride	20	23.4	117	23.4	117	0	47-143/20
74-95-3	Methylene bromide	20	20.9	105	20.7	104	1	80-125/10
75-09-2	Methylene chloride	20	20.0	100	19.9	100	1	65-124/15
91-20-3	Naphthalene	20	20.3	102	21.1	106	4	66-120/12
103-65-1	n-Propylbenzene	20	19.7	99	19.8	99	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.9	105	20.3	102	3	79-126/10
71-55-6	1,1,1-Trichloroethane	20	21.1	106	21.0	105	0	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.3	107	21.0	105	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.9	105	20.3	102	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	19.1	96	20.0	100	5	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.3	107	20.3	102	5	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	19.5	98	19.9	100	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	20.1	101	20.2	101	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.3	102	20.3	102	0	79-130/10
127-18-4	Tetrachloroethylene	20	20.4	102	20.0	100	2	72-124/13
108-88-3	Toluene	20	20.4	102	20.0	100	2	78-121/10
79-01-6	Trichloroethylene	20	20.4	102	20.3	102	0	75-119/10
75-69-4	Trichlorofluoromethane	20	20.1	101	21.6	108	7	68-130/19
75-01-4	Vinyl chloride	20	22.7	114	23.7	119	4	57-137/18
1330-20-7	Xylene (total)	60	60.8	101	59.7	100	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	101%	100%	80-123%
2037-26-5	Toluene-D8	100%	98%	88-112%
460-00-4	4-Bromofluorobenzene	100%	98%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1524-BS	R39894.D	1	05/05/16	CV	n/a	n/a	VR1524
VR1524-BSD	R39895.D	1	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.8	94	18.8	94	0	76-120/10
108-86-1	Bromobenzene	20	18.1	91	18.1	91	0	80-123/10
74-97-5	Bromochloromethane	20	19.0	95	19.2	96	1	79-124/10
75-27-4	Bromodichloromethane	20	18.5	93	18.6	93	1	75-121/10
75-25-2	Bromoform	20	14.7	74	14.9	75	1	62-127/10
104-51-8	n-Butylbenzene	20	17.9	90	18.0	90	1	74-129/10
135-98-8	sec-Butylbenzene	20	19.5	98	19.6	98	1	75-128/11
98-06-6	tert-Butylbenzene	20	18.8	94	19.0	95	1	74-127/11
108-90-7	Chlorobenzene	20	17.6	88	18.0	90	2	79-119/10
75-00-3	Chloroethane	20	16.0	80	15.7	79	2	60-115/14
67-66-3	Chloroform	20	18.7	94	18.8	94	1	75-122/10
95-49-8	o-Chlorotoluene	20	18.2	91	18.5	93	2	76-125/12
106-43-4	p-Chlorotoluene	20	18.9	95	18.7	94	1	76-126/11
75-15-0	Carbon disulfide	20	15.5	78	15.2	76	2	51-130/13
56-23-5	Carbon tetrachloride	20	19.0	95	19.1	96	1	72-128/13
75-34-3	1,1-Dichloroethane	20	19.3	97	19.4	97	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	17.8	89	17.6	88	1	62-125/13
563-58-6	1,1-Dichloropropene	20	18.2	91	18.3	92	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	14.4	72	14.7	74	2	64-129/11
106-93-4	1,2-Dibromoethane	20	18.3	92	18.6	93	2	81-124/10
107-06-2	1,2-Dichloroethane	20	18.9	95	19.0	95	1	74-122/10
78-87-5	1,2-Dichloropropane	20	19.3	97	19.3	97	0	75-123/10
142-28-9	1,3-Dichloropropane	20	19.0	95	19.3	97	2	81-127/11
594-20-7	2,2-Dichloropropane	20	19.1	96	19.1	96	0	66-130/12
124-48-1	Dibromochloromethane	20	15.4	77	15.6	78	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	10.1	51	9.2	46	9	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	19.4	97	19.6	98	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	17.7	89	17.6	88	1	76-131/10
541-73-1	m-Dichlorobenzene	20	18.2	91	18.1	91	1	79-121/10
95-50-1	o-Dichlorobenzene	20	18.1	91	18.1	91	0	79-120/10
106-46-7	p-Dichlorobenzene	20	17.9	90	17.9	90	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	17.2	86	17.2	86	0	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	16.0	80	16.3	82	2	73-125/10
100-41-4	Ethylbenzene	20	18.6	93	19.0	95	2	78-123/10
591-78-6	2-Hexanone	80	74.5	93	76.7	96	3	71-145/12
87-68-3	Hexachlorobutadiene	20	19.7	99	19.9	100	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1524-BS	R39894.D	1	05/05/16	CV	n/a	n/a	VR1524
VR1524-BSD	R39895.D	1	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.0	95	19.3	97	2	77-125/10
99-87-6	p-Isopropyltoluene	20	17.2	86	17.3	87	1	76-126/10
74-83-9	Methyl bromide	20	15.1	76	14.7	74	3	65-124/13
74-87-3	Methyl chloride	20	14.5	73	14.5	73	0	47-143/20
74-95-3	Methylene bromide	20	19.2	96	19.2	96	0	80-125/10
75-09-2	Methylene chloride	20	17.8	89	17.8	89	0	65-124/15
91-20-3	Naphthalene	20	15.4	77	15.5	78	1	66-120/12
103-65-1	n-Propylbenzene	20	18.6	93	18.7	94	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.6	93	18.9	95	2	79-126/10
71-55-6	1,1,1-Trichloroethane	20	19.3	97	19.5	98	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	18.9	95	19.1	96	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	18.6	93	18.9	95	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.7	89	17.6	88	1	70-128/12
96-18-4	1,2,3-Trichloropropane	20	18.3	92	18.5	93	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	15.5	78	15.5	78	0	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.0	95	19.1	96	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.1	96	19.3	97	1	79-130/10
127-18-4	Tetrachloroethylene	20	17.3	87	17.3	87	0	72-124/13
108-88-3	Toluene	20	17.9	90	18.2	91	2	78-121/10
79-01-6	Trichloroethylene	20	18.6	93	18.6	93	0	75-119/10
75-69-4	Trichlorofluoromethane	20	14.3	72	14.1	71	1	68-130/19
75-01-4	Vinyl chloride	20	15.7	79	15.2	76	3	57-137/18
1330-20-7	Xylene (total)	60	55.4	92	56.2	94	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	97%	98%	80-123%
2037-26-5	Toluene-D8	91%	93%	88-112%
460-00-4	4-Bromofluorobenzene	94%	95%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1520-LCS	R39834.D	1	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	105%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	95%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1412-LCS	U34450.D	1	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	99%	80-123%
2037-26-5	Toluene-D8	101%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1524-LCS	R39896.D	1	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	103%	80-123%
2037-26-5	Toluene-D8	93%	88-112%
460-00-4	4-Bromofluorobenzene	90%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45456-19MS	R39855.D	5	05/03/16	CV	n/a	n/a	VR1520
C45456-19MSD	R39856.D	5	05/03/16	CV	n/a	n/a	VR1520
C45456-19 [a]	R39837.D	5	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	C45456-19 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		100	118	118	100	119	119	1	76-120/10
108-86-1	Bromobenzene	ND		100	107	107	100	110	110	3	80-123/10
74-97-5	Bromochloromethane	ND		100	125	125* [b]	100	125	125* [b]	0	79-124/10
75-27-4	Bromodichloromethane	ND		100	98.1	98	100	110	110	11* [c]	75-121/10
75-25-2	Bromoform	ND		100	39.4	39* [d]	100	65.9	66	50* [c]	62-127/10
104-51-8	n-Butylbenzene	ND		100	101	101	100	106	106	5	74-129/10
135-98-8	sec-Butylbenzene	ND		100	111	111	100	116	116	4	75-128/11
98-06-6	tert-Butylbenzene	ND		100	108	108	100	108	108	0	74-127/11
108-90-7	Chlorobenzene	ND		100	109	109	100	110	110	1	79-119/10
75-00-3	Chloroethane	ND		100	110	110	100	111	111	1	60-115/14
67-66-3	Chloroform	ND		100	122	122	100	123	123* [b]	1	75-122/10
95-49-8	o-Chlorotoluene	ND		100	107	107	100	110	110	3	76-125/12
106-43-4	p-Chlorotoluene	ND		100	110	110	100	115	115	4	76-126/11
75-15-0	Carbon disulfide	ND		100	80.5	81	100	83.5	84	4	51-130/13
56-23-5	Carbon tetrachloride	ND		100	111	111	100	115	115	4	72-128/13
75-34-3	1,1-Dichloroethane	ND		100	125	125* [b]	100	126	126* [b]	1	70-121/10
75-35-4	1,1-Dichloroethylene	ND		100	112	112	100	113	113	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		100	110	110	100	113	113	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		100	83.8	84	100	90.1	90	7	64-129/11
106-93-4	1,2-Dibromoethane	ND		100	112	112	100	115	115	3	81-124/10
107-06-2	1,2-Dichloroethane	ND		100	120	120	100	121	121	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		100	122	122	100	121	121	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		100	117	117	100	118	118	1	81-127/11
594-20-7	2,2-Dichloropropane	ND		100	114	114	100	117	117	3	66-130/12
124-48-1	Dibromochloromethane	ND		100	59.4	59* [d]	100	81.1	81	31* [c]	76-124/10
75-71-8	Dichlorodifluoromethane	ND		100	76.8	77	100	74.4	74	3	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		100	126	126	100	128	128	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		100	105	105	100	107	107	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		100	107	107	100	111	111	4	79-121/10
95-50-1	o-Dichlorobenzene	ND		100	107	107	100	111	111	4	79-120/10
106-46-7	p-Dichlorobenzene	ND		100	106	106	100	109	109	3	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		100	110	110	100	111	111	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		100	92.9	93	100	94.4	94	2	73-125/10
100-41-4	Ethylbenzene	ND		100	115	115	100	116	116	1	78-123/10
591-78-6	2-Hexanone	ND		400	461	115	400	476	119	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		100	109	109	100	117	117	7	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45456-19MS	R39855.D	5	05/03/16	CV	n/a	n/a	VR1520
C45456-19MSD	R39856.D	5	05/03/16	CV	n/a	n/a	VR1520
C45456-19 [a]	R39837.D	5	05/03/16	CV	n/a	n/a	VR1520

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-1, C45583-3, C45583-4

CAS No.	Compound	C45456-19 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		100	115	115	100	116	116	1	77-125/10
99-87-6	p-Isopropyltoluene	ND		100	98.2	98	100	101	101	3	76-126/10
74-83-9	Methyl bromide	ND		100	102	102	100	103	103	1	65-124/13
74-87-3	Methyl chloride	ND		100	108	108	100	109	109	1	47-143/20
74-95-3	Methylene bromide	ND		100	123	123	100	123	123	0	80-125/10
75-09-2	Methylene chloride	ND		100	117	117	100	116	116	1	65-124/15
91-20-3	Naphthalene	ND		100	90.0	90	100	94.5	95	5	66-120/12
103-65-1	n-Propylbenzene	ND		100	107	107	100	111	111	4	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		100	114	114	100	116	116	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		100	122	122	100	124	124	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		100	112	112	100	117	117	4	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		100	115	115	100	116	116	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		100	99.2	99	100	106	106	7	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		100	113	113	100	116	116	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		100	87.0	87	100	93.0	93	7	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		100	107	107	100	105	105	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		100	111	111	100	115	115	4	79-130/10
127-18-4	Tetrachloroethylene	ND		100	102	102	100	104	104	2	72-124/13
108-88-3	Toluene	ND		100	110	110	100	112	112	2	78-121/10
79-01-6	Trichloroethylene	ND		100	117	117	100	117	117	0	75-119/10
75-69-4	Trichlorofluoromethane	ND		100	99.4	99	100	101	101	2	68-130/19
75-01-4	Vinyl chloride	ND		100	111	111	100	112	112	1	57-137/18
1330-20-7	Xylene (total)	ND		300	339	113	300	341	114	1	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45456-19	Limits
1868-53-7	Dibromofluoromethane	109%	109%	105%	80-123%
2037-26-5	Toluene-D8	96%	96%	99%	88-112%
460-00-4	4-Bromofluorobenzene	101%	101%	91%	79-114%

(a) Dilution required due to sample foaming.
(b) Outside laboratory control limits. AZ:M1
(c) Outside laboratory control limits. AZ:R9
(d) Outside laboratory control limits. AZ:M2

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45514-12MS	R39915.D	5	05/05/16	CV	n/a	n/a	VR1524
C45514-12MSD	R39916.D	5	05/05/16	CV	n/a	n/a	VR1524
C45514-12 [a]	R39909.D	5	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	C45514-12 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		100	95.9	96	100	97.8	98	2	76-120/10
108-86-1	Bromobenzene	ND		100	90.9	91	100	91.5	92	1	80-123/10
74-97-5	Bromochloromethane	ND		100	107	107	100	111	111	4	79-124/10
75-27-4	Bromodichloromethane	ND		100	95.5	96	100	95.9	96	0	75-121/10
75-25-2	Bromoform	ND		100	67.1	67	100	68.4	68	2	62-127/10
104-51-8	n-Butylbenzene	ND		100	82.3	82	100	86.2	86	5	74-129/10
135-98-8	sec-Butylbenzene	ND		100	88.8	89	100	94.4	94	6	75-128/11
98-06-6	tert-Butylbenzene	ND		100	87.9	88	100	91.7	92	4	74-127/11
108-90-7	Chlorobenzene	ND		100	89.4	89	100	91.4	91	2	79-119/10
75-00-3	Chloroethane	ND		100	93.2	93	100	98.2	98	5	60-115/14
67-66-3	Chloroform	ND		100	104	104	100	109	109	5	75-122/10
95-49-8	o-Chlorotoluene	ND		100	89.2	89	100	91.1	91	2	76-125/12
106-43-4	p-Chlorotoluene	ND		100	93.4	93	100	95.5	96	2	76-126/11
75-15-0	Carbon disulfide	ND		100	63.7	64	100	69.5	70	9	51-130/13
56-23-5	Carbon tetrachloride	ND		100	86.5	87	100	93.8	94	8	72-128/13
75-34-3	1,1-Dichloroethane	2.3	J	100	108	106	100	114	112	5	70-121/10
75-35-4	1,1-Dichloroethylene	ND		100	85.2	85	100	96.0	96	12	62-125/13
563-58-6	1,1-Dichloropropene	ND		100	85.6	86	100	91.6	92	7	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		100	74.6	75	100	77.4	77	4	64-129/11
106-93-4	1,2-Dibromoethane	ND		100	94.9	95	100	96.1	96	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		100	101	101	100	102	102	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		100	101	101	100	103	103	2	75-123/10
142-28-9	1,3-Dichloropropane	ND		100	98.5	99	100	99.8	100	1	81-127/11
594-20-7	2,2-Dichloropropane	ND		100	93.8	94	100	101	101	7	66-130/12
124-48-1	Dibromochloromethane	ND		100	74.5	75* [b]	100	75.5	76	1	76-124/10
75-71-8	Dichlorodifluoromethane	ND		100	55.4	55	100	58.6	59	6	26-163/26
156-59-2	cis-1,2-Dichloroethylene	1.1	J	100	108	107	100	113	112	5	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		100	89.3	89	100	89.8	90	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		100	90.6	91	100	91.8	92	1	79-121/10
95-50-1	o-Dichlorobenzene	ND		100	91.1	91	100	92.2	92	1	79-120/10
106-46-7	p-Dichlorobenzene	ND		100	89.3	89	100	90.3	90	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		100	89.8	90	100	96.5	97	7	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		100	79.2	79	100	81.0	81	2	73-125/10
100-41-4	Ethylbenzene	ND		100	92.0	92	100	95.3	95	4	78-123/10
591-78-6	2-Hexanone	ND		400	403	101	400	417	104	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		100	89.3	89	100	95.8	96	7	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45514-12MS	R39915.D	5	05/05/16	CV	n/a	n/a	VR1524
C45514-12MSD	R39916.D	5	05/05/16	CV	n/a	n/a	VR1524
C45514-12 [a]	R39909.D	5	05/05/16	CV	n/a	n/a	VR1524

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-2

CAS No.	Compound	C45514-12 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		100	91.1	91	100	95.7	96	5	77-125/10
99-87-6	p-Isopropyltoluene	ND		100	78.9	79	100	83.7	84	6	76-126/10
74-83-9	Methyl bromide	ND		100	85.8	86	100	89.1	89	4	65-124/13
74-87-3	Methyl chloride	ND		100	87.3	87	100	88.4	88	1	47-143/20
74-95-3	Methylene bromide	ND		100	102	102	100	103	103	1	80-125/10
75-09-2	Methylene chloride	ND		100	99.2	99	100	103	103	4	65-124/15
91-20-3	Naphthalene	ND		100	78.7	79	100	80.7	81	3	66-120/12
103-65-1	n-Propylbenzene	ND		100	87.5	88	100	91.4	91	4	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		100	94.7	95	100	96.6	97	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		100	97.4	97	100	107	107	9	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		100	98.1	98	100	100	100	2	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		100	96.3	96	100	98.0	98	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		100	86.3	86	100	88.5	89	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		100	95.6	96	100	98.0	98	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		100	75.7	76	100	77.0	77	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		100	90.5	91	100	93.1	93	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		100	92.0	92	100	95.3	95	4	79-130/10
127-18-4	Tetrachloroethylene	ND		100	78.8	79	100	83.5	84	6	72-124/13
108-88-3	Toluene	ND		100	88.9	89	100	92.0	92	3	78-121/10
79-01-6	Trichloroethylene	1.8	J	100	94.5	93	100	98.8	97	4	75-119/10
75-69-4	Trichlorofluoromethane	ND		100	83.8	84	100	89.0	89	6	68-130/19
75-01-4	Vinyl chloride	ND		100	89.8	90	100	97.2	97	8	57-137/18
1330-20-7	Xylene (total)	ND		300	276	92	300	284	95	3	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45514-12	Limits
1868-53-7	Dibromofluoromethane	108%	112%	110%	80-123%
2037-26-5	Toluene-D8	90%	90%	92%	88-112%
460-00-4	4-Bromofluorobenzene	95%	95%	82%	79-114%

(a) Dilution required due to sample foaming.
(b) Outside laboratory control limits. AZ:M2

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45514-18MS	U34471.D	50	05/05/16	KZ	n/a	n/a	VU1412
C45514-18MSD	U34472.D	50	05/05/16	KZ	n/a	n/a	VU1412
C45514-18	U34466.D	5	05/05/16	KZ	n/a	n/a	VU1412
C45514-18	U34459.D	50	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	C45514-18 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	9.5		1000	1090	108	1000	1050	104	4	76-120/10
108-86-1	Bromobenzene	ND		1000	1050	105	1000	1040	104	1	80-123/10
74-97-5	Bromochloromethane	ND		1000	1150	115	1000	1140	114	1	79-124/10
75-27-4	Bromodichloromethane	ND		1000	1020	102	1000	1010	101	1	75-121/10
75-25-2	Bromoform	ND		1000	737	74	1000	773	77	5	62-127/10
104-51-8	n-Butylbenzene	ND		1000	1030	103	1000	942	94	9	74-129/10
135-98-8	sec-Butylbenzene	ND		1000	1020	102	1000	935	94	9	75-128/11
98-06-6	tert-Butylbenzene	ND		1000	1020	102	1000	943	94	8	74-127/11
108-90-7	Chlorobenzene	ND		1000	1040	104	1000	1010	101	3	79-119/10
75-00-3	Chloroethane	ND		1000	1150	115	1000	1080	108	6	60-115/14
67-66-3	Chloroform	ND		1000	1110	111	1000	1080	108	3	75-122/10
95-49-8	o-Chlorotoluene	ND		1000	1050	105	1000	1020	102	3	76-125/12
106-43-4	p-Chlorotoluene	ND		1000	1030	103	1000	1010	101	2	76-126/11
75-15-0	Carbon disulfide	ND		1000	834	83	1000	838	84	0	51-130/13
56-23-5	Carbon tetrachloride	ND		1000	1030	103	1000	945	95	9	72-128/13
75-34-3	1,1-Dichloroethane	47.9		1000	1160	111	1000	1120	107	4	70-121/10
75-35-4	1,1-Dichloroethylene	6.3		1000	1070	106	1000	996	99	7	62-125/13
563-58-6	1,1-Dichloropropene	ND		1000	1030	103	1000	940	94	9	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		1000	1100	110	1000	1120	112	2	64-129/11
106-93-4	1,2-Dibromoethane	ND		1000	1120	112	1000	1080	108	4	81-124/10
107-06-2	1,2-Dichloroethane	ND		1000	1100	110	1000	1080	108	2	74-122/10
78-87-5	1,2-Dichloropropane	1.9	J	1000	1110	111	1000	1070	107	4	75-123/10
142-28-9	1,3-Dichloropropane	ND		1000	1130	113	1000	1110	111	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		1000	959	96	1000	902	90	6	66-130/12
124-48-1	Dibromochloromethane	ND		1000	974	97	1000	998	100	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		1000	1570	157	1000	1140	114	32* [a]	26-163/26
156-59-2	cis-1,2-Dichloroethylene	1610 [c]		1000	2780	65* [b]	1000	2760	63* [b]	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		1000	1050	105	1000	1080	108	3	76-131/10
541-73-1	m-Dichlorobenzene	ND		1000	1040	104	1000	1020	102	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		1000	1050	105	1000	1030	103	2	79-120/10
106-46-7	p-Dichlorobenzene	ND		1000	1040	104	1000	1020	102	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	140		1000	1120	98	1000	1090	95	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		1000	1010	101	1000	1030	103	2	73-125/10
100-41-4	Ethylbenzene	ND		1000	1070	107	1000	1010	101	6	78-123/10
591-78-6	2-Hexanone	ND		4000	4760	119	4000	4670	117	2	71-145/12
87-68-3	Hexachlorobutadiene	ND		1000	907	91	1000	836	84	8	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45583
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45514-18MS	U34471.D	50	05/05/16	KZ	n/a	n/a	VU1412
C45514-18MSD	U34472.D	50	05/05/16	KZ	n/a	n/a	VU1412
C45514-18	U34466.D	5	05/05/16	KZ	n/a	n/a	VU1412
C45514-18	U34459.D	50	05/05/16	KZ	n/a	n/a	VU1412

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45583-5, C45583-6, C45583-7, C45583-8

CAS No.	Compound	C45514-18 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		1000	1040	104	1000	965	97	7	77-125/10
99-87-6	p-Isopropyltoluene	ND		1000	1020	102	1000	954	95	7	76-126/10
74-83-9	Methyl bromide	ND		1000	1070	107	1000	1040	104	3	65-124/13
74-87-3	Methyl chloride	ND		1000	1380	138	1000	1240	124	11	47-143/20
74-95-3	Methylene bromide	ND		1000	1140	114	1000	1120	112	2	80-125/10
75-09-2	Methylene chloride	ND		1000	1080	108	1000	1060	106	2	65-124/15
91-20-3	Naphthalene	ND		1000	1070	107	1000	1120	112	5	66-120/12
103-65-1	n-Propylbenzene	ND		1000	1010	101	1000	957	96	5	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		1000	1080	108	1000	1040	104	4	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		1000	1100	110	1000	1030	103	7	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		1000	1150	115	1000	1140	114	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		1000	1130	113	1000	1090	109	4	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		1000	979	98	1000	1010	101	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		1000	1140	114	1000	1120	112	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		1000	988	99	1000	977	98	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		1000	1050	105	1000	1000	100	5	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		1000	1050	105	1000	1000	100	5	79-130/10
127-18-4	Tetrachloroethylene	ND		1000	993	99	1000	915	92	8	72-124/13
108-88-3	Toluene	ND		1000	1050	105	1000	1010	101	4	78-121/10
79-01-6	Trichloroethylene	1230 [c]		1000	2310	62* [d]	1000	2230	54* [d]	4	75-119/10
75-69-4	Trichlorofluoromethane	ND		1000	1150	115	1000	924	92	22* [a]	68-130/19
75-01-4	Vinyl chloride	6.4		1000	1350	134	1000	1170	116	14	57-137/18
1330-20-7	Xylene (total)	ND		3000	3160	105	3000	3010	100	5	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45514-18	C45514-18	Limits
1868-53-7	Dibromofluoromethane	103%	105%	106%	100%	80-123%
2037-26-5	Toluene-D8	100%	100%	101%	102%	88-112%
460-00-4	4-Bromofluorobenzene	99%	99%	94%	95%	79-114%

(a) Outside control limits due to matrix interference.
(b) Outside control limits due to high level in sample relative to spike amount. AZ:M3
(c) Result is from Run #2.
(d) Outside control limits due to matrix interference. AZ:M2

* = Outside of Control Limits.

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Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45693

Sampling Date: 04/27/16

Report to:

AMEC Foster Wheeler
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Total number of pages in report: **40**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45693

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45693-1	04/27/16	11:20	CM	05/05/16	AQ	Ground Water	BP.28.345.GW
C45693-2	04/27/16	11:25	CM	05/05/16	AQ	Ground Water	BP.28.355.GW
C45693-3	04/27/16	11:55	CM	05/05/16	AQ	Ground Water	BP.26.333.GW
C45693-4	04/27/16	12:00	CM	05/05/16	AQ	Ground Water	BP.26.345.GW
C45693-5	04/27/16	12:40	CM	05/05/16	AQ	Ground Water	WR.274A.341.GW
C45693-6	04/27/16	12:46	CM	05/05/16	AQ	Ground Water	BP.27.INJECTION
C45693-7	04/27/16	13:06	CM	05/05/16	AQ	Ground Water	BP.29.370.GW
C45693-8	04/27/16	00:00	CM	05/05/16	AQ	Trip Blank Water	TRIP BLANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45693
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	5/12/2016 7:37:08 PM

7 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 04/27/2016 and were received at Accutest on 05/05/2016 properly preserved, at 2.7 Deg. C and intact. These Samples received an Accutest job number of C45693. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1531

- Sample(s) C45634-5MS, C45634-5MSD were used as the QC samples indicated.
- C45693-1: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VU1416

- Sample(s) C45615-1MS, C45615-1MSD were used as the QC samples indicated.
- Sample(s) C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7 have for Methyl chloride a CCV outside of control limits (biased high); not detected in samples.
- Blank Spike and Matrix Spike Recovery(s) for Chloroethane, Methyl chloride are outside laboratory control limits (high bias); not detected in associated samples.
- Matrix Spike Recovery(s) for Bromoform, cis-1,2-Dichloroethylene are outside control limits. Probable cause due to matrix interference and/or high level in sample relative to spike amount.
- C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7: (pH=7) Sample pH did not satisfy field preservation criteria. Samples were not analyzed within 7 day holding time.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45693
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/27/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45693-1	**BP.28.345.GW**					
Benzene [a]		0.48 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.25 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.55	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.84	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.50	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [a]		0.35 J	0.50	0.30	ug/l	SW846 8260B
C45693-2	**BP.28.355.GW**					
Benzene [a]		0.48 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.32 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.24 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.57	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.39 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [a]		0.38 J	0.50	0.30	ug/l	SW846 8260B
C45693-3	**BP.26.333.GW**					
Benzene [a]		0.55 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.25 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.61	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.73	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		22.5	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [a]		0.46 J	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
C45693-4	**BP.26.345.GW**					
Benzene [a]		0.56 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.34 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.25 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.64	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.1	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		0.88	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.73	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		25.2	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		1.7	0.50	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C45693
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 04/27/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45693-5	**WR.274A.341.GW**					
Benzene [a]		0.74 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.41 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.76	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		6.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		13.9	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.99	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		69.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		13.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
C45693-6	**BP.27.INJECTION**					
Benzene [a]		0.77 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.42 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.77	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		6.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		13.9	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.0	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		69.5	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		13.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
C45693-7	**BP.29.370.GW**					
Benzene [a]		0.29 J	1.0	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		3.8	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		12.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		47.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		11.5	0.50	0.20	ug/l	SW846 8260B
C45693-8	**TRIP BLANK**					

No hits reported in this sample.

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45693-1	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40012.D	1	05/10/16	CV	n/a	n/a	VR1531
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.48	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.35	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.25	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.55	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.84	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.50	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45693-1	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene [b]	0.35	0.50	0.30	ug/l	J
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.355.GW		
Lab Sample ID:	C45693-2	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34567.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.48	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.32	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.24	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.57	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.39	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.355.GW		
Lab Sample ID:	C45693-2	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene [b]	0.38	0.50	0.30	ug/l	J
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45693-3	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34568.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.55	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.35	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.25	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.61	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.73	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45693-3	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	22.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene [b]	0.46	0.50	0.20	ug/l	J
75-69-4	Trichlorofluoromethane [b]	0.21	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45693-4	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34569.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.56	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.34	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.25	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.64	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	0.88	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.73	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45693-4	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	25.2	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	1.7	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45693-5	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34570.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.74	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.41	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.76	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	6.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	13.9	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.99	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45693-5	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	69.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	13.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.45	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.INJECTION		
Lab Sample ID:	C45693-6	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34571.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.77	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.42	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.77	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	6.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	13.9	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.0	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.INJECTION		
Lab Sample ID:	C45693-6	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	69.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	13.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.45	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45693-7	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34572.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.29	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.28	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	3.8	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	12.1	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.40	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45693-7	**Date Sampled:**	04/27/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [d]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	47.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	11.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:L1
(d) CCV outside of control limits (biased high); not detected in sample. AZ:V1,L1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45693-8	**Date Sampled:**	04/27/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R40001.D	1	05/10/16	CV	n/a	n/a	VR1531
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45693-8	**Date Sampled:**	04/27/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
L1	The associated blank spike recovery was above laboratory acceptance limits.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

PHOENIX

ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7829 9182 5254
Bottle Order Control #
Accutest Quote #
Accutest NC Job #: C C45693

Client / Reporting Information

Company Name: AMEC FW
Address: 4600 E. Washington St. #600
City: Phoenix State: Az Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: 520-247-8736
Samplers's Name: Chuck Mason

Project Information

Project Name: Broadway Pantano BP-15CO
Street:
City: Tucson State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis: 8260B (VOC's)

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	ASC NaOH	NaHSO4	MeOH	ENCORE	8260B (VOC's)	LAB USE ONLY
1	BP.28.345.GW	04/27/16	1120	CAM	W	3					3				X	
2	BP.28.355.GW		1125													
3	BP.26.333.GW		1155													
4	BP.26.345.GW		1200													
5	WR.27A.341.GW		1240													
6	BP.27.Injection		1246													
7	BP.29.370.GW		1306													
8	Trip Blank															

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULL1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	05/04/16 1431	1	2	5/04/16 1700	2 Fedex
3 Fedex	5/5/16 09:50	3 Ali Zeghami	4		4
5		5			

Custody Seal # Intact; Appropriate Bottle / Pres. Y / N; Headspace Y / N; On Ice Y / N; Labels match Coc? Y / N; Separate Receiving Check List used: Y / N; Cooler Temp. 1.7 2.7 °C

5.2 5

C45693: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C45693 **Client:** AMEC FW **Project:** BROADWAY PANTANO BP-ISCO

Date / Time Received: 5/5/2016 9:50:00 AM **Delivery Method:** FedEx **Airbill #'s:** 782991825254

Cooler Temps (Initial/Adjusted): #1: (1.7/2.7);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR3;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y or N	N/A
1. Trip Blank present / cooler:	☑ ☐	☐
2. Trip Blank listed on COC:	☑ ☐	☐
3. Samples preserved properly:	☑ ☐	
4. VOCs headspace free:	☑ ☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☑ ☐

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y or N	N/A
1. Analysis requested is clear:	☑ ☐	
2. Bottles received for unspecified tests	☐ ☑	
3. Sufficient volume recvd for analysis:	☑ ☐	
4. Compositing instructions clear:	☐ ☐	☑
5. Filtering instructions clear:	☐ ☐	☑

Comments

C45693: Chain of Custody
Page 2 of 2

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1531-MB	R39999.D	1	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1531-MB	R39999.D	1	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	92%	79-114%

Method Blank Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-MB	U34565.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-MB	U34565.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	105%	80-123%
2037-26-5	Toluene-D8	105%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1531-BS	R39996.D	1	05/10/16	CV	n/a	n/a	VR1531
VR1531-BSD	R39997.D	1	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.5	103	21.0	105	2	76-120/10
108-86-1	Bromobenzene	20	19.9	100	20.2	101	1	80-123/10
74-97-5	Bromochloromethane	20	21.0	105	22.4	112	6	79-124/10
75-27-4	Bromodichloromethane	20	20.5	103	21.0	105	2	75-121/10
75-25-2	Bromoform	20	16.9	85	17.0	85	1	62-127/10
104-51-8	n-Butylbenzene	20	18.7	94	18.8	94	1	74-129/10
135-98-8	sec-Butylbenzene	20	20.4	102	20.4	102	0	75-128/11
98-06-6	tert-Butylbenzene	20	19.5	98	19.6	98	1	74-127/11
108-90-7	Chlorobenzene	20	19.5	98	19.6	98	1	79-119/10
75-00-3	Chloroethane	20	19.7	99	20.1	101	2	60-115/14
67-66-3	Chloroform	20	20.5	103	21.7	109	6	75-122/10
95-49-8	o-Chlorotoluene	20	19.8	99	20.1	101	2	76-125/12
106-43-4	p-Chlorotoluene	20	20.3	102	20.6	103	1	76-126/11
75-15-0	Carbon disulfide	20	17.1	86	17.6	88	3	51-130/13
56-23-5	Carbon tetrachloride	20	20.2	101	20.6	103	2	72-128/13
75-34-3	1,1-Dichloroethane	20	20.9	105	22.1	111	6	70-121/10
75-35-4	1,1-Dichloroethylene	20	19.2	96	20.0	100	4	62-125/13
563-58-6	1,1-Dichloropropene	20	19.5	98	19.7	99	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	16.9	85	17.6	88	4	64-129/11
106-93-4	1,2-Dibromoethane	20	20.6	103	21.0	105	2	81-124/10
107-06-2	1,2-Dichloroethane	20	20.8	104	21.5	108	3	74-122/10
78-87-5	1,2-Dichloropropane	20	21.1	106	21.8	109	3	75-123/10
142-28-9	1,3-Dichloropropane	20	21.1	106	21.4	107	1	81-127/11
594-20-7	2,2-Dichloropropane	20	21.3	107	22.4	112	5	66-130/12
124-48-1	Dibromochloromethane	20	17.4	87	17.6	88	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	17.9	90	17.2	86	4	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.3	107	22.5	113	5	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.5	98	20.2	101	4	76-131/10
541-73-1	m-Dichlorobenzene	20	20.0	100	20.1	101	0	79-121/10
95-50-1	o-Dichlorobenzene	20	19.8	99	20.1	101	2	79-120/10
106-46-7	p-Dichlorobenzene	20	19.5	98	19.8	99	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	18.7	94	19.8	99	6	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.0	90	18.4	92	2	73-125/10
100-41-4	Ethylbenzene	20	20.4	102	20.5	103	0	78-123/10
591-78-6	2-Hexanone	80	83.3	104	85.3	107	2	71-145/12
87-68-3	Hexachlorobutadiene	20	20.4	102	20.9	105	2	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1531-BS	R39996.D	1	05/10/16	CV	n/a	n/a	VR1531
VR1531-BSD	R39997.D	1	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.6	103	20.6	103	0	77-125/10
99-87-6	p-Isopropyltoluene	20	18.1	91	18.1	91	0	76-126/10
74-83-9	Methyl bromide	20	18.3	92	19.0	95	4	65-124/13
74-87-3	Methyl chloride	20	20.5	103	19.7	99	4	47-143/20
74-95-3	Methylene bromide	20	21.2	106	21.9	110	3	80-125/10
75-09-2	Methylene chloride	20	19.5	98	20.8	104	6	65-124/15
91-20-3	Naphthalene	20	17.7	89	18.1	91	2	66-120/12
103-65-1	n-Propylbenzene	20	19.8	99	19.9	100	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.7	104	20.8	104	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.7	104	21.8	109	5	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.9	105	21.6	108	3	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.4	102	20.9	105	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	19.6	98	20.2	101	3	70-128/12
96-18-4	1,2,3-Trichloropropane	20	20.8	104	21.1	106	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.4	87	17.8	89	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	20.6	103	20.7	104	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.8	104	20.9	105	0	79-130/10
127-18-4	Tetrachloroethylene	20	18.7	94	18.9	95	1	72-124/13
108-88-3	Toluene	20	19.8	99	19.9	100	1	78-121/10
79-01-6	Trichloroethylene	20	20.2	101	20.7	104	2	75-119/10
75-69-4	Trichlorofluoromethane	20	18.4	92	18.8	94	2	68-130/19
75-01-4	Vinyl chloride	20	20.8	104	21.2	106	2	57-137/18
1330-20-7	Xylene (total)	60	61.1	102	61.4	102	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	102%	108%	80-123%
2037-26-5	Toluene-D8	97%	96%	88-112%
460-00-4	4-Bromofluorobenzene	102%	102%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-BS	U34562.D	1	05/11/16	KZ	n/a	n/a	VU1416
VU1416-BSD	U34563.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.6	103	20.8	104	1	76-120/10
108-86-1	Bromobenzene	20	18.9	95	19.1	96	1	80-123/10
74-97-5	Bromochloromethane	20	21.7	109	21.6	108	0	79-124/10
75-27-4	Bromodichloromethane	20	20.9	105	20.8	104	0	75-121/10
75-25-2	Bromoform	20	16.9	85	16.8	84	1	62-127/10
104-51-8	n-Butylbenzene	20	20.0	100	20.2	101	1	74-129/10
135-98-8	sec-Butylbenzene	20	19.2	96	19.5	98	2	75-128/11
98-06-6	tert-Butylbenzene	20	18.8	94	19.3	97	3	74-127/11
108-90-7	Chlorobenzene	20	19.3	97	19.4	97	1	79-119/10
75-00-3	Chloroethane	20	23.9	120* [a]	23.0	115	4	60-115/14
67-66-3	Chloroform	20	21.9	110	21.5	108	2	75-122/10
95-49-8	o-Chlorotoluene	20	19.4	97	19.8	99	2	76-125/12
106-43-4	p-Chlorotoluene	20	19.6	98	19.8	99	1	76-126/11
75-15-0	Carbon disulfide	20	21.7	109	21.4	107	1	51-130/13
56-23-5	Carbon tetrachloride	20	21.1	106	21.2	106	0	72-128/13
75-34-3	1,1-Dichloroethane	20	22.1	111	21.8	109	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	20.9	105	21.1	106	1	62-125/13
563-58-6	1,1-Dichloropropene	20	19.9	100	20.0	100	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	21.0	105	21.2	106	1	64-129/11
106-93-4	1,2-Dibromoethane	20	20.5	103	20.6	103	0	81-124/10
107-06-2	1,2-Dichloroethane	20	21.0	105	21.0	105	0	74-122/10
78-87-5	1,2-Dichloropropane	20	21.0	105	21.2	106	1	75-123/10
142-28-9	1,3-Dichloropropane	20	21.1	106	21.3	107	1	81-127/11
594-20-7	2,2-Dichloropropane	20	21.3	107	20.8	104	2	66-130/12
124-48-1	Dibromochloromethane	20	20.8	104	20.8	104	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	29.0	145	27.6	138	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	22.2	111	21.8	109	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	21.7	109	21.6	108	0	76-131/10
541-73-1	m-Dichlorobenzene	20	19.0	95	19.1	96	1	79-121/10
95-50-1	o-Dichlorobenzene	20	19.0	95	19.1	96	1	79-120/10
106-46-7	p-Dichlorobenzene	20	18.9	95	19.1	96	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.8	99	19.5	98	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	20.6	103	20.8	104	1	73-125/10
100-41-4	Ethylbenzene	20	20.2	101	20.4	102	1	78-123/10
591-78-6	2-Hexanone	80	89.7	112	89.6	112	0	71-145/12
87-68-3	Hexachlorobutadiene	20	17.7	89	18.3	92	3	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-BS	U34562.D	1	05/11/16	KZ	n/a	n/a	VU1416
VU1416-BSD	U34563.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.0	100	20.2	101	1	77-125/10
99-87-6	p-Isopropyltoluene	20	19.3	97	19.7	99	2	76-126/10
74-83-9	Methyl bromide	20	22.1	111	21.5	108	3	65-124/13
74-87-3	Methyl chloride	20	30.1	151* [a]	28.7	144* [a]	5	47-143/20
74-95-3	Methylene bromide	20	21.5	108	21.4	107	0	80-125/10
75-09-2	Methylene chloride	20	21.3	107	21.0	105	1	65-124/15
91-20-3	Naphthalene	20	19.2	96	20.5	103	7	66-120/12
103-65-1	n-Propylbenzene	20	18.9	95	19.3	97	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.3	102	20.2	101	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	22.1	111	21.7	109	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.0	105	21.1	106	0	78-127/10
79-00-5	1,1,2-Trichloroethane	20	21.2	106	21.2	106	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.9	90	19.0	95	6	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.3	107	21.2	106	0	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.2	91	18.6	93	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.4	97	19.8	99	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.5	98	19.7	99	1	79-130/10
127-18-4	Tetrachloroethylene	20	18.3	92	18.7	94	2	72-124/13
108-88-3	Toluene	20	19.8	99	20.0	100	1	78-121/10
79-01-6	Trichloroethylene	20	20.1	101	20.3	102	1	75-119/10
75-69-4	Trichlorofluoromethane	20	23.1	116	22.3	112	4	68-130/19
75-01-4	Vinyl chloride	20	26.0	130	25.0	125	4	57-137/18
1330-20-7	Xylene (total)	60	59.3	99	59.7	100	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	113%	109%	80-123%
2037-26-5	Toluene-D8	100%	101%	88-112%
460-00-4	4-Bromofluorobenzene	104%	103%	79-114%

(a) Outside laboratory control limits (high bias); not detected in associated samples. AZ:L1

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45634-5MS	R40021.D	50	05/11/16	CV	n/a	n/a	VR1531
C45634-5MSD	R40022.D	50	05/11/16	CV	n/a	n/a	VR1531
C45634-5 [a]	R40002.D	50	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	C45634-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	2670		1000	3620	95	1000	3650	98	1	76-120/10
108-86-1	Bromobenzene	ND		1000	1010	101	1000	996	100	1	80-123/10
74-97-5	Bromochloromethane	ND		1000	1130	113	1000	1150	115	2	79-124/10
75-27-4	Bromodichloromethane	ND		1000	1040	104	1000	1050	105	1	75-121/10
75-25-2	Bromoform	ND		1000	848	85	1000	814	81	4	62-127/10
104-51-8	n-Butylbenzene	ND		1000	971	97	1000	887	89	9	74-129/10
135-98-8	sec-Butylbenzene	ND		1000	1050	105	1000	964	96	9	75-128/11
98-06-6	tert-Butylbenzene	ND		1000	1000	100	1000	934	93	7	74-127/11
108-90-7	Chlorobenzene	ND		1000	997	100	1000	981	98	2	79-119/10
75-00-3	Chloroethane	ND		1000	1120	112	1000	1140	114	2	60-115/14
67-66-3	Chloroform	ND		1000	1120	112	1000	1140	114	2	75-122/10
95-49-8	o-Chlorotoluene	ND		1000	1020	102	1000	993	99	3	76-125/12
106-43-4	p-Chlorotoluene	ND		1000	1070	107	1000	1040	104	3	76-126/11
75-15-0	Carbon disulfide	ND		1000	920	92	1000	904	90	2	51-130/13
56-23-5	Carbon tetrachloride	ND		1000	1040	104	1000	1000	100	4	72-128/13
75-34-3	1,1-Dichloroethane	ND		1000	1170	117	1000	1180	118	1	70-121/10
75-35-4	1,1-Dichloroethylene	ND		1000	1040	104	1000	1020	102	2	62-125/13
563-58-6	1,1-Dichloropropene	ND		1000	1010	101	1000	972	97	4	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		1000	919	92	1000	880	88	4	64-129/11
106-93-4	1,2-Dibromoethane	ND		1000	1050	105	1000	1030	103	2	81-124/10
107-06-2	1,2-Dichloroethane	93.2		1000	1190	110	1000	1200	111	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		1000	1090	109	1000	1100	110	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		1000	1090	109	1000	1070	107	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		1000	1190	119	1000	1180	118	1	66-130/12
124-48-1	Dibromochloromethane	ND		1000	861	86	1000	846	85	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		1000	960	96	1000	938	94	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		1000	1150	115	1000	1190	119	3	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		1000	1030	103	1000	1030	103	0	76-131/10
541-73-1	m-Dichlorobenzene	ND		1000	1010	101	1000	988	99	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		1000	1010	101	1000	996	100	1	79-120/10
106-46-7	p-Dichlorobenzene	ND		1000	1000	100	1000	974	97	3	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		1000	1020	102	1000	1030	103	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		1000	945	95	1000	934	93	1	73-125/10
100-41-4	Ethylbenzene	23.6	J	1000	1080	106	1000	1050	103	3	78-123/10
591-78-6	2-Hexanone	ND		4000	4530	113	4000	4380	110	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		1000	1040	104	1000	959	96	8	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45634-5MS	R40021.D	50	05/11/16	CV	n/a	n/a	VR1531
C45634-5MSD	R40022.D	50	05/11/16	CV	n/a	n/a	VR1531
C45634-5 [a]	R40002.D	50	05/10/16	CV	n/a	n/a	VR1531

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-1, C45693-8

CAS No.	Compound	C45634-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	12.8	J	1000	1070	106	1000	1020	101	5	77-125/10
99-87-6	p-Isopropyltoluene	ND		1000	930	93	1000	856	86	8	76-126/10
74-83-9	Methyl bromide	ND		1000	1000	100	1000	1030	103	3	65-124/13
74-87-3	Methyl chloride	ND		1000	1120	112	1000	1110	111	1	47-143/20
74-95-3	Methylene bromide	ND		1000	1070	107	1000	1070	107	0	80-125/10
75-09-2	Methylene chloride	ND		1000	1080	108	1000	1100	110	2	65-124/15
91-20-3	Naphthalene	ND		1000	919	92	1000	891	89	3	66-120/12
103-65-1	n-Propylbenzene	12.0	J	1000	1040	103	1000	978	97	6	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		1000	1040	104	1000	1040	104	0	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		1000	1140	114	1000	1130	113	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		1000	1090	109	1000	1050	105	4	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		1000	1050	105	1000	1030	103	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		1000	997	100	1000	967	97	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		1000	1070	107	1000	1050	105	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		1000	877	88	1000	847	85	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		1000	1070	107	1000	1020	102	5	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		1000	1070	107	1000	1020	102	5	79-130/10
127-18-4	Tetrachloroethylene	ND		1000	924	92	1000	879	88	5	72-124/13
108-88-3	Toluene	ND		1000	1020	102	1000	1000	100	2	78-121/10
79-01-6	Trichloroethylene	ND		1000	1020	102	1000	1020	102	0	75-119/10
75-69-4	Trichlorofluoromethane	ND		1000	1040	104	1000	1050	105	1	68-130/19
75-01-4	Vinyl chloride	ND		1000	1150	115	1000	1160	116	1	57-137/18
1330-20-7	Xylene (total)	ND		3000	3120	104	3000	3050	102	2	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45634-5	Limits
1868-53-7	Dibromofluoromethane	109%	114%	105%	80-123%
2037-26-5	Toluene-D8	97%	96%	98%	88-112%
460-00-4	4-Bromofluorobenzene	103%	103%	93%	79-114%

(a) AZ:D2

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45615-1MS	U34585.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1MSD	U34586.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1 [a]	U34580.D	10	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	C45615-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		200	217	109	200	212	106	2	76-120/10
108-86-1	Bromobenzene	ND		200	207	104	200	205	103	1	80-123/10
74-97-5	Bromochloromethane	ND		200	230	115	200	221	111	4	79-124/10
75-27-4	Bromodichloromethane	ND		200	192	96	200	191	96	1	75-121/10
75-25-2	Bromoform	ND		200	107	54* [b]	200	114	57* [b]	6	62-127/10
104-51-8	n-Butylbenzene	ND		200	206	103	200	200	100	3	74-129/10
135-98-8	sec-Butylbenzene	ND		200	202	101	200	196	98	3	75-128/11
98-06-6	tert-Butylbenzene	ND		200	203	102	200	197	99	3	74-127/11
108-90-7	Chlorobenzene	ND		200	206	103	200	201	101	2	79-119/10
75-00-3	Chloroethane	ND		200	236	118* [c]	200	227	114	4	60-115/14
67-66-3	Chloroform	ND		200	225	113	200	214	107	5	75-122/10
95-49-8	o-Chlorotoluene	ND		200	208	104	200	204	102	2	76-125/12
106-43-4	p-Chlorotoluene	ND		200	210	105	200	207	104	1	76-126/11
75-15-0	Carbon disulfide	ND		200	176	88	200	168	84	5	51-130/13
56-23-5	Carbon tetrachloride	ND		200	205	103	200	203	102	1	72-128/13
75-34-3	1,1-Dichloroethane	323		200	556	117	200	532	105	4	70-121/10
75-35-4	1,1-Dichloroethylene	265		200	474	105	200	465	100	2	62-125/13
563-58-6	1,1-Dichloropropene	ND		200	204	102	200	199	100	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		200	204	102	200	207	104	1	64-129/11
106-93-4	1,2-Dibromoethane	ND		200	216	108	200	213	107	1	81-124/10
107-06-2	1,2-Dichloroethane	2.6	J	200	219	108	200	215	106	2	74-122/10
78-87-5	1,2-Dichloropropane	ND		200	218	109	200	215	108	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		200	223	112	200	219	110	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		200	202	101	200	192	96	5	66-130/12
124-48-1	Dibromochloromethane	ND		200	165	83	200	169	85	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		200	284	142	200	277	139	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	967		200	1230	132* [d]	200	1180	107	4	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		200	213	107	200	209	105	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		200	206	103	200	202	101	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		200	206	103	200	203	102	1	79-120/10
106-46-7	p-Dichlorobenzene	ND		200	204	102	200	201	101	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	10.7		200	214	102	200	208	99	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		200	204	102	200	198	99	3	73-125/10
100-41-4	Ethylbenzene	6.4	J	200	220	107	200	214	104	3	78-123/10
591-78-6	2-Hexanone	ND		800	897	112	800	894	112	0	71-145/12
87-68-3	Hexachlorobutadiene	ND		200	179	90	200	177	89	1	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45693
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45615-1MS	U34585.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1MSD	U34586.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1 [a]	U34580.D	10	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45693-2, C45693-3, C45693-4, C45693-5, C45693-6, C45693-7

CAS No.	Compound	C45615-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		200	206	103	200	199	100	3	77-125/10
99-87-6	p-Isopropyltoluene	ND		200	206	103	200	200	100	3	76-126/10
74-83-9	Methyl bromide	ND		200	222	111	200	214	107	4	65-124/13
74-87-3	Methyl chloride	ND		200	311	156* [c]	200	289	145* [c]	7	47-143/20
74-95-3	Methylene bromide	ND		200	227	114	200	223	112	2	80-125/10
75-09-2	Methylene chloride	ND		200	231	116	200	222	111	4	65-124/15
91-20-3	Naphthalene	ND		200	220	110	200	222	111	1	66-120/12
103-65-1	n-Propylbenzene	ND		200	202	101	200	198	99	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		200	210	105	200	208	104	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		200	219	110	200	210	105	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		200	223	112	200	223	112	0	78-127/10
79-00-5	1,1,2-Trichloroethane	4.6	J	200	227	111	200	221	108	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		200	209	105	200	204	102	2	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		200	219	110	200	216	108	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		200	203	102	200	197	99	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		200	210	105	200	204	102	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		200	209	105	200	204	102	2	79-130/10
127-18-4	Tetrachloroethylene	98.1		200	300	101	200	296	99	1	72-124/13
108-88-3	Toluene	ND		200	210	105	200	205	103	2	78-121/10
79-01-6	Trichloroethylene	934		200	1170	118	200	1160	113	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		200	222	111	200	216	108	3	68-130/19
75-01-4	Vinyl chloride	ND		200	265	133	200	254	127	4	57-137/18
1330-20-7	Xylene (total)	ND		600	627	105	600	609	102	3	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45615-1	Limits
1868-53-7	Dibromofluoromethane	108%	104%	110%	80-123%
2037-26-5	Toluene-D8	101%	101%	103%	88-112%
460-00-4	4-Bromofluorobenzene	101%	100%	94%	79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) Outside laboratory control limits. AZ:M2
(c) Outside laboratory control limits. AZ:L1
(d) Outside control limits due to high level in sample relative to spike amount. AZ:M3

* = Outside of Control Limits.

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45694

Sampling Date: 05/02/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **46**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45694

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45694-1	05/02/16	11:40	CAM	05/05/16	AQ	Ground Water	WR.274A.341.GW
C45694-2	05/02/16	12:07	CAM	05/05/16	AQ	Ground Water	BP.26.333.GW
C45694-3	05/02/16	12:13	CAM	05/05/16	AQ	Ground Water	BP.26.345.GW
C45694-4	05/02/16	12:30	CAM	05/05/16	AQ	Ground Water	BP.28.333.GW
C45694-5	05/02/16	12:38	CAM	05/05/16	AQ	Ground Water	BP.28.345.GW
C45694-6	05/02/16	12:48	CAM	05/05/16	AQ	Ground Water	BP.29.370.GW
C45694-7	05/02/16	13:12	CAM	05/05/16	AQ	Ground Water	BP.27.320.GW`
C45694-8	05/02/16	13:19	CAM	05/05/16	AQ	Ground Water	BP.27.333.GW
C45694-9	05/02/16	00:00	CAM	05/05/16	AQ	Trip Blank Water	TRIP BLANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

2

Client:	AMEC Foster Wheeler	**Job No**	C45694
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	5/16/2016 8:11:24 PM

8 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 05/02/2016 and were received at Accutest on 05/05/2016 properly preserved, at 2.7 Deg. C and intact. These Samples received an Accutest job number of C45694. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1535

- Sample(s) C45629-3MS, C45629-3MSD were used as the QC samples indicated.
- Blank Spike Recovery(s) for 1,1-Dichloroethane, Chloroform, Bromochloromethane, Chloroethane are outside laboratory control limits; associated results may be biased high. No associated sample detections > RL.
- RPD(s) for BSD for Bromochloromethane, Chloroform, 1,1-Dichloroethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, Methyl bromide are outside laboratory control limits.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,1-Dichloroethane, 1,2-Dichloroethane, 1,2-Dichloropropane, Bromochloromethane, Chloroethane, Chloroform, cis-1,2-Dichloroethylene are outside laboratory control limits.
- C45694-1, C45694-4, C45694-8: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VU1416

- Sample(s) C45615-1MS, C45615-1MSD were used as the QC samples indicated.
- Sample(s) C45694-2, C45694-3, C45694-5, C45694-6, C45694-7 have for Methyl chloride a CCV outside of control limits (biased high); not detected in samples.
- Blank Spike and Matrix Spike Recovery(s) for Chloroethane, Methyl chloride are outside laboratory control limits (high bias); not detected in associated samples.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for Bromoform, cis-1,2-Dichloroethylene are outside control limits. Probable cause due to matrix interference and/or high level in sample relative to spike amount.
- C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45694
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/02/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45694-1	**WR.274A.341.GW**					
Benzene [a]		0.67 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.20 J	1.0	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.23 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.73	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		3.0	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		10.7	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.1	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		44.1	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		9.8	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.32 J	0.50	0.20	ug/l	SW846 8260B
C45694-2	**BP.26.333.GW**					
Benzene [a]		0.59 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.39 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.2	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.85	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		11.1	0.50	0.30	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.20 J	0.50	0.20	ug/l	SW846 8260B
C45694-3	**BP.26.345.GW**					
Benzene [a]		0.60 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.39 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		2.3	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.81	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		12.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [a]		0.37 J	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.22 J	0.50	0.20	ug/l	SW846 8260B
C45694-4	**BP.28.333.GW**					
Benzene [a]		0.72 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.44 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.36 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.76	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.4	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.0	0.50	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C45694
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/02/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Tetrachloroethylene [a]		0.32 J	0.50	0.30	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
C45694-5	**BP.28.345.GW**					
Benzene [a]		0.69 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.41 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.72	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.7	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.87	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [a]		0.49 J	0.50	0.30	ug/l	SW846 8260B
C45694-6	**BP.29.370.GW**					
Benzene [a]		0.52 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		8.2	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		18.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.63	0.50	0.20	ug/l	SW846 8260B
trans-1,2-Dichloroethylene [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		92.9	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		19.9	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [b]		0.50	0.50	0.20	ug/l	SW846 8260B
C45694-7	**BP.27.320.GW`**					
Benzene [a]		0.41 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.23 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.38 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.6	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [a]		0.46 J	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.49 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		51.0	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		1.9	0.50	0.20	ug/l	SW846 8260B
C45694-8	**BP.27.333.GW**					
Benzene [a]		0.44 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.31 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.41 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.3	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [a]		0.46 J	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.52	0.50	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C45694
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/02/16

Lab Sample ID Client Sample ID Analyte	Result/ Qual	RL	MDL	Units	Method
Tetrachloroethylene [b]	48.3	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]	1.7	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]	0.20 J	0.50	0.20	ug/l	SW846 8260B

C45694-9 TRIP BLANK

No hits reported in this sample.

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(c) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections > RL. AZ:L1,E4

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45694-1	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40081.D	1	05/12/16	CV	n/a	n/a	VR1535
Run #2 [a]	U34573.D	1	05/11/16	KZ	n/a	n/a	VU1416

	Purge Volume
Run #1	10.0 ml
Run #2	10.0 ml

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.67	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND [c]	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND [c]	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.35 [c]	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.20	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.23 [c]	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.73	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	3.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	10.7	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR.274A.341.GW		
Lab Sample ID:	C45694-1	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	44.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	9.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.32	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%	105%	80-123%
2037-26-5	Toluene-D8	97%	105%	88-112%
460-00-4	4-Bromofluorobenzene	87%	95%	79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45694-2	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34574.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.59	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.39	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.70	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.85	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.333.GW		
Lab Sample ID:	C45694-2	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	11.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.20	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45694-3	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34575.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.60	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.39	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.70	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.81	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.26.345.GW		
Lab Sample ID:	C45694-3	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	12.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene [b]	0.37	0.50	0.20	ug/l	J
75-69-4	Trichlorofluoromethane [b]	0.22	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45694-4	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40083.D	1	05/12/16	CV	n/a	n/a	VR1535
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.72	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane [c]	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [d]	0.44	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [d]	0.36	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.76	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.4	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.0	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45694-4	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene [b]	0.32	0.50	0.30	ug/l	J
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.21	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	119%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections > RL. AZ:L1
(d) Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections >

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.333.GW		
Lab Sample ID:	C45694-4	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

RL. AZ:L1,E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45694-5	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34577.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.69	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.41	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.29	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.72	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.7	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.87	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.28.345.GW		
Lab Sample ID:	C45694-5	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene [b]	0.49	0.50	0.30	ug/l	J
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	105%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45694-6	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34578.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.52	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.28	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.45	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	8.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	18.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.63	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene [b]	0.30	0.50	0.20	ug/l	J

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.29.370.GW		
Lab Sample ID:	C45694-6	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	92.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	19.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	0.50	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.320.GW`		
Lab Sample ID:	C45694-7	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	U34579.D	1	05/11/16	KZ	n/a	n/a	VU1416
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.41	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.23	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.38	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.6	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene [b]	0.46	0.50	0.20	ug/l	J
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.49	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.320.GW`		
Lab Sample ID:	C45694-7	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride [c]	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	51.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	1.9	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	93%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45694-8	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40084.D	1	05/12/16	CV	n/a	n/a	VR1535
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.44	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane [c]	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [d]	0.31	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [c]	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.41	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene [b]	0.46	0.50	0.20	ug/l	J
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.52	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45694-8	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	48.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	1.7	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.20	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	121%		80-123%
2037-26-5	Toluene-D8	96%		88-112%
460-00-4	4-Bromofluorobenzene	85%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections > RL. AZ:L1
(d) Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections >

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP.27.333.GW		
Lab Sample ID:	C45694-8	**Date Sampled:**	05/02/16
Matrix:	AQ - Ground Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

RL. AZ:L1,E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45694-9	**Date Sampled:**	05/02/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	R40073.D	1	05/12/16	CV	n/a	n/a	VR1535
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane [a]	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [a]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [a]	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [a]	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45694-9	**Date Sampled:**	05/02/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/05/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) Associated BS recovery outside of laboratory control limits; result may be biased high. No sample detections > RL. AZ:L1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
L1	The associated blank spike recovery was above laboratory acceptance limits.
M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R9	Sample RPD exceeded the laboratory acceptance limit.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

SGS PHOENIX ACCUTEST

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 7829 9182 5254
Bottle Order Control #:
SGS Accutest Quote #:
SGS Accutest NC Job #: C: CU56914

Client / Reporting Information

Company Name: AMECFW
Address: 4600 E. Washington st. #600
City: Phoenix State: AZ Zip: 85034
Project Contact: Alex Yiannakakis
Phone #: 520-247-8736
Samplers's Name: Chuck Mason

Project Information

Project Name: Broadway Pantano BP-ISCO
Street:
City: Tucson State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

SGS Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: ICE	NaOH	HNO3	H2SO4	HCl	NaHSO4	MEOH	ENCORE	8260B (VOC's)	6010 (Fe, Total + Mn)	7470 (Mercury)
1	WR-274A-341-GW	05/02/16	1140	CAM	W	3					X				X	X	X
2	BP-26-333-GW	↓	1207	↓	↓	↓					↓				↓	↓	↓
3	BP-26-345-GW	↓	1213	↓	↓	↓					↓				↓	↓	↓
4	BP-28-333-GW	↓	1230	↓	↓	↓					↓				↓	↓	↓
5	BP-28-345-GW	↓	1238	↓	↓	↓					↓				↓	↓	↓
6	BP-29-370-GW	↓	1248	↓	↓	↓					↓				↓	↓	↓
7	BP-27-320-GW	↓	1312	↓	↓	↓					↓				↓	↓	↓
8	BP-27-333-GW	↓	1319	↓	↓	↓					↓				↓	↓	↓
9	Trip Blank														X		

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID:
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 [signature]	05/04/16 1431	1 [signature]	2 [signature]	05/04/16 1700	2 Fedex
Relinquished by: Fedex	Date Time: 5/5/16 09:50	Received By: 3 Ali Zeighami	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal #: Intact	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y / N; Cooler Temp. 1.7/2.7 °C

AZ

5.2 5

C45694: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C45694 **Client:** AMEC FW **Project:** BROADWAY PANTANO BP-ISCO

Date / Time Received: 5/5/2016 9:50:00 AM **Delivery Method:** FedEx **Airbill #'s:** 782991825254

Cooler Temps (Initial/Adjusted): #1: (1.7/2.7);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR3;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y or N	N/A
1. Trip Blank present / cooler:	☑ ☐	☐
2. Trip Blank listed on COC:	☑ ☐	☐
3. Samples preserved properly:	☑ ☐	
4. VOCs headspace free:	☑ ☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☑ ☐

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y or N	N/A
1. Analysis requested is clear:	☑ ☐	
2. Bottles received for unspecified tests	☐ ☑	
3. Sufficient volume recvd for analysis:	☑ ☐	
4. Compositing instructions clear:	☐ ☐	☑
5. Filtering instructions clear:	☐ ☐	☑

Comments Per client No samples for metals were collected, 05/05/16

5.2

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C45694: Chain of Custody

Page 2 of 2

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-MB	U34565.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-MB	U34565.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	105%	80-123%
2037-26-5	Toluene-D8	105%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

Method Blank Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1535-MB	R40072.D	1	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1535-MB	R40072.D	1	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	106%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	90%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-BS	U34562.D	1	05/11/16	KZ	n/a	n/a	VU1416
VU1416-BSD	U34563.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.6	103	20.8	104	1	76-120/10
108-86-1	Bromobenzene	20	18.9	95	19.1	96	1	80-123/10
74-97-5	Bromochloromethane	20	21.7	109	21.6	108	0	79-124/10
75-27-4	Bromodichloromethane	20	20.9	105	20.8	104	0	75-121/10
75-25-2	Bromoform	20	16.9	85	16.8	84	1	62-127/10
104-51-8	n-Butylbenzene	20	20.0	100	20.2	101	1	74-129/10
135-98-8	sec-Butylbenzene	20	19.2	96	19.5	98	2	75-128/11
98-06-6	tert-Butylbenzene	20	18.8	94	19.3	97	3	74-127/11
108-90-7	Chlorobenzene	20	19.3	97	19.4	97	1	79-119/10
75-00-3	Chloroethane	20	23.9	120* [a]	23.0	115	4	60-115/14
67-66-3	Chloroform	20	21.9	110	21.5	108	2	75-122/10
95-49-8	o-Chlorotoluene	20	19.4	97	19.8	99	2	76-125/12
106-43-4	p-Chlorotoluene	20	19.6	98	19.8	99	1	76-126/11
75-15-0	Carbon disulfide	20	21.7	109	21.4	107	1	51-130/13
56-23-5	Carbon tetrachloride	20	21.1	106	21.2	106	0	72-128/13
75-34-3	1,1-Dichloroethane	20	22.1	111	21.8	109	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	20.9	105	21.1	106	1	62-125/13
563-58-6	1,1-Dichloropropene	20	19.9	100	20.0	100	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	21.0	105	21.2	106	1	64-129/11
106-93-4	1,2-Dibromoethane	20	20.5	103	20.6	103	0	81-124/10
107-06-2	1,2-Dichloroethane	20	21.0	105	21.0	105	0	74-122/10
78-87-5	1,2-Dichloropropane	20	21.0	105	21.2	106	1	75-123/10
142-28-9	1,3-Dichloropropane	20	21.1	106	21.3	107	1	81-127/11
594-20-7	2,2-Dichloropropane	20	21.3	107	20.8	104	2	66-130/12
124-48-1	Dibromochloromethane	20	20.8	104	20.8	104	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	29.0	145	27.6	138	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	22.2	111	21.8	109	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	21.7	109	21.6	108	0	76-131/10
541-73-1	m-Dichlorobenzene	20	19.0	95	19.1	96	1	79-121/10
95-50-1	o-Dichlorobenzene	20	19.0	95	19.1	96	1	79-120/10
106-46-7	p-Dichlorobenzene	20	18.9	95	19.1	96	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.8	99	19.5	98	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	20.6	103	20.8	104	1	73-125/10
100-41-4	Ethylbenzene	20	20.2	101	20.4	102	1	78-123/10
591-78-6	2-Hexanone	80	89.7	112	89.6	112	0	71-145/12
87-68-3	Hexachlorobutadiene	20	17.7	89	18.3	92	3	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VU1416-BS	U34562.D	1	05/11/16	KZ	n/a	n/a	VU1416
VU1416-BSD	U34563.D	1	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.0	100	20.2	101	1	77-125/10
99-87-6	p-Isopropyltoluene	20	19.3	97	19.7	99	2	76-126/10
74-83-9	Methyl bromide	20	22.1	111	21.5	108	3	65-124/13
74-87-3	Methyl chloride	20	30.1	151* [a]	28.7	144* [a]	5	47-143/20
74-95-3	Methylene bromide	20	21.5	108	21.4	107	0	80-125/10
75-09-2	Methylene chloride	20	21.3	107	21.0	105	1	65-124/15
91-20-3	Naphthalene	20	19.2	96	20.5	103	7	66-120/12
103-65-1	n-Propylbenzene	20	18.9	95	19.3	97	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.3	102	20.2	101	0	79-126/10
71-55-6	1,1,1-Trichloroethane	20	22.1	111	21.7	109	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.0	105	21.1	106	0	78-127/10
79-00-5	1,1,2-Trichloroethane	20	21.2	106	21.2	106	0	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.9	90	19.0	95	6	70-128/12
96-18-4	1,2,3-Trichloropropane	20	21.3	107	21.2	106	0	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.2	91	18.6	93	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.4	97	19.8	99	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.5	98	19.7	99	1	79-130/10
127-18-4	Tetrachloroethylene	20	18.3	92	18.7	94	2	72-124/13
108-88-3	Toluene	20	19.8	99	20.0	100	1	78-121/10
79-01-6	Trichloroethylene	20	20.1	101	20.3	102	1	75-119/10
75-69-4	Trichlorofluoromethane	20	23.1	116	22.3	112	4	68-130/19
75-01-4	Vinyl chloride	20	26.0	130	25.0	125	4	57-137/18
1330-20-7	Xylene (total)	60	59.3	99	59.7	100	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	113%	109%	80-123%
2037-26-5	Toluene-D8	100%	101%	88-112%
460-00-4	4-Bromofluorobenzene	104%	103%	79-114%

(a) Outside laboratory control limits (high bias); not detected in associated samples. AZ:L1

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1535-BS	R40069.D	1	05/12/16	CV	n/a	n/a	VR1535
VR1535-BSD	R40070.D	1	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	22.8	114	21.5	108	6	76-120/10
108-86-1	Bromobenzene	20	20.8	104	20.5	103	1	80-123/10
74-97-5	Bromochloromethane	20	25.2	126* [a]	21.8	109	14* [b]	79-124/10
75-27-4	Bromodichloromethane	20	22.9	115	21.4	107	7	75-121/10
75-25-2	Bromoform	20	18.0	90	17.4	87	3	62-127/10
104-51-8	n-Butylbenzene	20	18.8	94	19.3	97	3	74-129/10
135-98-8	sec-Butylbenzene	20	20.1	101	20.6	103	2	75-128/11
98-06-6	tert-Butylbenzene	20	19.4	97	19.8	99	2	74-127/11
108-90-7	Chlorobenzene	20	20.5	103	20.3	102	1	79-119/10
75-00-3	Chloroethane	20	24.7	124* [a]	21.4	107	14	60-115/14
67-66-3	Chloroform	20	24.8	124* [c]	21.6	108	14* [b]	75-122/10
95-49-8	o-Chlorotoluene	20	20.9	105	20.9	105	0	76-125/12
106-43-4	p-Chlorotoluene	20	21.2	106	21.4	107	1	76-126/11
75-15-0	Carbon disulfide	20	18.8	94	17.1	86	9	51-130/13
56-23-5	Carbon tetrachloride	20	20.2	101	20.0	100	1	72-128/13
75-34-3	1,1-Dichloroethane	20	25.5	128* [c]	22.5	113	13* [b]	70-121/10
75-35-4	1,1-Dichloroethylene	20	20.4	102	19.1	96	7	62-125/13
563-58-6	1,1-Dichloropropene	20	19.9	100	19.7	99	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	18.7	94	18.0	90	4	64-129/11
106-93-4	1,2-Dibromoethane	20	22.0	110	21.5	108	2	81-124/10
107-06-2	1,2-Dichloroethane	20	24.1	121	22.3	112	8	74-122/10
78-87-5	1,2-Dichloropropane	20	24.0	120	22.5	113	6	75-123/10
142-28-9	1,3-Dichloropropane	20	23.0	115	22.5	113	2	81-127/11
594-20-7	2,2-Dichloropropane	20	24.0	120	21.9	110	9	66-130/12
124-48-1	Dibromochloromethane	20	18.2	91	18.0	90	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	21.9	110	19.0	95	14	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	25.5	128	22.3	112	13* [b]	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	22.1	111	20.8	104	6	76-131/10
541-73-1	m-Dichlorobenzene	20	20.9	105	20.7	104	1	79-121/10
95-50-1	o-Dichlorobenzene	20	21.1	106	20.7	104	2	79-120/10
106-46-7	p-Dichlorobenzene	20	20.8	104	20.5	103	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	21.7	109	19.2	96	12* [b]	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	19.5	98	19.4	97	1	73-125/10
100-41-4	Ethylbenzene	20	21.1	106	21.2	106	0	78-123/10
591-78-6	2-Hexanone	80	95.8	120	92.2	115	4	71-145/12
87-68-3	Hexachlorobutadiene	20	19.4	97	20.5	103	6	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1535-BS	R40069.D	1	05/12/16	CV	n/a	n/a	VR1535
VR1535-BSD	R40070.D	1	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	21.0	105	21.0	105	0	77-125/10
99-87-6	p-Isopropyltoluene	20	17.9	90	18.4	92	3	76-126/10
74-83-9	Methyl bromide	20	23.0	115	19.5	98	16* b	65-124/13
74-87-3	Methyl chloride	20	25.3	127	21.4	107	17	47-143/20
74-95-3	Methylene bromide	20	24.1	121	22.2	111	8	80-125/10
75-09-2	Methylene chloride	20	23.9	120	20.8	104	14	65-124/15
91-20-3	Naphthalene	20	19.2	96	18.8	94	2	66-120/12
103-65-1	n-Propylbenzene	20	20.0	100	20.5	103	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	21.8	109	21.3	107	2	79-126/10
71-55-6	1,1,1-Trichloroethane	20	23.1	116	21.0	105	10	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	22.9	115	22.5	113	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	22.5	113	21.9	110	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	20.8	104	20.7	104	0	70-128/12
96-18-4	1,2,3-Trichloropropane	20	22.8	114	21.6	108	5	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	18.1	91	17.9	90	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	21.5	108	21.3	107	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	21.0	105	21.3	107	1	79-130/10
127-18-4	Tetrachloroethylene	20	17.9	90	18.7	94	4	72-124/13
108-88-3	Toluene	20	20.5	103	20.6	103	0	78-121/10
79-01-6	Trichloroethylene	20	21.1	106	20.5	103	3	75-119/10
75-69-4	Trichlorofluoromethane	20	22.5	113	19.8	99	13	68-130/19
75-01-4	Vinyl chloride	20	26.4	132	22.9	115	14	57-137/18
1330-20-7	Xylene (total)	60	63.3	106	62.9	105	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	119%	104%	80-123%
2037-26-5	Toluene-D8	94%	98%	88-112%
460-00-4	4-Bromofluorobenzene	102%	101%	79-114%

(a) Outside laboratory control limits (high bias); not detected in associated samples. AZ:L1
(b) Outside laboratory control limits. AZ:R9
(c) Outside laboratory control limits (high bias); but within marginal exceedence criteria. AZ:L1

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1535-LCS	R40071.D	1	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	107%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45615-1MS	U34585.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1MSD	U34586.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1 [a]	U34580.D	10	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	C45615-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		200	217	109	200	212	106	2	76-120/10
108-86-1	Bromobenzene	ND		200	207	104	200	205	103	1	80-123/10
74-97-5	Bromochloromethane	ND		200	230	115	200	221	111	4	79-124/10
75-27-4	Bromodichloromethane	ND		200	192	96	200	191	96	1	75-121/10
75-25-2	Bromoform	ND		200	107	54* [b]	200	114	57* [b]	6	62-127/10
104-51-8	n-Butylbenzene	ND		200	206	103	200	200	100	3	74-129/10
135-98-8	sec-Butylbenzene	ND		200	202	101	200	196	98	3	75-128/11
98-06-6	tert-Butylbenzene	ND		200	203	102	200	197	99	3	74-127/11
108-90-7	Chlorobenzene	ND		200	206	103	200	201	101	2	79-119/10
75-00-3	Chloroethane	ND		200	236	118* [c]	200	227	114	4	60-115/14
67-66-3	Chloroform	ND		200	225	113	200	214	107	5	75-122/10
95-49-8	o-Chlorotoluene	ND		200	208	104	200	204	102	2	76-125/12
106-43-4	p-Chlorotoluene	ND		200	210	105	200	207	104	1	76-126/11
75-15-0	Carbon disulfide	ND		200	176	88	200	168	84	5	51-130/13
56-23-5	Carbon tetrachloride	ND		200	205	103	200	203	102	1	72-128/13
75-34-3	1,1-Dichloroethane	323		200	556	117	200	532	105	4	70-121/10
75-35-4	1,1-Dichloroethylene	265		200	474	105	200	465	100	2	62-125/13
563-58-6	1,1-Dichloropropene	ND		200	204	102	200	199	100	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		200	204	102	200	207	104	1	64-129/11
106-93-4	1,2-Dibromoethane	ND		200	216	108	200	213	107	1	81-124/10
107-06-2	1,2-Dichloroethane	2.6	J	200	219	108	200	215	106	2	74-122/10
78-87-5	1,2-Dichloropropane	ND		200	218	109	200	215	108	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		200	223	112	200	219	110	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		200	202	101	200	192	96	5	66-130/12
124-48-1	Dibromochloromethane	ND		200	165	83	200	169	85	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		200	284	142	200	277	139	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	967		200	1230	132* [d]	200	1180	107	4	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		200	213	107	200	209	105	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		200	206	103	200	202	101	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		200	206	103	200	203	102	1	79-120/10
106-46-7	p-Dichlorobenzene	ND		200	204	102	200	201	101	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	10.7		200	214	102	200	208	99	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		200	204	102	200	198	99	3	73-125/10
100-41-4	Ethylbenzene	6.4	J	200	220	107	200	214	104	3	78-123/10
591-78-6	2-Hexanone	ND		800	897	112	800	894	112	0	71-145/12
87-68-3	Hexachlorobutadiene	ND		200	179	90	200	177	89	1	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45615-1MS	U34585.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1MSD	U34586.D	10	05/11/16	KZ	n/a	n/a	VU1416
C45615-1 [a]	U34580.D	10	05/11/16	KZ	n/a	n/a	VU1416

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-2, C45694-3, C45694-5, C45694-6, C45694-7

CAS No.	Compound	C45615-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		200	206	103	200	199	100	3	77-125/10
99-87-6	p-Isopropyltoluene	ND		200	206	103	200	200	100	3	76-126/10
74-83-9	Methyl bromide	ND		200	222	111	200	214	107	4	65-124/13
74-87-3	Methyl chloride	ND		200	311	156* [c]	200	289	145* [c]	7	47-143/20
74-95-3	Methylene bromide	ND		200	227	114	200	223	112	2	80-125/10
75-09-2	Methylene chloride	ND		200	231	116	200	222	111	4	65-124/15
91-20-3	Naphthalene	ND		200	220	110	200	222	111	1	66-120/12
103-65-1	n-Propylbenzene	ND		200	202	101	200	198	99	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		200	210	105	200	208	104	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		200	219	110	200	210	105	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		200	223	112	200	223	112	0	78-127/10
79-00-5	1,1,2-Trichloroethane	4.6	J	200	227	111	200	221	108	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		200	209	105	200	204	102	2	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		200	219	110	200	216	108	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		200	203	102	200	197	99	3	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		200	210	105	200	204	102	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		200	209	105	200	204	102	2	79-130/10
127-18-4	Tetrachloroethylene	98.1		200	300	101	200	296	99	1	72-124/13
108-88-3	Toluene	ND		200	210	105	200	205	103	2	78-121/10
79-01-6	Trichloroethylene	934		200	1170	118	200	1160	113	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		200	222	111	200	216	108	3	68-130/19
75-01-4	Vinyl chloride	ND		200	265	133	200	254	127	4	57-137/18
1330-20-7	Xylene (total)	ND		600	627	105	600	609	102	3	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45615-1	Limits
1868-53-7	Dibromofluoromethane	108%	104%	110%	80-123%
2037-26-5	Toluene-D8	101%	101%	103%	88-112%
460-00-4	4-Bromofluorobenzene	101%	100%	94%	79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) Outside laboratory control limits. AZ:M2
(c) Outside laboratory control limits. AZ:L1
(d) Outside control limits due to high level in sample relative to spike amount. AZ:M3

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45629-3MS	R40092.D	25	05/12/16	CV	n/a	n/a	VR1535
C45629-3MSD	R40093.D	25	05/12/16	CV	n/a	n/a	VR1535
C45629-3	R40082.D	25	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	C45629-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	7.4	J	500	600	119	500	589	116	2	76-120/10
108-86-1	Bromobenzene	ND		500	545	109	500	538	108	1	80-123/10
74-97-5	Bromochloromethane	ND		500	629	126* [a]	500	623	125* [a]	1	79-124/10
75-27-4	Bromodichloromethane	ND		500	575	115	500	560	112	3	75-121/10
75-25-2	Bromoform	ND		500	376	75	500	369	74	2	62-127/10
104-51-8	n-Butylbenzene	ND		500	475	95	500	482	96	1	74-129/10
135-98-8	sec-Butylbenzene	ND		500	513	103	500	524	105	2	75-128/11
98-06-6	tert-Butylbenzene	ND		500	501	100	500	500	100	0	74-127/11
108-90-7	Chlorobenzene	1980		500	2540	112	500	2500	104	2	79-119/10
75-00-3	Chloroethane	ND		500	622	124* [a]	500	602	120* [a]	3	60-115/14
67-66-3	Chloroform	ND		500	627	125* [a]	500	615	123* [a]	2	75-122/10
95-49-8	o-Chlorotoluene	ND		500	548	110	500	537	107	2	76-125/12
106-43-4	p-Chlorotoluene	ND		500	562	112	500	563	113	0	76-126/11
75-15-0	Carbon disulfide	ND		500	388	78	500	395	79	2	51-130/13
56-23-5	Carbon tetrachloride	ND		500	510	102	500	524	105	3	72-128/13
75-34-3	1,1-Dichloroethane	12.0	J	500	653	128* [a]	500	650	128* [a]	0	70-121/10
75-35-4	1,1-Dichloroethylene	ND		500	497	99	500	530	106	6	62-125/13
563-58-6	1,1-Dichloropropene	ND		500	507	101	500	525	105	3	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		500	450	90	500	459	92	2	64-129/11
106-93-4	1,2-Dibromoethane	ND		500	557	111	500	551	110	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		500	624	125* [b]	500	605	121	3	74-122/10
78-87-5	1,2-Dichloropropane	ND		500	624	125* [b]	500	611	122	2	75-123/10
142-28-9	1,3-Dichloropropane	ND		500	589	118	500	577	115	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		500	533	107	500	554	111	4	66-130/12
124-48-1	Dibromochloromethane	ND		500	419	84	500	413	83	1	76-124/10
75-71-8	Dichlorodifluoromethane	ND		500	565	113	500	514	103	9	26-163/26
156-59-2	cis-1,2-Dichloroethylene	213		500	862	130* [b]	500	854	128	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		500	539	108	500	530	106	2	76-131/10
541-73-1	m-Dichlorobenzene	34.2		500	591	111	500	576	108	3	79-121/10
95-50-1	o-Dichlorobenzene	536		500	1100	113	500	1080	109	2	79-120/10
106-46-7	p-Dichlorobenzene	262		500	812	110	500	791	106	3	79-120/10
156-60-5	trans-1,2-Dichloroethylene	8.4	J	500	542	107	500	553	109	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		500	480	96	500	474	95	1	73-125/10
100-41-4	Ethylbenzene	ND		500	558	112	500	551	110	1	78-123/10
591-78-6	2-Hexanone	ND		2000	2400	120	2000	2410	121	0	71-145/12
87-68-3	Hexachlorobutadiene	ND		500	462	92	500	489	98	6	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45694
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45629-3MS	R40092.D	25	05/12/16	CV	n/a	n/a	VR1535
C45629-3MSD	R40093.D	25	05/12/16	CV	n/a	n/a	VR1535
C45629-3	R40082.D	25	05/12/16	CV	n/a	n/a	VR1535

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45694-1, C45694-4, C45694-8, C45694-9

CAS No.	Compound	C45629-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		500	539	108	500	537	107	0	77-125/10
99-87-6	p-Isopropyltoluene	ND		500	459	92	500	462	92	1	76-126/10
74-83-9	Methyl bromide	ND		500	564	113	500	549	110	3	65-124/13
74-87-3	Methyl chloride	ND		500	563	113	500	610	122	8	47-143/20
74-95-3	Methylene bromide	ND		500	620	124	500	605	121	2	80-125/10
75-09-2	Methylene chloride	ND		500	594	119	500	588	118	1	65-124/15
91-20-3	Naphthalene	ND		500	475	95	500	478	96	1	66-120/12
103-65-1	n-Propylbenzene	ND		500	519	104	500	526	105	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		500	572	114	500	559	112	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		500	566	113	500	589	118	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		500	594	119	500	592	118	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		500	585	117	500	567	113	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		500	503	101	500	510	102	1	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		500	575	115	500	565	113	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		500	436	87	500	438	88	0	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		500	556	111	500	553	111	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		500	542	108	500	548	110	1	79-130/10
127-18-4	Tetrachloroethylene	ND		500	454	91	500	461	92	2	72-124/13
108-88-3	Toluene	ND		500	536	107	500	531	106	1	78-121/10
79-01-6	Trichloroethylene	ND		500	550	110	500	550	110	0	75-119/10
75-69-4	Trichlorofluoromethane	ND		500	565	113	500	528	106	7	68-130/19
75-01-4	Vinyl chloride	312		500	907	119	500	893	116	2	57-137/18
1330-20-7	Xylene (total)	ND		1500	1650	110	1500	1620	108	2	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45629-3	Limits
1868-53-7	Dibromofluoromethane	116%	114%	123%	80-123%
2037-26-5	Toluene-D8	95%	95%	93%	88-112%
460-00-4	4-Bromofluorobenzene	101%	100%	92%	79-114%

(a) Outside laboratory control limits. AZ:L1
(b) Outside laboratory control limits. AZ:M1

* = Outside of Control Limits.

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042

SGS Accutest Job Number: C45760

Sampling Date: 05/09/16

Report to:

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ATTN: Alex Yiannakakis

Total number of pages in report: **69**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45760

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45760-1	05/09/16	10:30	ERC	05/11/16	AQ	Ground Water	BP-27-320-GW
C45760-2	05/09/16	10:45	ERC	05/11/16	AQ	Ground Water	BP-27-333-GW
C45760-3	05/09/16	09:10	ERC	05/11/16	AQ	Ground Water	BP-28-333-GW
C45760-4	05/09/16	09:20	ERC	05/11/16	AQ	Ground Water	BP-28-355-GW
C45760-5	05/09/16	08:45	ERC	05/11/16	AQ	Ground Water	BP-26-333-GW
C45760-6	05/09/16	09:00	ERC	05/11/16	AQ	Ground Water	BP-26-355-GW
C45760-7	05/09/16	09:50	ERC	05/11/16	AQ	Ground Water	BP-29-370-GW
C45760-8	05/09/16	08:20	ERC	05/11/16	AQ	Ground Water	WR-274A-341-GW
C45760-9	05/09/16	00:00	ERC	05/11/16	AQ	Trip Blank Water	TB-1

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45760
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	5/18/2016 9:20:36 PM

8 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 05/09/2016 and were received at Accutest on 05/11/2016 properly preserved, at 3.2 Deg. C and intact. These Samples received an Accutest job number of C45760. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1539

- Sample(s) C45661-8MS, C45661-8MSD were used as the QC samples indicated.
- Matrix Spike Recovery for 1,1-Dichloroethane is outside laboratory control limits. Probable cause due to matrix interference.
- C45760-2: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45760-1: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
- C45760-3: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1541

- Sample(s) C45703-18MS, C45703-18MSD were used as the QC samples indicated.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, Dibromochloromethane, p-Isopropyltoluene, trans-1,3-Dichloropropene, Xylene (total) are outside control limits. Probable cause due to matrix interference.
- RPD(s) for MSD for 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene are outside laboratory control limits for sample C45703-18MSD.
- C45760-5: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45760-4: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45760-6: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45760-7: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- C45760-9: (pH=3) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Matrix: AQ **Batch ID:** VR1543

- C45760-8: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11306

- Sample(s) C45799-1MS, C45799-1MSD, C45799-1SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Arsenic, Chromium, Selenium are outside control limits for sample MP11306-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11327

- Sample(s) C45799-1MS, C45799-1MSD were used as the QC samples for metals.
- C45760-1, -2, -3, -4, -5, -6, -7, -8 for Mercury: Sample diluted 5x at prep phase due to sample matrix.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45760
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/09/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45760-1	**BP-27-320-GW**					
Benzene [a]		0.50 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.0	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		2.5	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.51	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		33.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		3.3	0.50	0.20	ug/l	SW846 8260B
Barium		654	200		ug/l	SW846 6010B
Chromium		13.2	10		ug/l	SW846 6010B
Iron		325	200		ug/l	SW846 6010B
Manganese		11400	15		ug/l	SW846 6010B
C45760-2	**BP-27-333-GW**					
Benzene [a]		0.45 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.41 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.0	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		2.6	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.47 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		33.1	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		3.2	0.50	0.20	ug/l	SW846 8260B
Barium		629	200		ug/l	SW846 6010B
Chromium		12.9	10		ug/l	SW846 6010B
Iron		490	200		ug/l	SW846 6010B
Manganese		10200	15		ug/l	SW846 6010B
C45760-3	**BP-28-333-GW**					
Benzene [a]		0.66 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.44 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.34 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.72	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.72	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		2.6	0.50	0.30	ug/l	SW846 8260B
Barium		318	200		ug/l	SW846 6010B
Chromium		22.1	10		ug/l	SW846 6010B
Manganese		23900	15		ug/l	SW846 6010B

Summary of Hits

Job Number: C45760
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/09/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45760-4	**BP-28-355-GW**					
Benzene [c]		0.64 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.40 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.31 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.68	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		1.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.74	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		2.9	0.50	0.30	ug/l	SW846 8260B
Barium		324	200		ug/l	SW846 6010B
Chromium		20.9	10		ug/l	SW846 6010B
Iron		515	200		ug/l	SW846 6010B
Manganese		23500	15		ug/l	SW846 6010B
C45760-5	**BP-26-333-GW**					
Benzene [c]		0.59 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.39 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.32 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.65	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		1.4	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.76	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		3.3	0.50	0.30	ug/l	SW846 8260B
Barium		358	200		ug/l	SW846 6010B
Chromium		32.5	10		ug/l	SW846 6010B
Iron		1670	200		ug/l	SW846 6010B
Manganese [e]		47400	45		ug/l	SW846 6010B
Selenium		13.3	10		ug/l	SW846 6010B
C45760-6	**BP-26-355-GW**					
Benzene [c]		0.58 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.42 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.69	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		1.3	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.68	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		2.9	0.50	0.30	ug/l	SW846 8260B
Barium		338	200		ug/l	SW846 6010B
Chromium		31.5	10		ug/l	SW846 6010B
Iron		253	200		ug/l	SW846 6010B
Manganese [e]		51100	45		ug/l	SW846 6010B
Selenium		15.3	10		ug/l	SW846 6010B

Summary of Hits

Job Number: C45760
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/09/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45760-7	**BP-29-370-GW**					
Benzene [c]		0.49 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.26 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [c]		0.71 J	1.0	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.37 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		5.2	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		5.6	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		0.57	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		59.3	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		7.3	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [c]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Barium		302	200		ug/l	SW846 6010B
Chromium		10.5	10		ug/l	SW846 6010B
Manganese		3680	15		ug/l	SW846 6010B
C45760-8	**WR-274A-341-GW**					
Benzene [c]		0.75 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [c]		0.49 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [c]		0.23 J	1.0	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [c]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.78	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [d]		2.8	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [d]		9.8	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [d]		1.1	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [d]		45.6	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [d]		9.8	0.50	0.20	ug/l	SW846 8260B
Barium		331	200		ug/l	SW846 6010B
Chromium		17.6	10		ug/l	SW846 6010B
Manganese		21500	15		ug/l	SW846 6010B
C45760-9	**TB-1**					

No hits reported in this sample.

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(c) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(d) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(e) AZ:D2

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45760-1	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40149.D	1	05/16/16	CV	n/a	n/a	VR1539
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.50	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.45	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	2.5	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.51	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45760-1	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	33.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.3	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45760-1	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	654	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	13.2	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	325	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	11400	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45760-2	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40150.D	1	05/16/16	CV	n/a	n/a	VR1539
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.45	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.28	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.41	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	2.6	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.47	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45760-2	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	33.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	3.2	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	93%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45760-2	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	629	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	12.9	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	490	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	10200	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45760-3	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40151.D	1	05/16/16	CV	n/a	n/a	VR1539
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.66	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.44	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.34	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.72	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.72	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45760-3	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	2.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	116%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	93%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45760-3	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	318	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	22.1	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	23900	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45760-4	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40182.D	1	05/17/16	CV	n/a	n/a	VR1541
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.64	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.40	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.31	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.68	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.74	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45760-4	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	2.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	114%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45760-4	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	324	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	20.9	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	515	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	23500	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45760-5	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40183.D	1	05/17/16	CV	n/a	n/a	VR1541
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.59	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.39	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.32	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.65	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.4	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.76	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45760-5	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	3.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	113%		80-123%
2037-26-5	Toluene-D8	100%		88-112%
460-00-4	4-Bromofluorobenzene	90%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45760-5	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	358	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	32.5	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	1670	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese [a]	47400	45	ug/l	3	05/16/16	05/17/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury [b]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [3]	SW846 7470A [5]
Selenium	13.3	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5868
(3) Instrument QC Batch: MA5871
(4) Prep QC Batch: MP11306
(5) Prep QC Batch: MP11327

(a) AZ:D2
(b) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45760-6	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40185.D	1	05/17/16	CV	n/a	n/a	VR1541
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.58	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.42	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.69	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.3	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.68	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45760-6	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	2.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	117%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45760-6	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	338	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	31.5	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	253	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese [a]	51100	45	ug/l	3	05/16/16	05/17/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury [b]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [3]	SW846 7470A [5]
Selenium	15.3	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [4]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5868
(3) Instrument QC Batch: MA5871
(4) Prep QC Batch: MP11306
(5) Prep QC Batch: MP11327

(a) AZ:D2
(b) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45760-7	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40184.D	1	05/17/16	CV	n/a	n/a	VR1541
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.49	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.26	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.71	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.37	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	5.2	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	5.6	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.57	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45760-7	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	59.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	7.3	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.42	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	89%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45760-7	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	302	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	10.5	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	3680	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45760-8	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40206.D	1	05/18/16	CV	n/a	n/a	VR1543
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.75	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.49	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.23	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.78	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.8	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	9.8	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45760-8	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	45.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	9.8	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	92%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45760-8	**Date Sampled:**	05/09/16
Matrix:	AQ - Ground Water	**Date Received:**	05/11/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	331	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Cadmium	< 2.0	2.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	17.6	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 200	200	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Lead	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	21500	15	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/17/16	05/17/16	EB	SW846 7470A [2]	SW846 7470A [4]
Selenium	< 10	10	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 5.0	5.0	ug/l	1	05/16/16	05/16/16	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA5866
(2) Instrument QC Batch: MA5871
(3) Prep QC Batch: MP11306
(4) Prep QC Batch: MP11327

(a) Sample diluted 5x at prep phase due to sample matrix. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C45760-9	**Date Sampled:**	05/09/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40173.D	1	05/17/16	CV	n/a	n/a	VR1541
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TB-1		
Lab Sample ID:	C45760-9	**Date Sampled:**	05/09/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/11/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-123%
2037-26-5	Toluene-D8	101%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 3) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of target analyte.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
R9	Sample RPD exceeded the laboratory acceptance limit.

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 2263 1078 8467
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C45760

Client / Reporting Information

Company Name: AMEC FW
Address:
City: PHOENIX State: AZ Zip:
Project Contact: ALEX V.
Phone #: 520-247-8736
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BROADWAY PANTANO ISCO
Street:
City: TUCSON State: AZ
Project #:
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaHSO4	MEOH	ENCORE	8260 BD	6010 (RCRA + Total + Mn)	7470 (Mercury)	Just Manganese
1	BP-27-320-GW	5/9/16	1030	ERL	W	4			1		3			X	X	X	
2	BP-27-333-GW		1045						1		3			X	X	X	
3	BP-28-333-GW		910						1		3			X	X	X	
4	BP-28-355-GW		920						1		3			X	X	X	
5	BP-26-333-GW		845						1		3			X	X	X	
6	BP-26-355-GW		900						1		3			X	X	X	
7	BP-29-370-GW		950						1		3			X	X	X	
8	WR-274A-341-GW		820						1		3			X	X	X	
~~9~~	~~BP-27-INFLUENT~~																X
9	TB-1	—	—							HCL	2			X			

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

- [X] 10 Day Standard
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Approved By / Date:

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler	Date Time	Received By	Relinquished By	Date Time	Received By
1	05/10/16 1320	1	2	5/10/16 1700	2 Fed Ex
3 FEDEX	5/11/16 0950	3	4		4
5		5			

Custody Seal #: Intact
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 2.2/3.2

C45760: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C45760 **Client:** AMEC FW **Project:** BROADWAY PANTANO BP-ISCO

Date / Time Received: 5/11/2016 9:50:00 AM **Delivery Method:** FedEx **Airbill #'s:** 776310788467

Cooler Temps (Initial/Adjusted): #1: (2.2/3.2);

Cooler Security	Y or N		Y or N
1. Custody Seals Present:	☑ ☐	3. COC Present:	☑ ☐
2. Custody Seals Intact:	☑ ☐	4. Smpl Dates/Time OK	☑ ☐

Cooler Temperature	Y or N
1. Temp criteria achieved:	☑ ☐
2. Therm ID:	IR3;
3. Cooler media:	Ice (Bag)
4. No. Coolers:	1

Quality Control Preservation	Y or N	N/A
1. Trip Blank present / cooler:	☑ ☐	☐
2. Trip Blank listed on COC:	☑ ☐	☐
3. Samples preserved properly:	☑ ☐	
4. VOCs headspace free:	☑ ☐	☐

Sample Integrity - Documentation	Y or N
1. Sample labels present on bottles:	☑ ☐
2. Container labeling complete:	☑ ☐
3. Sample container label / COC agree:	☑ ☐

Sample Integrity - Condition	Y or N
1. Sample recvd within HT:	☑ ☐
2. All containers accounted for:	☑ ☐
3. Condition of sample:	Intact

Sample Integrity - Instructions	Y or N	N/A
1. Analysis requested is clear:	☑ ☐	
2. Bottles received for unspecified tests	☐ ☑	
3. Sufficient volume recvd for analysis:	☑ ☐	
4. Compositing instructions clear:	☐ ☐	☑
5. Filtering instructions clear:	☐ ☐	☑

Comments

5.2

5

C45760: Chain of Custody

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GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1539-MB	R40135.D	1	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1539-MB	R40135.D	1	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	106%	80-123%
2037-26-5	Toluene-D8	101%	88-112%
460-00-4	4-Bromofluorobenzene	93%	79-114%

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1541-MB	R40172.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	0.30	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1541-MB	R40172.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	93%	79-114%

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1543-MB	R40203.D	1	05/18/16	CV	n/a	n/a	VR1543

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1543-MB	R40203.D	1	05/18/16	CV	n/a	n/a	VR1543

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-8

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	103%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	94%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1539-BS	R40132.D	1	05/16/16	CV	n/a	n/a	VR1539
VR1539-BSD	R40133.D	1	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	20.4	102	20.3	102	0	76-120/10
108-86-1	Bromobenzene	20	19.7	99	19.5	98	1	80-123/10
74-97-5	Bromochloromethane	20	21.2	106	21.1	106	0	79-124/10
75-27-4	Bromodichloromethane	20	20.5	103	20.3	102	1	75-121/10
75-25-2	Bromoform	20	17.5	88	17.2	86	2	62-127/10
104-51-8	n-Butylbenzene	20	18.5	93	18.8	94	2	74-129/10
135-98-8	sec-Butylbenzene	20	20.2	101	20.4	102	1	75-128/11
98-06-6	tert-Butylbenzene	20	19.1	96	19.7	99	3	74-127/11
108-90-7	Chlorobenzene	20	19.2	96	19.0	95	1	79-119/10
75-00-3	Chloroethane	20	19.7	99	18.5	93	6	60-115/14
67-66-3	Chloroform	20	20.8	104	20.5	103	1	75-122/10
95-49-8	o-Chlorotoluene	20	19.5	98	19.6	98	1	76-125/12
106-43-4	p-Chlorotoluene	20	20.5	103	20.4	102	0	76-126/11
75-15-0	Carbon disulfide	20	16.9	85	16.8	84	1	51-130/13
56-23-5	Carbon tetrachloride	20	19.6	98	20.2	101	3	72-128/13
75-34-3	1,1-Dichloroethane	20	21.5	108	21.2	106	1	70-121/10
75-35-4	1,1-Dichloroethylene	20	18.9	95	19.2	96	2	62-125/13
563-58-6	1,1-Dichloropropene	20	19.2	96	19.6	98	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	17.5	88	16.7	84	5	64-129/11
106-93-4	1,2-Dibromoethane	20	20.5	103	20.2	101	1	81-124/10
107-06-2	1,2-Dichloroethane	20	20.9	105	20.6	103	1	74-122/10
78-87-5	1,2-Dichloropropane	20	21.3	107	20.9	105	2	75-123/10
142-28-9	1,3-Dichloropropane	20	21.1	106	20.7	104	2	81-127/11
594-20-7	2,2-Dichloropropane	20	21.5	108	21.7	109	1	66-130/12
124-48-1	Dibromochloromethane	20	17.3	87	17.1	86	1	76-124/10
75-71-8	Dichlorodifluoromethane	20	16.0	80	14.1	71	13	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	21.7	109	21.4	107	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.9	100	19.6	98	2	76-131/10
541-73-1	m-Dichlorobenzene	20	19.7	99	19.6	98	1	79-121/10
95-50-1	o-Dichlorobenzene	20	19.7	99	19.6	98	1	79-120/10
106-46-7	p-Dichlorobenzene	20	19.4	97	19.3	97	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.0	95	18.9	95	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.4	92	18.1	91	2	73-125/10
100-41-4	Ethylbenzene	20	20.2	101	20.1	101	0	78-123/10
591-78-6	2-Hexanone	80	86.4	108	83.2	104	4	71-145/12
87-68-3	Hexachlorobutadiene	20	20.1	101	20.9	105	4	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1539-BS	R40132.D	1	05/16/16	CV	n/a	n/a	VR1539
VR1539-BSD	R40133.D	1	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	20.2	101	20.3	102	0	77-125/10
99-87-6	p-Isopropyltoluene	20	17.7	89	17.8	89	1	76-126/10
74-83-9	Methyl bromide	20	18.2	91	17.3	87	5	65-124/13
74-87-3	Methyl chloride	20	19.5	98	18.1	91	7	47-143/20
74-95-3	Methylene bromide	20	21.1	106	20.8	104	1	80-125/10
75-09-2	Methylene chloride	20	19.9	100	19.4	97	3	65-124/15
91-20-3	Naphthalene	20	17.9	90	17.6	88	2	66-120/12
103-65-1	n-Propylbenzene	20	19.7	99	19.8	99	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.2	101	20.0	100	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.8	104	21.0	105	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.4	107	20.7	104	3	78-127/10
79-00-5	1,1,2-Trichloroethane	20	20.5	103	20.3	102	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	19.5	98	19.7	99	1	70-128/12
96-18-4	1,2,3-Trichloropropane	20	20.6	103	20.2	101	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.1	86	17.2	86	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	20.4	102	20.3	102	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.4	102	20.5	103	0	79-130/10
127-18-4	Tetrachloroethylene	20	18.5	93	18.9	95	2	72-124/13
108-88-3	Toluene	20	19.6	98	19.5	98	1	78-121/10
79-01-6	Trichloroethylene	20	19.7	99	19.9	100	1	75-119/10
75-69-4	Trichlorofluoromethane	20	17.8	89	16.6	83	7	68-130/19
75-01-4	Vinyl chloride	20	20.2	101	18.7	94	8	57-137/18
1330-20-7	Xylene (total)	60	60.2	100	59.6	99	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	108%	107%	80-123%
2037-26-5	Toluene-D8	99%	99%	88-112%
460-00-4	4-Bromofluorobenzene	103%	103%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1541-BS	R40169.D	1	05/17/16	CV	n/a	n/a	VR1541
VR1541-BSD	R40170.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	19.6	98	19.0	95	3	76-120/10
108-86-1	Bromobenzene	20	19.1	96	18.8	94	2	80-123/10
74-97-5	Bromochloromethane	20	20.4	102	20.0	100	2	79-124/10
75-27-4	Bromodichloromethane	20	19.6	98	19.0	95	3	75-121/10
75-25-2	Bromoform	20	16.6	83	16.4	82	1	62-127/10
104-51-8	n-Butylbenzene	20	17.7	89	17.3	87	2	74-129/10
135-98-8	sec-Butylbenzene	20	19.4	97	18.9	95	3	75-128/11
98-06-6	tert-Butylbenzene	20	18.5	93	18.7	94	1	74-127/11
108-90-7	Chlorobenzene	20	18.6	93	18.2	91	2	79-119/10
75-00-3	Chloroethane	20	17.9	90	17.7	89	1	60-115/14
67-66-3	Chloroform	20	19.9	100	19.4	97	3	75-122/10
95-49-8	o-Chlorotoluene	20	19.1	96	18.7	94	2	76-125/12
106-43-4	p-Chlorotoluene	20	19.7	99	19.4	97	2	76-126/11
75-15-0	Carbon disulfide	20	16.2	81	15.4	77	5	51-130/13
56-23-5	Carbon tetrachloride	20	19.1	96	18.4	92	4	72-128/13
75-34-3	1,1-Dichloroethane	20	20.5	103	19.9	100	3	70-121/10
75-35-4	1,1-Dichloroethylene	20	18.6	93	17.7	89	5	62-125/13
563-58-6	1,1-Dichloropropene	20	18.6	93	17.9	90	4	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	16.6	83	16.3	82	2	64-129/11
106-93-4	1,2-Dibromoethane	20	19.9	100	19.5	98	2	81-124/10
107-06-2	1,2-Dichloroethane	20	20.1	101	19.4	97	4	74-122/10
78-87-5	1,2-Dichloropropane	20	20.2	101	19.7	99	3	75-123/10
142-28-9	1,3-Dichloropropane	20	20.4	102	19.8	99	3	81-127/11
594-20-7	2,2-Dichloropropane	20	20.8	104	19.9	100	4	66-130/12
124-48-1	Dibromochloromethane	20	16.7	84	16.3	82	2	76-124/10
75-71-8	Dichlorodifluoromethane	20	13.0	65	12.4	62	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	20.7	104	20.1	101	3	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	18.9	95	18.3	92	3	76-131/10
541-73-1	m-Dichlorobenzene	20	18.9	95	18.6	93	2	79-121/10
95-50-1	o-Dichlorobenzene	20	18.9	95	18.7	94	1	79-120/10
106-46-7	p-Dichlorobenzene	20	18.7	94	18.4	92	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	18.3	92	17.6	88	4	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	17.6	88	17.2	86	2	73-125/10
100-41-4	Ethylbenzene	20	19.4	97	18.9	95	3	78-123/10
591-78-6	2-Hexanone	80	81.9	102	79.9	100	2	71-145/12
87-68-3	Hexachlorobutadiene	20	19.5	98	19.1	96	2	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1541-BS	R40169.D	1	05/17/16	CV	n/a	n/a	VR1541
VR1541-BSD	R40170.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.4	97	18.9	95	3	77-125/10
99-87-6	p-Isopropyltoluene	20	17.1	86	16.8	84	2	76-126/10
74-83-9	Methyl bromide	20	16.8	84	16.6	83	1	65-124/13
74-87-3	Methyl chloride	20	17.1	86	16.9	85	1	47-143/20
74-95-3	Methylene bromide	20	20.2	101	19.7	99	3	80-125/10
75-09-2	Methylene chloride	20	19.2	96	18.5	93	4	65-124/15
91-20-3	Naphthalene	20	17.2	86	16.9	85	2	66-120/12
103-65-1	n-Propylbenzene	20	19.0	95	18.6	93	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	19.6	98	19.3	97	2	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.1	101	19.4	97	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.5	103	20.1	101	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.8	99	19.3	97	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	19.0	95	18.7	94	2	70-128/12
96-18-4	1,2,3-Trichloropropane	20	19.9	100	19.4	97	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	16.7	84	16.5	83	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.5	98	19.3	97	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.7	99	19.5	98	1	79-130/10
127-18-4	Tetrachloroethylene	20	18.4	92	17.8	89	3	72-124/13
108-88-3	Toluene	20	18.8	94	18.5	93	2	78-121/10
79-01-6	Trichloroethylene	20	19.2	96	18.6	93	3	75-119/10
75-69-4	Trichlorofluoromethane	20	15.8	79	15.8	79	0	68-130/19
75-01-4	Vinyl chloride	20	17.9	90	17.7	89	1	57-137/18
1330-20-7	Xylene (total)	60	57.6	96	56.2	94	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	105%	104%	80-123%
2037-26-5	Toluene-D8	98%	98%	88-112%
460-00-4	4-Bromofluorobenzene	101%	101%	79-114%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1543-BS	R40200.D	1	05/18/16	CV	n/a	n/a	VR1543
VR1543-BSD	R40201.D	1	05/18/16	CV	n/a	n/a	VR1543

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	19.5	98	19.7	99	1	76-120/10
108-86-1	Bromobenzene	20	19.3	97	19.4	97	1	80-123/10
74-97-5	Bromochloromethane	20	19.9	100	20.3	102	2	79-124/10
75-27-4	Bromodichloromethane	20	19.5	98	19.8	99	2	75-121/10
75-25-2	Bromoform	20	16.5	83	16.8	84	2	62-127/10
104-51-8	n-Butylbenzene	20	18.1	91	18.1	91	0	74-129/10
135-98-8	sec-Butylbenzene	20	19.8	99	19.8	99	0	75-128/11
98-06-6	tert-Butylbenzene	20	18.9	95	19.5	98	3	74-127/11
108-90-7	Chlorobenzene	20	18.9	95	18.9	95	0	79-119/10
75-00-3	Chloroethane	20	18.1	91	17.4	87	4	60-115/14
67-66-3	Chloroform	20	19.5	98	19.8	99	2	75-122/10
95-49-8	o-Chlorotoluene	20	19.3	97	19.2	96	1	76-125/12
106-43-4	p-Chlorotoluene	20	20.2	101	20.1	101	0	76-126/11
75-15-0	Carbon disulfide	20	15.7	79	15.7	79	0	51-130/13
56-23-5	Carbon tetrachloride	20	19.5	98	19.6	98	1	72-128/13
75-34-3	1,1-Dichloroethane	20	20.0	100	20.1	101	0	70-121/10
75-35-4	1,1-Dichloroethylene	20	18.2	91	18.2	91	0	62-125/13
563-58-6	1,1-Dichloropropene	20	18.8	94	18.8	94	0	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	16.4	82	16.8	84	2	64-129/11
106-93-4	1,2-Dibromoethane	20	19.8	99	20.1	101	2	81-124/10
107-06-2	1,2-Dichloroethane	20	19.8	99	20.1	101	2	74-122/10
78-87-5	1,2-Dichloropropane	20	20.1	101	20.3	102	1	75-123/10
142-28-9	1,3-Dichloropropane	20	20.4	102	20.6	103	1	81-127/11
594-20-7	2,2-Dichloropropane	20	20.2	101	20.5	103	1	66-130/12
124-48-1	Dibromochloromethane	20	16.7	84	17.0	85	2	76-124/10
75-71-8	Dichlorodifluoromethane	20	13.8	69	11.9	60	15	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	20.4	102	20.6	103	1	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	18.8	94	19.1	96	2	76-131/10
541-73-1	m-Dichlorobenzene	20	19.2	96	19.3	97	1	79-121/10
95-50-1	o-Dichlorobenzene	20	19.1	96	19.2	96	1	79-120/10
106-46-7	p-Dichlorobenzene	20	19.0	95	19.0	95	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	17.9	90	18.0	90	1	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	17.6	88	17.7	89	1	73-125/10
100-41-4	Ethylbenzene	20	19.8	99	19.7	99	1	78-123/10
591-78-6	2-Hexanone	80	79.1	99	81.1	101	2	71-145/12
87-68-3	Hexachlorobutadiene	20	20.0	100	20.4	102	2	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1543-BS	R40200.D	1	05/18/16	CV	n/a	n/a	VR1543
VR1543-BSD	R40201.D	1	05/18/16	CV	n/a	n/a	VR1543

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.8	99	19.8	99	0	77-125/10
99-87-6	p-Isopropyltoluene	20	17.6	88	17.5	88	1	76-126/10
74-83-9	Methyl bromide	20	16.8	84	16.5	83	2	65-124/13
74-87-3	Methyl chloride	20	17.2	86	16.6	83	4	47-143/20
74-95-3	Methylene bromide	20	19.9	100	20.3	102	2	80-125/10
75-09-2	Methylene chloride	20	18.4	92	18.6	93	1	65-124/15
91-20-3	Naphthalene	20	16.9	85	17.3	87	2	66-120/12
103-65-1	n-Propylbenzene	20	19.4	97	19.4	97	0	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	19.8	99	20.0	100	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	19.8	99	20.1	101	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	20.1	101	20.6	103	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.9	100	19.8	99	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	18.9	95	19.4	97	3	70-128/12
96-18-4	1,2,3-Trichloropropane	20	19.6	98	20.1	101	3	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	16.7	84	17.0	85	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	20.0	100	20.0	100	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.2	101	20.2	101	0	79-130/10
127-18-4	Tetrachloroethylene	20	18.1	91	18.1	91	0	72-124/13
108-88-3	Toluene	20	19.3	97	19.2	96	1	78-121/10
79-01-6	Trichloroethylene	20	19.3	97	19.4	97	1	75-119/10
75-69-4	Trichlorofluoromethane	20	17.1	86	15.9	80	7	68-130/19
75-01-4	Vinyl chloride	20	18.7	94	17.4	87	7	57-137/18
1330-20-7	Xylene (total)	60	58.6	98	58.7	98	0	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	100%	102%	80-123%
2037-26-5	Toluene-D8	98%	98%	88-112%
460-00-4	4-Bromofluorobenzene	102%	101%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1539-LCS	R40134.D	1	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	110%	80-123%
2037-26-5	Toluene-D8	101%	88-112%
460-00-4	4-Bromofluorobenzene	97%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1541-LCS	R40171.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	107%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1543-LCS	R40202.D	1	05/18/16	CV	n/a	n/a	VR1543

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-8

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	102%	80-123%
2037-26-5	Toluene-D8	99%	88-112%
460-00-4	4-Bromofluorobenzene	97%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45661-8MS	R40155.D	25	05/16/16	CV	n/a	n/a	VR1539
C45661-8MSD	R40156.D	25	05/16/16	CV	n/a	n/a	VR1539
C45661-8 [a]	R40148.D	25	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	C45661-8 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		500	533	107	500	507	101	5	76-120/10
108-86-1	Bromobenzene	ND		500	489	98	500	486	97	1	80-123/10
74-97-5	Bromochloromethane	ND		500	535	107	500	513	103	4	79-124/10
75-27-4	Bromodichloromethane	ND		500	499	100	500	497	99	0	75-121/10
75-25-2	Bromoform	ND		500	354	71	500	372	74	5	62-127/10
104-51-8	n-Butylbenzene	ND		500	476	95	500	458	92	4	74-129/10
135-98-8	sec-Butylbenzene	ND		500	522	104	500	504	101	4	75-128/11
98-06-6	tert-Butylbenzene	ND		500	496	99	500	493	99	1	74-127/11
108-90-7	Chlorobenzene	ND		500	484	97	500	470	94	3	79-119/10
75-00-3	Chloroethane	29.5		500	584	111	500	545	103	7	60-115/14
67-66-3	Chloroform	ND		500	542	108	500	505	101	7	75-122/10
95-49-8	o-Chlorotoluene	ND		500	502	100	500	485	97	3	76-125/12
106-43-4	p-Chlorotoluene	ND		500	510	102	500	515	103	1	76-126/11
75-15-0	Carbon disulfide	ND		500	421	84	500	379	76	11	51-130/13
56-23-5	Carbon tetrachloride	ND		500	535	107	500	507	101	5	72-128/13
75-34-3	1,1-Dichloroethane	677		500	1370	139* [b]	500	1250	115	9	70-121/10
75-35-4	1,1-Dichloroethylene	8.1	J	500	547	108	500	484	95	12	62-125/13
563-58-6	1,1-Dichloropropene	ND		500	526	105	500	489	98	7	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		500	406	81	500	408	82	0	64-129/11
106-93-4	1,2-Dibromoethane	ND		500	498	100	500	492	98	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		500	529	106	500	515	103	3	74-122/10
78-87-5	1,2-Dichloropropane	ND		500	544	109	500	524	105	4	75-123/10
142-28-9	1,3-Dichloropropane	ND		500	521	104	500	509	102	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		500	538	108	500	487	97	10	66-130/12
124-48-1	Dibromochloromethane	ND		500	385	77	500	394	79	2	76-124/10
75-71-8	Dichlorodifluoromethane	ND		500	488	98	500	392	78	22	26-163/26
156-59-2	cis-1,2-Dichloroethylene	293		500	917	125	500	853	112	7	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		500	480	96	500	474	95	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		500	488	98	500	486	97	0	79-121/10
95-50-1	o-Dichlorobenzene	ND		500	486	97	500	488	98	0	79-120/10
106-46-7	p-Dichlorobenzene	ND		500	481	96	500	478	96	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	8.0	J	500	512	101	500	468	92	9	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		500	435	87	500	430	86	1	73-125/10
100-41-4	Ethylbenzene	16.7	J	500	540	105	500	512	99	5	78-123/10
591-78-6	2-Hexanone	ND		2000	2070	104	2000	2000	100	3	71-145/12
87-68-3	Hexachlorobutadiene	ND		500	517	103	500	505	101	2	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45661-8MS	R40155.D	25	05/16/16	CV	n/a	n/a	VR1539
C45661-8MSD	R40156.D	25	05/16/16	CV	n/a	n/a	VR1539
C45661-8 [a]	R40148.D	25	05/16/16	CV	n/a	n/a	VR1539

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-1, C45760-2, C45760-3

CAS No.	Compound	C45661-8 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		500	523	105	500	494	99	6	77-125/10
99-87-6	p-Isopropyltoluene	ND		500	454	91	500	440	88	3	76-126/10
74-83-9	Methyl bromide	ND		500	494	99	500	463	93	6	65-124/13
74-87-3	Methyl chloride	ND		500	530	106	500	480	96	10	47-143/20
74-95-3	Methylene bromide	ND		500	523	105	500	514	103	2	80-125/10
75-09-2	Methylene chloride	ND		500	519	104	500	482	96	7	65-124/15
91-20-3	Naphthalene	134		500	511	75	500	523	78	2	66-120/12
103-65-1	n-Propylbenzene	ND		500	509	102	500	494	99	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		500	501	100	500	491	98	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		500	564	113	500	519	104	8	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		500	511	102	500	516	103	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		500	504	101	500	492	98	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		500	476	95	500	480	96	1	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		500	492	98	500	480	96	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		500	422	84	500	425	85	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	12.4	J	500	532	104	500	526	103	1	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		500	527	105	500	516	103	2	79-130/10
127-18-4	Tetrachloroethylene	ND		500	472	94	500	443	89	6	72-124/13
108-88-3	Toluene	126		500	646	104	500	613	97	5	78-121/10
79-01-6	Trichloroethylene	ND		500	526	105	500	497	99	6	75-119/10
75-69-4	Trichlorofluoromethane	ND		500	550	110	500	501	100	9	68-130/19
75-01-4	Vinyl chloride	137		500	715	116	500	658	104	8	57-137/18
1330-20-7	Xylene (total)	76.8		1500	1630	104	1500	1560	99	4	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45661-8	Limits
1868-53-7	Dibromofluoromethane	111%	106%	106%	80-123%
2037-26-5	Toluene-D8	99%	98%	98%	88-112%
460-00-4	4-Bromofluorobenzene	104%	103%	95%	79-114%

(a) Dilution required due to sample foaming.
(b) Outside laboratory control limits. AZ:M1

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45703-18MS	R40190.D	1	05/17/16	CV	n/a	n/a	VR1541
C45703-18MSD	R40191.D	1	05/17/16	CV	n/a	n/a	VR1541
C45703-18	R40180.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	C45703-18 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		20	19.9	100	20	20.1	101	1	76-120/10
108-86-1	Bromobenzene	ND		20	19.1	96	20	19.5	98	2	80-123/10
74-97-5	Bromochloromethane	ND		20	19.2	96	20	19.3	97	1	79-124/10
75-27-4	Bromodichloromethane	ND		20	18.4	92	20	18.5	93	1	75-121/10
75-25-2	Bromoform	ND		20	12.8	64	20	12.7	64	1	62-127/10
104-51-8	n-Butylbenzene	ND		20	17.0	85	20	17.1	86	1	74-129/10
135-98-8	sec-Butylbenzene	ND		20	19.5	98	20	19.8	99	2	75-128/11
98-06-6	tert-Butylbenzene	ND		20	18.6	93	20	19.1	96	3	74-127/11
108-90-7	Chlorobenzene	ND		20	18.8	94	20	19.1	96	2	79-119/10
75-00-3	Chloroethane	ND		20	19.4	97	20	20.0	100	3	60-115/14
67-66-3	Chloroform	ND		20	19.1	96	20	19.3	97	1	75-122/10
95-49-8	o-Chlorotoluene	ND		20	18.2	91	20	18.4	92	1	76-125/12
106-43-4	p-Chlorotoluene	ND		20	19.1	96	20	19.5	98	2	76-126/11
75-15-0	Carbon disulfide	ND		20	14.7	74	20	13.9	70	6	51-130/13
56-23-5	Carbon tetrachloride	ND		20	20.9	105	20	21.1	106	1	72-128/13
75-34-3	1,1-Dichloroethane	2.6		20	22.5	100	20	22.5	100	0	70-121/10
75-35-4	1,1-Dichloroethylene	ND		20	17.9	90	20	18.5	93	3	62-125/13
563-58-6	1,1-Dichloropropene	ND		20	18.9	95	20	18.9	95	0	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		20	16.8	84	20	16.5	83	2	64-129/11
106-93-4	1,2-Dibromoethane	ND		20	19.1	96	20	19.2	96	1	81-124/10
107-06-2	1,2-Dichloroethane	ND		20	19.4	97	20	19.2	96	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		20	20.1	101	20	20.1	101	0	75-123/10
142-28-9	1,3-Dichloropropane	ND		20	19.3	97	20	19.5	98	1	81-127/11
594-20-7	2,2-Dichloropropane	ND		20	19.6	98	20	19.5	98	1	66-130/12
124-48-1	Dibromochloromethane	ND		20	14.6	73* [a]	20	14.6	73* [a]	0	76-124/10
75-71-8	Dichlorodifluoromethane	ND		20	15.0	75	20	14.6	73	3	26-163/26
156-59-2	cis-1,2-Dichloroethylene	5.8		20	25.5	99	20	26.0	101	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		20	16.1	81	20	16.2	81	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		20	19.2	96	20	19.6	98	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		20	19.0	95	20	19.3	97	2	79-120/10
106-46-7	p-Dichlorobenzene	ND		20	18.9	95	20	19.3	97	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	2.0		20	19.6	88	20	19.9	90	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		20	14.1	71* [a]	20	14.5	73	3	73-125/10
100-41-4	Ethylbenzene	ND		20	17.4	87	20	17.2	86	1	78-123/10
591-78-6	2-Hexanone	ND		80	75.8	95	80	72.5	91	4	71-145/12
87-68-3	Hexachlorobutadiene	ND		20	21.0	105	20	22.2	111	6	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45760
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45703-18MS	R40190.D	1	05/17/16	CV	n/a	n/a	VR1541
C45703-18MSD	R40191.D	1	05/17/16	CV	n/a	n/a	VR1541
C45703-18	R40180.D	1	05/17/16	CV	n/a	n/a	VR1541

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45760-4, C45760-5, C45760-6, C45760-7, C45760-9

CAS No.	Compound	C45703-18 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		20	18.3	92	20	18.2	91	1	77-125/10
99-87-6	p-Isopropyltoluene	ND		20	14.4	72* [a]	20	14.1	71* [a]	2	76-126/10
74-83-9	Methyl bromide	ND		20	16.4	82	20	16.6	83	1	65-124/13
74-87-3	Methyl chloride	ND		20	15.8	79	20	17.2	86	8	47-143/20
74-95-3	Methylene bromide	ND		20	19.5	98	20	19.4	97	1	80-125/10
75-09-2	Methylene chloride	ND		20	18.1	91	20	18.2	91	1	65-124/15
91-20-3	Naphthalene	ND		20	18.3	92	20	16.6	83	10	66-120/12
103-65-1	n-Propylbenzene	ND		20	18.2	91	20	18.1	91	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		20	19.4	97	20	19.7	99	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		20	20.9	105	20	21.0	105	0	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		20	20.0	100	20	20.0	100	0	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		20	18.7	94	20	18.8	94	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		20	18.1	91	20	18.7	94	3	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		20	18.8	94	20	18.6	93	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		20	16.3	82	20	16.9	85	4	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		20	10.2	51* [a]	20	8.9	45* [a]	14* [b]	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		20	7.5	38* [a]	20	6.6	33* [a]	13* [b]	79-130/10
127-18-4	Tetrachloroethylene	ND		20	18.4	92	20	18.9	95	3	72-124/13
108-88-3	Toluene	ND		20	16.6	83	20	16.6	83	0	78-121/10
79-01-6	Trichloroethylene	ND		20	20.0	100	20	20.5	103	2	75-119/10
75-69-4	Trichlorofluoromethane	ND		20	18.7	94	20	19.0	95	2	68-130/19
75-01-4	Vinyl chloride	4.4		20	22.8	92	20	22.9	93	0	57-137/18
1330-20-7	Xylene (total)	ND		60	38.8	65* [a]	60	36.2	60* [a]	7	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45703-18	Limits
1868-53-7	Dibromofluoromethane	98%	97%	105%	80-123%
2037-26-5	Toluene-D8	89%	88%	84%* [c]	88-112%
460-00-4	4-Bromofluorobenzene	99%	97%	90%	79-114%

(a) Outside laboratory control limits. AZ:M2
(b) Outside laboratory control limits. AZ:R9
(c) Outside control limits due to matrix interference. Confirmed by reanalysis.

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11306
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/16/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5	0.80	<10
Barium	200	.2	.5	0.10	<200
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3	0.0	<2.0
Calcium	5000	28	69		
Chromium	10	.4	.6	-0.20	<10
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	-5.3	<200
Lead	10	1	1.7	-1.2	<10
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.0	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3	0.10	<10
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5	0.30	<5.0
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11306: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11306
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/16/16

Metal	C45799-1 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony	anr				
Arsenic	4.9	544	500	107.8	75-125
Barium	148	652	500	100.8	75-125
Beryllium	anr				
Boron					
Cadmium	0.0	552	500	110.4	75-125
Calcium					
Chromium	0.80	514	500	102.6	75-125
Cobalt	anr				
Copper	anr				
Iron	763	13600	12500	102.7	75-125
Lead	0.0	507	500	101.4	75-125
Magnesium					
Manganese	295	803	500	101.6	75-125
Molybdenum	anr				
Nickel	anr				
Potassium					
Selenium	14.2	564	500	110.0	75-125
Silicon					
Silver	0.0	510	500	102.0	75-125
Sodium					
Strontium					
Thallium	anr				
Tin					
Titanium	anr				
Vanadium	anr				
Zinc	anr				

Associated samples MP11306: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11306
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/16/16

Metal	C45799-1 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	anr					
Arsenic	4.9	549	500	108.8	0.9	20
Barium	148	656	500	101.6	0.6	20
Beryllium	anr					
Boron						
Cadmium	0.0	554	500	110.8	0.4	20
Calcium						
Chromium	0.80	521	500	104.0	1.4	20
Cobalt	anr					
Copper	anr					
Iron	763	13700	12500	103.5	0.7	20
Lead	0.0	509	500	101.8	0.4	20
Magnesium						
Manganese	295	814	500	103.8	1.4	20
Molybdenum	anr					
Nickel	anr					
Potassium						
Selenium	14.2	566	500	110.4	0.4	20
Silicon						
Silver	0.0	517	500	103.4	1.4	20
Sodium						
Strontium						
Thallium	anr					
Tin						
Titanium	anr					
Vanadium	anr					
Zinc	anr					

Associated samples MP11306: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11306
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/16/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony	anr			
Arsenic	510	500	102.0	80-120
Barium	515	500	103.0	80-120
Beryllium	anr			
Boron				
Cadmium	511	500	102.2	80-120
Calcium				
Chromium	531	500	106.2	80-120
Cobalt	anr			
Copper	anr			
Iron	13100	12500	104.8	80-120
Lead	509	500	101.8	80-120
Magnesium				
Manganese	536	500	107.2	80-120
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	509	500	101.8	80-120
Silicon				
Silver	476	500	95.2	80-120
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium	anr			
Vanadium	anr			
Zinc	anr			

Associated samples MP11306: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11306
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/16/16

Metal	C45799-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony	anr			
Arsenic	4.90	11.3	130.6(a)	0-10
Barium	148	156	5.4	0-10
Beryllium	anr			
Boron				
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	0.800	0.00	100.0(a)	0-10
Cobalt	anr			
Copper	anr			
Iron	763	803	5.2	0-10
Lead	0.00	0.00	NC	0-10
Magnesium				
Manganese	295	320	8.4	0-10
Molybdenum	anr			
Nickel	anr			
Potassium				
Selenium	14.2	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	anr			
Tin				
Titanium	anr			
Vanadium	anr			
Zinc	anr			

Associated samples MP11306: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11327 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/17/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.02	0.014	<0.20

Associated samples MP11327: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11327
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 05/17/16

Metal	C45799-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0	1.6	2	80.0	75-125

Associated samples MP11327: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11327 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/17/16

Metal	C45799-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.0	1.6	2	80.0	0.0	30

Associated samples MP11327: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45760
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11327
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 05/17/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.0	2	100.0	85-115

Associated samples MP11327: C45760-1, C45760-2, C45760-3, C45760-4, C45760-5, C45760-6, C45760-7, C45760-8

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042.02.6004

SGS Accutest Job Number: C45877

Sampling Date: 05/17/16

Report to:

AMEC Foster Wheeler
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alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **60**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45877

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042.02.6004

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45877-1	05/17/16	08:30	ERC	05/19/16	AQ	Ground Water	BP-26-320-GW
C45877-2	05/17/16	08:40	ERC	05/19/16	AQ	Ground Water	BP-26-333-GW
C45877-3	05/17/16	08:50	ERC	05/19/16	AQ	Ground Water	BP-26-355-GW
C45877-4	05/17/16	09:10	ERC	05/19/16	AQ	Ground Water	BP-28-320-GW
C45877-5	05/17/16	09:20	ERC	05/19/16	AQ	Ground Water	BP-28-333-GW
C45877-6	05/17/16	09:30	ERC	05/19/16	AQ	Ground Water	BP-28-355-GW
C45877-7	05/17/16	09:40	ERC	05/19/16	AQ	Ground Water	BP-27-320-GW
C45877-8	05/17/16	09:50	ERC	05/19/16	AQ	Ground Water	BP-27-333-GW
C45877-9	05/17/16	08:15	ERC	05/19/16	AQ	Ground Water	BP-29-370-GW
C45877-10	05/17/16	10:15	ERC	05/19/16	AQ	Ground Water	WP-274A-341-GW
C45877-11	05/17/16	00:00	ERC	05/19/16	AQ	Trip Blank Water	TRIP BLANK
C45877-12	05/17/16	16:00	ERC	05/19/16	AQ	Ground Water	BP-27-INJECTION

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45877
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	6/1/2016 12:25:52 AM

11 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 05/17/2016 and were received at Accutest on 05/19/2016 properly preserved, at 3.1 Deg. C and intact. These Samples received an Accutest job number of C45877. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VW2309

- Sample(s) C45877-1MS, C45877-1MSD were used as the QC samples indicated.
- Sample(s) C45877-11, C45877-1, C45877-10, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9 have for Carbon tetrachloride a CCV outside of control limits (biased high); not detected in samples.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride are outside laboratory control limits. Probable cause due to matrix interference. The associated blank spike recoveries were acceptable.
- RPD(s) for MSD for 1,1-Dichloroethane, Chloroethane, Chloroform, Methyl bromide exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria.
- C45877-1, -2, -3, -4, -5, -6, -7, -8, -9, -10: (pH=6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11371

- Sample(s) C45904-2MS, C45904-2MSD, C45904-2SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Iron, Manganese are outside control limits for sample MP11371-SD1. Serial dilution indicates possible matrix interference.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45877
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/17/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45877-1	**BP-26-320-GW**					
Benzene [a]		0.39 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [b]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [b]		0.36 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		0.87	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.55	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		8.7	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [a]		0.38 J	0.50	0.20	ug/l	SW846 8260B
Iron		2410	200		ug/l	SW846 6010B
Manganese		9540	15		ug/l	SW846 6010B
C45877-2	**BP-26-333-GW**					
Benzene [a]		0.37 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.38 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		0.96	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.58	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		9.8	0.50	0.30	ug/l	SW846 8260B
Iron		1260	200		ug/l	SW846 6010B
Manganese		9750	15		ug/l	SW846 6010B
C45877-3	**BP-26-355-GW**					
Benzene [a]		0.53 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.33 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.26 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.47 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		1.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.68	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		4.4	0.50	0.30	ug/l	SW846 8260B
Iron		740	200		ug/l	SW846 6010B
Manganese		14200	15		ug/l	SW846 6010B
C45877-4	**BP-28-320-GW**					
Benzene [a]		0.50 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.32 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.26 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.48 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		1.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.70	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		8.8	0.50	0.30	ug/l	SW846 8260B
Iron		655	200		ug/l	SW846 6010B

Summary of Hits

Job Number: C45877
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/17/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Manganese		13400	15		ug/l	SW846 6010B
C45877-5	**BP-28-333-GW**					
Benzene [a]		0.50 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		1.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.64	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		12.9	0.50	0.30	ug/l	SW846 8260B
Iron		238	200		ug/l	SW846 6010B
Manganese		10900	15		ug/l	SW846 6010B
C45877-6	**BP-28-355-GW**					
Benzene [a]		0.45 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		0.94	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.53	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		15.4	0.50	0.30	ug/l	SW846 8260B
Iron		450	200		ug/l	SW846 6010B
Manganese		9670	15		ug/l	SW846 6010B
C45877-7	**BP-27-320-GW**					
Benzene [a]		0.47 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.26 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		0.79	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.57	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		30.8	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [c]		1.5	0.50	0.20	ug/l	SW846 8260B
Manganese		11500	15		ug/l	SW846 6010B
C45877-8	**BP-27-333-GW**					
Benzene [a]		0.48 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		0.83	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.62	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		34.3	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [c]		1.5	0.50	0.20	ug/l	SW846 8260B
Iron		597	200		ug/l	SW846 6010B
Manganese		10900	15		ug/l	SW846 6010B

Summary of Hits

Job Number: C45877
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/17/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45877-9	**BP-29-370-GW**					
Benzene [a]		0.51 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.87 J	1.0	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		4.7	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [c]		7.4	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		0.79	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		51.5	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [c]		9.5	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Manganese		9130	15		ug/l	SW846 6010B
C45877-10	**WP-274A-341-GW**					
Benzene [a]		0.73 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [c]		0.72	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [c]		2.0	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [c]		1.1	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [c]		4.1	0.50	0.30	ug/l	SW846 8260B
Manganese		22100	15		ug/l	SW846 6010B
C45877-11	**TRIP BLANK**					
No hits reported in this sample.						
C45877-12	**BP-27-INJECTION**					
Manganese		54800	75		ug/l	SW846 6010B

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4,R5
(c) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45877-1	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61109.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.39	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane [c]	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [d]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [e]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [d]	0.36	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane [f]	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.87	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.55	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45877-1	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide [c]	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane [f]	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	8.7	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene [b]	0.38	0.50	0.20	ug/l	J
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) AZ:R5
(d) AZ:E4,R5
(e) CCV outside of control limits (biased high); not detected in sample. AZ:V1,M1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45877-1	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q

(f) AZ:M1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45877-1	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	2410	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	9540	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45877-2	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61110.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.37	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.38	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.96	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.58	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45877-2	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	9.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45877-2	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	1260	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	9750	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45877-3	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61111.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.53	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.33	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.26	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.47	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.1	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.68	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45877-3	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	4.4	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	102%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45877-3	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	740	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	14200	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45877-4	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61112.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.50	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.32	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.26	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.48	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.70	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45877-4	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	8.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	102%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45877-4	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	655	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	13400	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45877-5	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61113.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.50	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.64	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45877-5	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	12.9	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45877-5	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	238	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	10900	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45877-6	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61114.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.45	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.28	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.94	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.53	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45877-6	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	15.4	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45877-6	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	450	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	9670	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45877-7	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61115.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.47	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.26	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.79	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.57	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45877-7	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	30.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	1.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	99%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45877-7	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	11500	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45877-8	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61116.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.48	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.27	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.83	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.62	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45877-8	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	34.3	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	1.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45877-8	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	597	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	10900	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45877-9	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61117.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.51	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.28	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.87	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	4.7	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	7.4	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.79	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45877-9	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	51.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	9.5	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.42	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-123%
2037-26-5	Toluene-D8	103%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45877-9	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	9130	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WP-274A-341-GW		
Lab Sample ID:	C45877-10	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	W61118.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.73	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.45	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [c]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.29	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.72	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.0	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WP-274A-341-GW		
Lab Sample ID:	C45877-10	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	4.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	111%		80-123%
2037-26-5	Toluene-D8	104%		88-112%
460-00-4	4-Bromofluorobenzene	101%		79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4
(c) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WP-274A-341-GW		
Lab Sample ID:	C45877-10	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]
Manganese	22100	15	ug/l	1	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5896
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45877-11	**Date Sampled:**	05/17/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	W61119.D	1	05/26/16	MV	n/a	n/a	VW2309
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride [a]	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45877-11	**Date Sampled:**	05/17/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/19/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-123%
2037-26-5	Toluene-D8	105%		88-112%
460-00-4	4-Bromofluorobenzene	102%		79-114%

(a) CCV outside of control limits (biased high); not detected in sample. AZ:V1

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-INJECTION		
Lab Sample ID:	C45877-12	**Date Sampled:**	05/17/16
Matrix:	AQ - Ground Water	**Date Received:**	05/19/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	54800	75	ug/l	5	05/25/16	05/26/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5900
(2) Prep QC Batch: MP11371

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable.
R5	MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
V1	CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

PHOENIX

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

1 of 2

FED-EX Tracking #: 7831 3164 5227
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C C45877

Client / Reporting Information

Company Name: AMEC
Address:
City: PHOENIX State: AZ Zip:
Project Contact: ALEX Y.
Phone #: 520-247-8736
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BP ISCO
Street:
City: TUCSON State: AZ
Project #: 14201520412.02.0004
EMAIL:
Client Purchase Order #:

Requested Analysis: 8260B; TOTAL FE; JUST MN

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	H2O	NaOH	HNO3	H2SO4	ZnAc	NaHSO4	MEOH	ENCORE	8260B	TOTAL FE	JUST MN	LAB USE ONLY
1	BP-26-320-GW	5/18/16	850	ERC	W	4			1		3				X	X	X	
2	BP-26-333-GW		840						1		3				X	X	X	
3	BP-26-355-GW		850						1		3				X	X	X	
4	BP-28-320-GW		910						1		3				X	X	X	
5	BP-28-333-GW		920						1		3				X	X	X	
6	BP-28-355-GW		930						1		3				X	X	X	
7	BP-27-320-GW		940						1		3				X	X	X	
8	BP-27-333-GW		950						1		3				X	X	X	
9	BP-29-370-GW		815						1		3				X	X	X	
10	WP-274A-341-GW	5/19/16	845 1015						1		3				X	X	X	

Turnaround Time (Business days)

Approved By / Date:

- [ ] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	5/18/16 1330	E Prosnitz	2	5/18/16 1700	2 Fed-Ex
Relinquished by: 3 Fedex	Date Time: 5/19/16 09:40	Received By: 3 Ali Zeighami	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # Intact	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N

On Ice (Y) N Cooler Temp: 1.7/2.7 - 2.1/3.1

AZ 5/19

C45877: Chain of Custody
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PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C C45877

Client / Reporting Information

Company Name: AMEC
Address: 1
City: PHOENIX State: AZ Zip:
Project Contact: ALEX V
Phone #: 520-247-87360
Samplers's Name: EMILY CORKERY

Project Information

Project Name: BP ISCO
Street:
City: TUCSON State: AZ
Project #: 1420152042.02.6004
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaS2O3	MeOH	ENCORE	8260 B	JUST MN										Matrix Codes / LAB USE ONLY
11	TRIP BLANK	—	—	—	W	2								X											
12	BP-27-INJECTION	5/17/16	1600	ERC	W	1			1						X										

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	5/18/16 1330	1 Elizabeth Pollitt	2	5/18/16 1700	2 Fed-Ex
Relinquished By: Fedex	Date Time: 5/19/16 09:40	Received By: 3 Ali Zeighami	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # Intact	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N	On Ice Y / N	Cooler Temp. °C

A2

B

5.2 5

SGS Accutest Sample Receipt Summary

Job Number: C45877 **Client:** AMEC **Project:** BP ISCO

Date / Time Received: 5/19/2016 9:40:00 AM **Delivery Method:** FedEx **Airbill #'s:** 783131645227

Cooler Temps (Initial/Adjusted): #1: (2.1/3.1);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR3;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☑		☐	☐
2. Trip Blank listed on COC:	☑		☐	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

C45877: Chain of Custody
Page 3 of 3

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2309-MB	W61108.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2309-MB	W61108.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	98%	80-123%
2037-26-5	Toluene-D8	97%	88-112%
460-00-4	4-Bromofluorobenzene	102%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2309-BS	W61105.D	1	05/26/16	MV	n/a	n/a	VW2309
VW2309-BSD	W61106.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.1	91	18.0	90	1	76-120/10
108-86-1	Bromobenzene	20	18.4	92	18.4	92	0	80-123/10
74-97-5	Bromochloromethane	20	18.5	93	18.2	91	2	79-124/10
75-27-4	Bromodichloromethane	20	20.9	105	20.9	105	0	75-121/10
75-25-2	Bromoform	20	18.5	93	18.3	92	1	62-127/10
104-51-8	n-Butylbenzene	20	17.9	90	17.9	90	0	74-129/10
135-98-8	sec-Butylbenzene	20	18.2	91	18.3	92	1	75-128/11
98-06-6	tert-Butylbenzene	20	18.8	94	18.9	95	1	74-127/11
108-90-7	Chlorobenzene	20	18.3	92	18.2	91	1	79-119/10
75-00-3	Chloroethane	20	16.9	85	16.9	85	0	60-115/14
67-66-3	Chloroform	20	19.3	97	18.9	95	2	75-122/10
95-49-8	o-Chlorotoluene	20	18.3	92	18.4	92	1	76-125/12
106-43-4	p-Chlorotoluene	20	18.5	93	18.5	93	0	76-126/11
75-15-0	Carbon disulfide	20	12.2	61	12.0	60	2	51-130/13
56-23-5	Carbon tetrachloride	20	23.2	116	22.9	115	1	72-128/13
75-34-3	1,1-Dichloroethane	20	17.7	89	17.4	87	2	70-121/10
75-35-4	1,1-Dichloroethylene	20	15.4	77	14.8	74	4	62-125/13
563-58-6	1,1-Dichloropropene	20	19.3	97	19.2	96	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	17.8	89	18.3	92	3	64-129/11
106-93-4	1,2-Dibromoethane	20	18.7	94	18.4	92	2	81-124/10
107-06-2	1,2-Dichloroethane	20	21.3	107	21.2	106	0	74-122/10
78-87-5	1,2-Dichloropropane	20	18.0	90	18.0	90	0	75-123/10
142-28-9	1,3-Dichloropropane	20	18.7	94	18.6	93	1	81-127/11
594-20-7	2,2-Dichloropropane	20	19.7	99	19.2	96	3	66-130/12
124-48-1	Dibromochloromethane	20	20.4	102	20.0	100	2	76-124/10
75-71-8	Dichlorodifluoromethane	20	12.6	63	12.3	62	2	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	18.8	94	18.3	92	3	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	20.7	104	20.6	103	0	76-131/10
541-73-1	m-Dichlorobenzene	20	18.1	91	17.9	90	1	79-121/10
95-50-1	o-Dichlorobenzene	20	17.6	88	17.8	89	1	79-120/10
106-46-7	p-Dichlorobenzene	20	17.9	90	18.0	90	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	16.1	81	15.6	78	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	19.7	99	19.3	97	2	73-125/10
100-41-4	Ethylbenzene	20	19.7	99	19.3	97	2	78-123/10
591-78-6	2-Hexanone	80	77.5	97	76.2	95	2	71-145/12
87-68-3	Hexachlorobutadiene	20	19.8	99	19.9	100	1	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VW2309-BS	W61105.D	1	05/26/16	MV	n/a	n/a	VW2309
VW2309-BSD	W61106.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.8	99	19.6	98	1	77-125/10
99-87-6	p-Isopropyltoluene	20	18.9	95	18.8	94	1	76-126/10
74-83-9	Methyl bromide	20	15.5	78	15.3	77	1	65-124/13
74-87-3	Methyl chloride	20	18.5	93	18.6	93	1	47-143/20
74-95-3	Methylene bromide	20	20.2	101	20.1	101	0	80-125/10
75-09-2	Methylene chloride	20	16.1	81	15.7	79	3	65-124/15
91-20-3	Naphthalene	20	17.0	85	17.0	85	0	66-120/12
103-65-1	n-Propylbenzene	20	17.8	89	17.9	90	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	20.5	103	20.3	102	1	79-126/10
71-55-6	1,1,1-Trichloroethane	20	21.5	108	21.1	106	2	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	16.7	84	17.0	85	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	17.9	90	17.8	89	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.0	85	17.3	87	2	70-128/12
96-18-4	1,2,3-Trichloropropane	20	17.4	87	17.3	87	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.4	87	17.6	88	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	18.9	95	18.9	95	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.2	96	19.2	96	0	79-130/10
127-18-4	Tetrachloroethylene	20	19.5	98	19.4	97	1	72-124/13
108-88-3	Toluene	20	18.4	92	18.1	91	2	78-121/10
79-01-6	Trichloroethylene	20	19.9	100	19.9	100	0	75-119/10
75-69-4	Trichlorofluoromethane	20	21.5	108	21.3	107	1	68-130/19
75-01-4	Vinyl chloride	20	22.1	111	19.9	100	10	57-137/18
1330-20-7	Xylene (total)	60	57.3	96	56.3	94	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	99%	98%	80-123%
2037-26-5	Toluene-D8	97%	95%	88-112%
460-00-4	4-Bromofluorobenzene	104%	103%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45877-1MS	W61122.D	1	05/26/16	MV	n/a	n/a	VW2309
C45877-1MSD	W61123.D	1	05/26/16	MV	n/a	n/a	VW2309
C45877-1 [a]	W61109.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	C45877-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	0.39	J	20	19.5	96	20	17.6	86	10	76-120/10
108-86-1	Bromobenzene	ND		20	19.2	96	20	17.9	90	7	80-123/10
74-97-5	Bromochloromethane	ND		20	18.3	92	20	16.9	85	8	79-124/10
75-27-4	Bromodichloromethane	ND		20	23.4	117	20	21.5	108	8	75-121/10
75-25-2	Bromoform	ND		20	19.3	97	20	18.4	92	5	62-127/10
104-51-8	n-Butylbenzene	ND		20	20.9	105	20	19.7	99	6	74-129/10
135-98-8	sec-Butylbenzene	ND		20	21.1	106	20	19.3	97	9	75-128/11
98-06-6	tert-Butylbenzene	ND		20	21.7	109	20	19.9	100	9	74-127/11
108-90-7	Chlorobenzene	ND		20	19.5	98	20	18.5	93	5	79-119/10
75-00-3	Chloroethane	ND		20	17.7	89	20	15.3	77	15* [b]	60-115/14
67-66-3	Chloroform	0.29	J	20	22.3	110	20	20.0	99	11* [b]	75-122/10
95-49-8	o-Chlorotoluene	ND		20	21.6	108	20	19.7	99	9	76-125/12
106-43-4	p-Chlorotoluene	ND		20	21.0	105	20	19.7	99	6	76-126/11
75-15-0	Carbon disulfide	ND		20	13.3	67	20	11.8	59	12	51-130/13
56-23-5	Carbon tetrachloride	ND		20	28.4	142* [c]	20	26.1	131* [c]	8	72-128/13
75-34-3	1,1-Dichloroethane	0.36	J	20	19.7	97	20	17.5	86	12* [b]	70-121/10
75-35-4	1,1-Dichloroethylene	ND		20	16.5	83	20	14.6	73	12	62-125/13
563-58-6	1,1-Dichloropropene	ND		20	21.2	106	20	19.9	100	6	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		20	22.6	113	20	21.4	107	5	64-129/11
106-93-4	1,2-Dibromoethane	ND		20	20.1	101	20	18.7	94	7	81-124/10
107-06-2	1,2-Dichloroethane	ND		20	25.1	126* [c]	20	23.0	115	9	74-122/10
78-87-5	1,2-Dichloropropane	ND		20	18.6	93	20	16.9	85	10	75-123/10
142-28-9	1,3-Dichloropropane	ND		20	20.2	101	20	18.8	94	7	81-127/11
594-20-7	2,2-Dichloropropane	ND		20	22.2	111	20	19.8	99	11	66-130/12
124-48-1	Dibromochloromethane	ND		20	22.6	113	20	21.3	107	6	76-124/10
75-71-8	Dichlorodifluoromethane	0.87		20	17.3	82	20	16.5	78	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		20	19.3	97	20	17.5	88	10	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		20	21.6	108	20	19.6	98	10	76-131/10
541-73-1	m-Dichlorobenzene	ND		20	19.3	97	20	17.9	90	8	79-121/10
95-50-1	o-Dichlorobenzene	ND		20	19.2	96	20	17.8	89	8	79-120/10
106-46-7	p-Dichlorobenzene	0.55		20	19.9	97	20	18.5	90	7	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		20	16.7	84	20	15.1	76	10	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		20	21.8	109	20	20.5	103	6	73-125/10
100-41-4	Ethylbenzene	ND		20	21.9	110	20	20.8	104	5	78-123/10
591-78-6	2-Hexanone	ND		80	81.4	102	80	76.6	96	6	71-145/12
87-68-3	Hexachlorobutadiene	ND		20	20.7	104	20	20.1	101	3	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45877
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45877-1MS	W61122.D	1	05/26/16	MV	n/a	n/a	VW2309
C45877-1MSD	W61123.D	1	05/26/16	MV	n/a	n/a	VW2309
C45877-1 [a]	W61109.D	1	05/26/16	MV	n/a	n/a	VW2309

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-11

CAS No.	Compound	C45877-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		20	22.2	111	20	21.0	105	6	77-125/10
99-87-6	p-Isopropyltoluene	ND		20	21.4	107	20	20.0	100	7	76-126/10
74-83-9	Methyl bromide	ND		20	16.2	81	20	14.1	71	14* [b]	65-124/13
74-87-3	Methyl chloride	ND		20	17.4	87	20	16.9	85	3	47-143/20
74-95-3	Methylene bromide	ND		20	22.1	111	20	20.3	102	8	80-125/10
75-09-2	Methylene chloride	ND		20	16.9	85	20	15.0	75	12	65-124/15
91-20-3	Naphthalene	ND		20	18.8	94	20	17.6	88	7	66-120/12
103-65-1	n-Propylbenzene	ND		20	20.5	103	20	19.0	95	8	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		20	22.7	114	20	21.5	108	5	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		20	25.8	129* [c]	20	23.2	116	11	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		20	18.2	91	20	16.5	83	10	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		20	19.1	96	20	17.6	88	8	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		20	18.4	92	20	17.4	87	6	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		20	18.8	94	20	17.3	87	8	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		20	18.5	93	20	17.7	89	4	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		20	21.8	109	20	20.0	100	9	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		20	22.1	111	20	20.5	103	8	79-130/10
127-18-4	Tetrachloroethylene	8.7		20	28.3	98	20	28.4	99	0	72-124/13
108-88-3	Toluene	ND		20	19.7	99	20	18.7	94	5	78-121/10
79-01-6	Trichloroethylene	0.38	J	20	21.7	107	20	19.9	98	9	75-119/10
75-69-4	Trichlorofluoromethane	ND		20	25.4	127	20	23.1	116	9	68-130/19
75-01-4	Vinyl chloride	ND		20	20.0	100	20	18.8	94	6	57-137/18
1330-20-7	Xylene (total)	ND		60	61.2	102	60	58.4	97	5	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45877-1	Limits
1868-53-7	Dibromofluoromethane	110%	108%	99%	80-123%
2037-26-5	Toluene-D8	104%	104%	104%	88-112%
460-00-4	4-Bromofluorobenzene	109%	109%	100%	79-114%

(a) (pH= 6) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) RPD exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria. AZ:R5
(c) Outside laboratory control limits. AZ:M1

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45877
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11371
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/25/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	0.40	<200
Lead	10	1	1.7		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.10	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11371: C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45877
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11371
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/25/16

Metal	C45904-2 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Boron					
Cadmium	anr				
Calcium					
Chromium	anr				
Cobalt					
Copper	anr				
Iron	9030	22600	12500	108.6	75-125
Lead	anr				
Magnesium					
Manganese	3020	3580	500	112.0	75-125
Molybdenum					
Nickel					
Potassium					
Selenium	anr				
Silicon					
Silver	anr				
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc	anr				

Associated samples MP11371: C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45877
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11371 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/25/16

Metal	C45904-2 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	anr					
Beryllium						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper	anr					
Iron	9030	20000	12500	87.8	12.2	20
Lead	anr					
Magnesium						
Manganese	3020	3200	500	36.0 (a)	11.2	20
Molybdenum						
Nickel						
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc	anr					

Associated samples MP11371: C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information. AZ:M3

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45877
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11371
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/25/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron	13700	12500	109.6	80-120
Lead	anr			
Magnesium				
Manganese	541	500	108.2	80-120
Molybdenum				
Nickel				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc	anr			

Associated samples MP11371: C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45877
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11371
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/25/16

Metal	C45904-2 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron	9030	10500	15.8*(a)	0-10
Lead	anr			
Magnesium				
Manganese	3020	3570	18.1*(a)	0-10
Molybdenum				
Nickel				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc	anr			

Associated samples MP11371: C45877-1, C45877-2, C45877-3, C45877-4, C45877-5, C45877-6, C45877-7, C45877-8, C45877-9, C45877-10, C45877-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042.02.6004

SGS Accutest Job Number: C45947

Sampling Date: 05/23/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: **69**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C45947

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042.02.6004

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C45947-1	05/23/16	13:45	CAM	05/25/16	AQ	Ground Water	BP-26-320-GW
C45947-2	05/23/16	13:50	CAM	05/25/16	AQ	Ground Water	BP-26-333-GW
C45947-3	05/23/16	13:55	CAM	05/25/16	AQ	Ground Water	BP-26-355-GW
C45947-4	05/23/16	14:30	CAM	05/25/16	AQ	Ground Water	BP-28-320-GW
C45947-5	05/23/16	14:35	CAM	05/25/16	AQ	Ground Water	BP-28-333-GW
C45947-6	05/23/16	14:40	CAM	05/25/16	AQ	Ground Water	BP-28-355-GW
C45947-7	05/23/16	15:00	CAM	05/25/16	AQ	Ground Water	BP-27-320-GW
C45947-8	05/23/16	15:05	CAM	05/25/16	AQ	Ground Water	BP-27-333-GW
C45947-9	05/23/16	12:45	CAM	05/25/16	AQ	Ground Water	BP-29-370-GW
C45947-10	05/23/16	13:10	CAM	05/25/16	AQ	Ground Water	WR-274A-341-GW
C45947-11	05/23/16	00:00	CAM	05/25/16	AQ	Trip Blank Water	TRIP BLANK
C45947-12	05/23/16	12:20	CAM	05/25/16	AQ	Ground Water	BP-27-INJECTION

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C45947
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	6/10/2016 12:48:30 A

11 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 05/23/2016 and were received at Accutest on 05/25/2016 properly preserved, at 5.9 Deg. C and intact. These Samples received an Accutest job number of C45947. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VR1562

- Sample(s) C45969-1MS, C45969-1MSD were used as the QC samples indicated.
- Blank Spike and Matrix Spike Recovery(s) for Chloroethane is outside laboratory control limits (high bias); not detected in associated samples.
- Blank Spike Duplicate Recovery for Methyl chloride is outside laboratory control limits; but within marginal exceedance criteria.
- RPD(s) for BSD for Chloroethane, Carbon disulfide, 1,1-Dichloroethylene, Dichlorodifluoromethane, trans-1,2-Dichloroethylene, Methyl bromide, Methyl chloride, Methylene chloride, Vinyl chloride are outside laboratory control limits.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for Bromoform, Dibromochloromethane are outside control limits. Probable cause due to matrix interference.
- C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
- RPD(s) for MSD for Methyl chloride exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria.

Matrix: AQ **Batch ID:** VV1378

- Sample(s) C45967-7MS, C45967-7MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Trichloroethylene, Trichlorofluoromethane are outside control limits. Probable cause due to matrix interference and/or high level in sample relative to spike amount. The associated blank spike recoveries were acceptable.
- C45947-10: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11386

- Sample(s) C45950-2MS, C45950-2MSD, C45950-2SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Iron, Manganese are outside control limits for sample MP11386-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11393

- Sample(s) C45947-1MSD, C45947-1MS were used as the QC samples for metals.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for Mercury are outside control limits. Probable cause due to matrix interference.
- C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10: Elevated reporting limit(s) for Mercury due to matrix interference.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C45947
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/23/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C45947-1	**BP-26-320-GW**					
Benzene [a]		0.45 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.97	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.58	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		3.1	0.50	0.30	ug/l	SW846 8260B
Iron		2170	200		ug/l	SW846 6010B
Manganese		11000	15		ug/l	SW846 6010B
C45947-2	**BP-26-333-GW**					
Benzene [a]		0.41 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.83	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.44 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		0.77	0.50	0.30	ug/l	SW846 8260B
Iron		902	200		ug/l	SW846 6010B
Manganese		13800	15		ug/l	SW846 6010B
C45947-3	**BP-26-355-GW**					
Benzene [a]		0.53 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.34 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.51	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.60	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.64	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		0.53	0.50	0.30	ug/l	SW846 8260B
Iron		2820	200		ug/l	SW846 6010B
Manganese		11500	15		ug/l	SW846 6010B
C45947-4	**BP-28-320-GW**					
Benzene [a]		0.46 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.44 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [a]		0.48 J	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.58	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		0.96	0.50	0.30	ug/l	SW846 8260B

Summary of Hits

Job Number: C45947
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/23/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Iron		1450	200		ug/l	SW846 6010B
Manganese		11900	15		ug/l	SW846 6010B
C45947-5	**BP-28-333-GW**					
Benzene [a]		0.40 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.26 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [a]		0.45 J	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.44 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		1.0	0.50	0.30	ug/l	SW846 8260B
Manganese		12000	15		ug/l	SW846 6010B
C45947-6	**BP-28-355-GW**					
Benzene [a]		0.41 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.26 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [a]		0.42 J	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		1.4	0.50	0.30	ug/l	SW846 8260B
Iron		490	200		ug/l	SW846 6010B
Manganese		13300	15		ug/l	SW846 6010B
C45947-7	**BP-27-320-GW**					
Benzene [a]		0.62 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.38 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.68	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.59	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		2.7	0.50	0.30	ug/l	SW846 8260B
Manganese		24600	15		ug/l	SW846 6010B
Mercury [c]		1.1	1.0		ug/l	SW846 7470A
C45947-8	**BP-27-333-GW**					
Benzene [a]		0.63 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.28 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.65	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.62	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.67	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		2.6	0.50	0.30	ug/l	SW846 8260B

Summary of Hits

Job Number: C45947
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/23/16

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Manganese		25400	15		ug/l	SW846 6010B
Mercury [c]		1.1	1.0		ug/l	SW846 7470A
C45947-9	**BP-29-370-GW**					
Benzene [d]		0.52 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [d]		0.25 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [d]		0.42 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane		2.7	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene		6.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene		0.64	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene		41.8	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene		7.2	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [d]		0.32 J	0.50	0.20	ug/l	SW846 8260B
Manganese		8840	15		ug/l	SW846 6010B
C45947-10	**WR-274A-341-GW**					
Benzene [a]		0.71 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.39 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.58 J	1.0	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.29 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.70	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.94	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.91	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		1.6	0.50	0.30	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.20 J	0.50	0.20	ug/l	SW846 8260B
Manganese		12600	15		ug/l	SW846 6010B
Mercury [c]		1.1	1.0		ug/l	SW846 7470A
C45947-11	**TRIP BLANK**					
No hits reported in this sample.						
C45947-12	**BP-27-INJECTION**					
Manganese		25400	45		ug/l	SW846 6010B

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(c) Elevated reporting limit(s) due to matrix interference. AZ:D1
(d) AZ:E4

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45947-1	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40610.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.45	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.30	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.40	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.43	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.97	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.58	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45947-1	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	3.1	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	91%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-320-GW		
Lab Sample ID:	C45947-1	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	2170	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	11000	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45947-2	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40611.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.41	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.29	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.27	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.42	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.83	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.44	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45947-2	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	0.77	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	88%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C45947-2	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	902	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	13800	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45947-3	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40612.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.53	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.34	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.51	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.60	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.64	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45947-3	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	0.53	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-355-GW		
Lab Sample ID:	C45947-3	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	2820	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	11500	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45947-4	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40613.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.46	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.30	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.29	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.44	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane [b]	0.48	0.50	0.20	ug/l	J
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.58	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45947-4	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	0.96	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-320-GW		
Lab Sample ID:	C45947-4	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	1450	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	11900	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45947-5	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40614.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.40	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.26	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.43	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane [b]	0.45	0.50	0.20	ug/l	J
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.44	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45947-5	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	1.0	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	112%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C45947-5	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	12000	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45947-6	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40615.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.41	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.26	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.40	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane [b]	0.42	0.50	0.20	ug/l	J
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene [b]	0.40	0.50	0.20	ug/l	J
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45947-6	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	1.4	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-123%
2037-26-5	Toluene-D8	97%		88-112%
460-00-4	4-Bromofluorobenzene	93%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-355-GW		
Lab Sample ID:	C45947-6	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	490	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	13300	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45947-7	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40616.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.62	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.38	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.68	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.59	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.70	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45947-7	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	2.7	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	94%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-320-GW		
Lab Sample ID:	C45947-7	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	24600	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	1.1	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45947-8	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40617.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.63	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.40	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.28	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.65	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.62	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.67	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45947-8	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	2.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		80-123%
2037-26-5	Toluene-D8	106%		88-112%
460-00-4	4-Bromofluorobenzene	95%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C45947-8	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	25400	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	1.1	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45947-9	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	V33485.D	1	06/06/16	KZ	n/a	n/a	VV1378
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [a]	0.52	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [a]	0.25	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [a]	0.42	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	2.7	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	6.1	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.64	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45947-9	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	41.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	7.2	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [a]	0.32	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	98%		79-114%

(a) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C45947-9	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	8840	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	< 1.0	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45947-10	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	V33486.D	1	06/06/16	KZ	n/a	n/a	VV1378
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.71	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.39	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.58	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.29	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.70	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.94	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.91	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45947-10	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	1.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.20	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	98%		88-112%
460-00-4	4-Bromofluorobenzene	100%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C45947-10	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Iron	< 200	200	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	12600	15	ug/l	1	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [3]
Mercury [a]	1.1	1.0	ug/l	1	05/27/16	05/27/16	EB	SW846 7470A [2]	SW846 7470A [4]

(1) Instrument QC Batch: MA5900
(2) Instrument QC Batch: MA5903
(3) Prep QC Batch: MP11386
(4) Prep QC Batch: MP11393

(a) Elevated reporting limit(s) due to matrix interference. AZ:D1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45947-11	**Date Sampled:**	05/23/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	R40609.D	1	06/02/16	CV	n/a	n/a	VR1562
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C45947-11	**Date Sampled:**	05/23/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/25/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		80-123%
2037-26-5	Toluene-D8	100%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-INJECTION		
Lab Sample ID:	C45947-12	**Date Sampled:**	05/23/16
Matrix:	AQ - Ground Water	**Date Received:**	05/25/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Manganese	25400	45	ug/l	3	05/26/16	05/27/16	RS	SW846 6010B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5900
(2) Prep QC Batch: MP11386

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
D1	Sample required dilution due to matrix.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).
L1	The associated blank spike recovery was above laboratory acceptance limits.
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
R5	MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R7	LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R9	Sample RPD exceeded the laboratory acceptance limit.

1 of 2

PHOENIX ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #: 7763 6509 8774
Accutest Quote #:
Bottle Order Control #:
Accutest NC Job #: C 045947

Client / Reporting Information

Company Name: AMEC
Address:
City: PHOENIX State: AZ Zip:
Project Contact: ALEX Y.
Phone #: 520-217-8736
Samplers's Name: Emily Corkery / Chuck Mason

Project Information

Project Name: BPISCO
Street:
City: TUCSON State: AZ
Project #: 1420152042.02.00004
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaHSO4	MeOH	ENCORE	8260D	6010 + TOTAL Fe, Mn	7470 Mercury
1	BP-26-320-GW	5/23/16	1345	CAM	W	4			1		3			X	X	X
2	BP-26-333-GW		1350			3			1		2			X	X	X
3	BP-26-355-GW		1355			3			1		2			X	X	X
4	BP-28-320-GW		1430			3			1		2			X	X	X
5	BP-28-333-GW		1435			3			1		2			X	X	X
6	BP-28-355-GW		1440			3			1		2			X	X	X
7	BP-27-320-GW		1500			3			1		2			X	X	X
8	BP-27-333-GW		1505			3			1		2			X	X	X
9	BP-29-370-GW		1245			4			1		3			X	X	X
10	WR-274A-341-GW		1310			4			1		3			X	X	X

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

LAB USE ONLY

Turnaround Time (Business days)

Approved By / Date:

- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler	Date Time	Received By	Relinquished By	Date Time	Received By
1	5/24/16	1000	2	5/24/16 1700	2 Fedex
3 Fedex	5/25/16 09:15	3 Ali Zeighami	4		4
5		5			

Custody Seal # Intact
Appropriate Bottle / Pres. Y / N
Labels match Coc? Y / N
Headspace Y / N
Separate Receiving Check List used: Y / N
On Ice Y / N
Cooler Temp. 4.9/5.9 oC

AZ

5.2 5

C45947: Chain of Custody
Page 1 of 3

2 of 2

PHOENIX

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest NC Job #: C C45947

Client / Reporting Information

Company Name: AMEC
Address:
City: PHOENIX State: AZ Zip:
Project Contact: ALEX Y.
Phone #: 520-247-8736
Samplers's Name: Emily Corkery / Chuck Mason

Project Information

Project Name: BP ISCO
Street:
City: TUCSON State: AZ
Project #: 1420152042.02.00004
EMAIL:
Client Purchase Order #:

Requested Analysis

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	EnCORE	8260DP	Just MN	LAB USE ONLY
11	TRIP BLANK	—	—	—	W	2	2								X		
12	BP-27-INJECTION	5/23/16	1220	CAM	W	1			1							X	

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; Ol-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Turnaround Time (Business days)

Approved By / Date:

- [x] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	5/24/16 1000	2	2	5/24/16 1700	2 Fed-Ex
Relinquished by: Fedex	Date Time: 5/25/16 09:15	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal #	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y / N; Cooler Temp. ___ °C

AZ

5.2 5

C45947: Chain of Custody
Page 2 of 3

SGS Accutest Sample Receipt Summary

Job Number: C45947 **Client:** AMEC **Project:** BPISCO

Date / Time Received: 5/25/2016 9:15:00 AM **Delivery Method:** FedEx **Airbill #'s:** 776365098774

Cooler Temps (Initial/Adjusted): #1: (4.9/5.9);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR3; IR3;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☐	☑
2. Trip Blank listed on COC:	☐		☐	☑
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

C45947: Chain of Custody
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GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1562-MB	R40603.D	1	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1562-MB	R40603.D	1	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	92%	79-114%

Method Blank Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1378-MB	V33475.D	1	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1378-MB	V33475.D	1	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	100%	80-123%
2037-26-5	Toluene-D8	98%	88-112%
460-00-4	4-Bromofluorobenzene	99%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1562-BS	R40598.D	1	06/02/16	CV	n/a	n/a	VR1562
VR1562-BSD	R40599.D	1	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.9	95	18.6	93	2	76-120/10
108-86-1	Bromobenzene	20	19.5	98	19.3	97	1	80-123/10
74-97-5	Bromochloromethane	20	20.0	100	19.3	97	4	79-124/10
75-27-4	Bromodichloromethane	20	20.1	101	19.4	97	4	75-121/10
75-25-2	Bromoform	20	16.7	84	16.5	83	1	62-127/10
104-51-8	n-Butylbenzene	20	17.7	89	17.3	87	2	74-129/10
135-98-8	sec-Butylbenzene	20	19.2	96	18.8	94	2	75-128/11
98-06-6	tert-Butylbenzene	20	18.7	94	18.4	92	2	74-127/11
108-90-7	Chlorobenzene	20	18.3	92	18.2	91	1	79-119/10
75-00-3	Chloroethane	20	23.4	117* [a]	18.8	94	22* [a]	60-115/14
67-66-3	Chloroform	20	20.0	100	18.8	94	6	75-122/10
95-49-8	o-Chlorotoluene	20	18.9	95	19.0	95	1	76-125/12
106-43-4	p-Chlorotoluene	20	20.1	101	19.7	99	2	76-126/11
75-15-0	Carbon disulfide	20	17.5	88	14.3	72	20* [b]	51-130/13
56-23-5	Carbon tetrachloride	20	19.2	96	18.3	92	5	72-128/13
75-34-3	1,1-Dichloroethane	20	20.2	101	18.8	94	7	70-121/10
75-35-4	1,1-Dichloroethylene	20	19.8	99	16.5	83	18* [b]	62-125/13
563-58-6	1,1-Dichloropropene	20	18.4	92	17.5	88	5	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	19.6	98	19.2	96	2	64-129/11
106-93-4	1,2-Dibromoethane	20	20.2	101	19.9	100	1	81-124/10
107-06-2	1,2-Dichloroethane	20	20.4	102	19.5	98	5	74-122/10
78-87-5	1,2-Dichloropropane	20	20.2	101	20.0	100	1	75-123/10
142-28-9	1,3-Dichloropropane	20	20.2	101	20.0	100	1	81-127/11
594-20-7	2,2-Dichloropropane	20	21.2	106	19.7	99	7	66-130/12
124-48-1	Dibromochloromethane	20	17.0	85	16.4	82	4	76-124/10
75-71-8	Dichlorodifluoromethane	20	18.9	95	10	50	62* [b]	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	20.2	101	19.4	97	4	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	19.4	97	19.0	95	2	76-131/10
541-73-1	m-Dichlorobenzene	20	19.2	96	19.1	96	1	79-121/10
95-50-1	o-Dichlorobenzene	20	19.6	98	19.6	98	0	79-120/10
106-46-7	p-Dichlorobenzene	20	18.9	95	18.9	95	0	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	19.8	99	16.7	84	17* [b]	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	17.2	86	16.9	85	2	73-125/10
100-41-4	Ethylbenzene	20	19.1	96	18.9	95	1	78-123/10
591-78-6	2-Hexanone	80	79.9	100	82.0	103	3	71-145/12
87-68-3	Hexachlorobutadiene	20	22.2	111	19.9	100	11	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VR1562-BS	R40598.D	1	06/02/16	CV	n/a	n/a	VR1562
VR1562-BSD	R40599.D	1	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.0	95	18.9	95	1	77-125/10
99-87-6	p-Isopropyltoluene	20	17.2	86	16.7	84	3	76-126/10
74-83-9	Methyl bromide	20	21.2	106	17.2	86	21* b	65-124/13
74-87-3	Methyl chloride	20	11.0	55	7.9	40* c	33* d	47-143/20
74-95-3	Methylene bromide	20	20.2	101	19.7	99	3	80-125/10
75-09-2	Methylene chloride	20	21.3	107	17.6	88	19* b	65-124/15
91-20-3	Naphthalene	20	20.5	103	19.3	97	6	66-120/12
103-65-1	n-Propylbenzene	20	19.2	96	18.7	94	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	19.6	98	19.3	97	2	79-126/10
71-55-6	1,1,1-Trichloroethane	20	20.6	103	19.3	97	7	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	21.1	106	21.4	107	1	78-127/10
79-00-5	1,1,2-Trichloroethane	20	18.3	92	18.4	92	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	22.2	111	21.0	105	6	70-128/12
96-18-4	1,2,3-Trichloropropane	20	20.4	102	20.7	104	1	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	19.5	98	18.1	91	7	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.5	98	19.5	98	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	20.1	101	19.6	98	3	79-130/10
127-18-4	Tetrachloroethylene	20	16.9	85	16.6	83	2	72-124/13
108-88-3	Toluene	20	18.3	92	18.1	91	1	78-121/10
79-01-6	Trichloroethylene	20	19.2	96	18.5	93	4	75-119/10
75-69-4	Trichlorofluoromethane	20	21.5	108	18.0	90	18	68-130/19
75-01-4	Vinyl chloride	20	23.4	117	15.3	77	42* b	57-137/18
1330-20-7	Xylene (total)	60	54.8	91	55.1	92	1	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	105%	100%	80-123%
2037-26-5	Toluene-D8	95%	95%	88-112%
460-00-4	4-Bromofluorobenzene	102%	101%	79-114%

(a) Outside laboratory control limits (high bias); not detected in associated samples. AZ:L1
(b) RPD exceeded laboratory acceptance limit; BS/BSD recoveries met acceptance criteria. AZ:R7
(c) Outside laboratory control limits; but within marginal exceedance criteria. AZ:L2
(d) Outside laboratory control limits. AZ:R9

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1378-BS	V33472.D	1	06/06/16	KZ	n/a	n/a	VV1378
VV1378-BSD	V33473.D	1	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	18.5	93	20.0	100	8	76-120/10
108-86-1	Bromobenzene	20	18.3	92	20.1	101	9	80-123/10
74-97-5	Bromochloromethane	20	19.5	98	21.0	105	7	79-124/10
75-27-4	Bromodichloromethane	20	18.7	94	20.1	101	7	75-121/10
75-25-2	Bromoform	20	16.9	85	18.3	92	8	62-127/10
104-51-8	n-Butylbenzene	20	17.6	88	19.0	95	8	74-129/10
135-98-8	sec-Butylbenzene	20	17.8	89	19.3	97	8	75-128/11
98-06-6	tert-Butylbenzene	20	17.7	89	19.3	97	9	74-127/11
108-90-7	Chlorobenzene	20	18.2	91	19.8	99	8	79-119/10
75-00-3	Chloroethane	20	17.7	89	19.2	96	8	60-115/14
67-66-3	Chloroform	20	18.5	93	20.1	101	8	75-122/10
95-49-8	o-Chlorotoluene	20	17.9	90	19.6	98	9	76-125/12
106-43-4	p-Chlorotoluene	20	18.7	94	20.5	103	9	76-126/11
75-15-0	Carbon disulfide	20	17.2	86	18.4	92	7	51-130/13
56-23-5	Carbon tetrachloride	20	18.9	95	20.2	101	7	72-128/13
75-34-3	1,1-Dichloroethane	20	18.6	93	20.2	101	8	70-121/10
75-35-4	1,1-Dichloroethylene	20	18.5	93	19.8	99	7	62-125/13
563-58-6	1,1-Dichloropropene	20	18.1	91	19.3	97	6	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	17.3	87	19.0	95	9	64-129/11
106-93-4	1,2-Dibromoethane	20	18.5	93	20.0	100	8	81-124/10
107-06-2	1,2-Dichloroethane	20	18.7	94	20.1	101	7	74-122/10
78-87-5	1,2-Dichloropropane	20	18.9	95	20.6	103	9	75-123/10
142-28-9	1,3-Dichloropropane	20	18.8	94	20.4	102	8	81-127/11
594-20-7	2,2-Dichloropropane	20	18.6	93	19.7	99	6	66-130/12
124-48-1	Dibromochloromethane	20	18.8	94	20.7	104	10	76-124/10
75-71-8	Dichlorodifluoromethane	20	15.0	75	15.5	78	3	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	19.7	99	21.5	108	9	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	20.0	100	21.7	109	8	76-131/10
541-73-1	m-Dichlorobenzene	20	17.9	90	19.6	98	9	79-121/10
95-50-1	o-Dichlorobenzene	20	18.1	91	19.9	100	9	79-120/10
106-46-7	p-Dichlorobenzene	20	18.1	91	19.7	99	8	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	17.5	88	18.9	95	8	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	18.5	93	20.0	100	8	73-125/10
100-41-4	Ethylbenzene	20	18.3	92	19.8	99	8	78-123/10
591-78-6	2-Hexanone	80	76.0	95	81.1	101	6	71-145/12
87-68-3	Hexachlorobutadiene	20	17.7	89	19.5	98	10	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VV1378-BS	V33472.D	1	06/06/16	KZ	n/a	n/a	VV1378
VV1378-BSD	V33473.D	1	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	18.0	90	19.6	98	9	77-125/10
99-87-6	p-Isopropyltoluene	20	18.0	90	19.5	98	8	76-126/10
74-83-9	Methyl bromide	20	16.4	82	18.2	91	10	65-124/13
74-87-3	Methyl chloride	20	17.1	86	18.3	92	7	47-143/20
74-95-3	Methylene bromide	20	19.5	98	20.9	105	7	80-125/10
75-09-2	Methylene chloride	20	18.2	91	19.7	99	8	65-124/15
91-20-3	Naphthalene	20	18.3	92	20.2	101	10	66-120/12
103-65-1	n-Propylbenzene	20	17.5	88	19.0	95	8	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	18.6	93	20.5	103	10	79-126/10
71-55-6	1,1,1-Trichloroethane	20	18.9	95	20.4	102	8	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	18.8	94	20.1	101	7	78-127/10
79-00-5	1,1,2-Trichloroethane	20	18.4	92	20.0	100	8	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	17.6	88	19.5	98	10	70-128/12
96-18-4	1,2,3-Trichloropropane	20	18.9	95	20.6	103	9	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	17.7	89	19.6	98	10	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	17.9	90	19.4	97	8	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	18.1	91	19.7	99	8	79-130/10
127-18-4	Tetrachloroethylene	20	18.2	91	19.7	99	8	72-124/13
108-88-3	Toluene	20	18.1	91	19.8	99	9	78-121/10
79-01-6	Trichloroethylene	20	18.8	94	19.9	100	6	75-119/10
75-69-4	Trichlorofluoromethane	20	17.9	90	19.2	96	7	68-130/19
75-01-4	Vinyl chloride	20	17.4	87	18.4	92	6	57-137/18
1330-20-7	Xylene (total)	60	54.7	91	59.4	99	8	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	101%	100%	80-123%
2037-26-5	Toluene-D8	97%	98%	88-112%
460-00-4	4-Bromofluorobenzene	98%	100%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45969-1MS	R40620.D	50	06/02/16	CV	n/a	n/a	VR1562
C45969-1MSD	R40621.D	50	06/02/16	CV	n/a	n/a	VR1562
C45969-1 [a]	R40618.D	50	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	C45969-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		1000	1090	109	1000	1060	106	3	76-120/10
108-86-1	Bromobenzene	ND		1000	1030	103	1000	1010	101	2	80-123/10
74-97-5	Bromochloromethane	ND		1000	1210	121	1000	1120	112	8	79-124/10
75-27-4	Bromodichloromethane	ND		1000	901	90	1000	886	89	2	75-121/10
75-25-2	Bromoform	ND		1000	398	40* [b]	1000	404	40* [b]	1	62-127/10
104-51-8	n-Butylbenzene	ND		1000	873	87	1000	892	89	2	74-129/10
135-98-8	sec-Butylbenzene	ND		1000	960	96	1000	978	98	2	75-128/11
98-06-6	tert-Butylbenzene	ND		1000	937	94	1000	951	95	1	74-127/11
108-90-7	Chlorobenzene	ND		1000	1000	100	1000	976	98	2	79-119/10
75-00-3	Chloroethane	ND		1000	1230	123* [c]	1000	1160	116* [c]	6	60-115/14
67-66-3	Chloroform	ND		1000	1180	118	1000	1110	111	6	75-122/10
95-49-8	o-Chlorotoluene	ND		1000	1030	103	1000	1020	102	1	76-125/12
106-43-4	p-Chlorotoluene	ND		1000	1030	103	1000	1040	104	1	76-126/11
75-15-0	Carbon disulfide	35.9	J	1000	857	82	1000	833	80	3	51-130/13
56-23-5	Carbon tetrachloride	ND		1000	928	93	1000	940	94	1	72-128/13
75-34-3	1,1-Dichloroethane	ND		1000	1200	120	1000	1140	114	5	70-121/10
75-35-4	1,1-Dichloroethylene	ND		1000	947	95	1000	914	91	4	62-125/13
563-58-6	1,1-Dichloropropene	ND		1000	962	96	1000	975	98	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		1000	925	93	1000	953	95	3	64-129/11
106-93-4	1,2-Dibromoethane	ND		1000	1080	108	1000	1060	106	2	81-124/10
107-06-2	1,2-Dichloroethane	ND		1000	1120	112	1000	1110	111	1	74-122/10
78-87-5	1,2-Dichloropropane	ND		1000	1160	116	1000	1130	113	3	75-123/10
142-28-9	1,3-Dichloropropane	ND		1000	1130	113	1000	1110	111	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		1000	1090	109	1000	1050	105	4	66-130/12
124-48-1	Dibromochloromethane	ND		1000	562	56* [b]	1000	565	57* [b]	1	76-124/10
75-71-8	Dichlorodifluoromethane	ND		1000	1060	106	1000	856	86	21	26-163/26
156-59-2	cis-1,2-Dichloroethylene	14.0	J	1000	1180	117	1000	1100	109	7	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		1000	941	94	1000	959	96	2	76-131/10
541-73-1	m-Dichlorobenzene	ND		1000	1010	101	1000	996	100	1	79-121/10
95-50-1	o-Dichlorobenzene	ND		1000	1030	103	1000	1010	101	2	79-120/10
106-46-7	p-Dichlorobenzene	ND		1000	1000	100	1000	989	99	1	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		1000	991	99	1000	947	95	5	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		1000	811	81	1000	831	83	2	73-125/10
100-41-4	Ethylbenzene	ND		1000	1030	103	1000	1020	102	1	78-123/10
591-78-6	2-Hexanone	ND		4000	4830	121	4000	4880	122	1	71-145/12
87-68-3	Hexachlorobutadiene	ND		1000	878	88	1000	962	96	9	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45969-1MS	R40620.D	50	06/02/16	CV	n/a	n/a	VR1562
C45969-1MSD	R40621.D	50	06/02/16	CV	n/a	n/a	VR1562
C45969-1 [a]	R40618.D	50	06/02/16	CV	n/a	n/a	VR1562

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-11

CAS No.	Compound	C45969-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		1000	1000	100	1000	992	99	1	77-125/10
99-87-6	p-Isopropyltoluene	ND		1000	842	84	1000	854	85	1	76-126/10
74-83-9	Methyl bromide	ND		1000	1110	111	1000	1010	101	9	65-124/13
74-87-3	Methyl chloride	ND		1000	871	87	1000	674	67	26* [d]	47-143/20
74-95-3	Methylene bromide	ND		1000	1160	116	1000	1130	113	3	80-125/10
75-09-2	Methylene chloride	ND		1000	1120	112	1000	996	100	12	65-124/15
91-20-3	Naphthalene	ND		1000	913	91	1000	948	95	4	66-120/12
103-65-1	n-Propylbenzene	ND		1000	978	98	1000	987	99	1	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		1000	1040	104	1000	1020	102	2	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		1000	1110	111	1000	1070	107	4	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		1000	1160	116	1000	1150	115	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		1000	1100	110	1000	1070	107	3	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		1000	935	94	1000	1010	101	8	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		1000	1100	110	1000	1080	108	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		1000	805	81	1000	861	86	7	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		1000	1030	103	1000	1030	103	0	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		1000	1010	101	1000	1020	102	1	79-130/10
127-18-4	Tetrachloroethylene	ND		1000	884	88	1000	877	88	1	72-124/13
108-88-3	Toluene	ND		1000	1010	101	1000	990	99	2	78-121/10
79-01-6	Trichloroethylene	ND		1000	1000	100	1000	988	99	1	75-119/10
75-69-4	Trichlorofluoromethane	ND		1000	1090	109	1000	1060	106	3	68-130/19
75-01-4	Vinyl chloride	13.7	J	1000	1250	124	1000	1210	120	3	57-137/18
1330-20-7	Xylene (total)	ND		3000	3050	102	3000	2990	100	2	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45969-1	Limits
1868-53-7	Dibromofluoromethane	115%	109%	117%	80-123%
2037-26-5	Toluene-D8	95%	96%	95%	88-112%
460-00-4	4-Bromofluorobenzene	100%	100%	89%	79-114%

(a) Dilution required due to nature of sample matrix. Sample vial contained floating product and more than 0.5cm of sediment.
(b) Outside laboratory control limits. AZ:M2
(c) Outside laboratory control limits (high bias); not detected in associated samples. AZ:L1
(d) RPD exceeded laboratory acceptance limit; MS/MSD recoveries met acceptance criteria. AZ:R5

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45967-7MS	V33493.D	50	06/06/16	KZ	n/a	n/a	VV1378
C45967-7MSD	V33494.D	50	06/06/16	KZ	n/a	n/a	VV1378
C45967-7 [a]	V33483.D	50	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	C45967-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		1000	881	88	1000	880	88	0	76-120/10
108-86-1	Bromobenzene	ND		1000	861	86	1000	876	88	2	80-123/10
74-97-5	Bromochloromethane	ND		1000	931	93	1000	915	92	2	79-124/10
75-27-4	Bromodichloromethane	ND		1000	889	89	1000	885	89	0	75-121/10
75-25-2	Bromoform	ND		1000	722	72	1000	711	71	2	62-127/10
104-51-8	n-Butylbenzene	ND		1000	812	81	1000	825	83	2	74-129/10
135-98-8	sec-Butylbenzene	ND		1000	827	83	1000	845	85	2	75-128/11
98-06-6	tert-Butylbenzene	ND		1000	823	82	1000	842	84	2	74-127/11
108-90-7	Chlorobenzene	ND		1000	867	87	1000	866	87	0	79-119/10
75-00-3	Chloroethane	ND		1000	854	85	1000	856	86	0	60-115/14
67-66-3	Chloroform	ND		1000	904	90	1000	888	89	2	75-122/10
95-49-8	o-Chlorotoluene	ND		1000	847	85	1000	871	87	3	76-125/12
106-43-4	p-Chlorotoluene	ND		1000	887	89	1000	899	90	1	76-126/11
75-15-0	Carbon disulfide	ND		1000	808	81	1000	791	79	2	51-130/13
56-23-5	Carbon tetrachloride	ND		1000	866	87	1000	888	89	3	72-128/13
75-34-3	1,1-Dichloroethane	ND		1000	914	91	1000	888	89	3	70-121/10
75-35-4	1,1-Dichloroethylene	212		1000	1040	83	1000	1050	84	1	62-125/13
563-58-6	1,1-Dichloropropene	ND		1000	832	83	1000	845	85	2	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		1000	812	81	1000	808	81	0	64-129/11
106-93-4	1,2-Dibromoethane	ND		1000	875	88	1000	872	87	0	81-124/10
107-06-2	1,2-Dichloroethane	ND		1000	921	92	1000	902	90	2	74-122/10
78-87-5	1,2-Dichloropropane	ND		1000	913	91	1000	902	90	1	75-123/10
142-28-9	1,3-Dichloropropane	ND		1000	917	92	1000	898	90	2	81-127/11
594-20-7	2,2-Dichloropropane	ND		1000	787	79	1000	763	76	3	66-130/12
124-48-1	Dibromochloromethane	ND		1000	873	87	1000	865	87	1	76-124/10
75-71-8	Dichlorodifluoromethane	ND		1000	494	49	1000	579	58	16	26-163/26
156-59-2	cis-1,2-Dichloroethylene	ND		1000	945	95	1000	927	93	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		1000	924	92	1000	915	92	1	76-131/10
541-73-1	m-Dichlorobenzene	ND		1000	842	84	1000	858	86	2	79-121/10
95-50-1	o-Dichlorobenzene	ND		1000	848	85	1000	870	87	3	79-120/10
106-46-7	p-Dichlorobenzene	ND		1000	849	85	1000	862	86	2	79-120/10
156-60-5	trans-1,2-Dichloroethylene	ND		1000	834	83	1000	820	82	2	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		1000	860	86	1000	851	85	1	73-125/10
100-41-4	Ethylbenzene	ND		1000	876	88	1000	869	87	1	78-123/10
591-78-6	2-Hexanone	ND		4000	3710	93	4000	3620	91	2	71-145/12
87-68-3	Hexachlorobutadiene	ND		1000	794	79	1000	813	81	2	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C45947
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45967-7MS	V33493.D	50	06/06/16	KZ	n/a	n/a	VV1378
C45967-7MSD	V33494.D	50	06/06/16	KZ	n/a	n/a	VV1378
C45967-7 [a]	V33483.D	50	06/06/16	KZ	n/a	n/a	VV1378

The QC reported here applies to the following samples: **Method:** SW846 8260B

C45947-9, C45947-10

CAS No.	Compound	C45967-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		1000	861	86	1000	860	86	0	77-125/10
99-87-6	p-Isopropyltoluene	ND		1000	831	83	1000	849	85	2	76-126/10
74-83-9	Methyl bromide	ND		1000	810	81	1000	807	81	0	65-124/13
74-87-3	Methyl chloride	ND		1000	836	84	1000	843	84	1	47-143/20
74-95-3	Methylene bromide	ND		1000	930	93	1000	918	92	1	80-125/10
75-09-2	Methylene chloride	ND		1000	881	88	1000	863	86	2	65-124/15
91-20-3	Naphthalene	ND		1000	859	86	1000	885	89	3	66-120/12
103-65-1	n-Propylbenzene	ND		1000	817	82	1000	836	84	2	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		1000	893	89	1000	882	88	1	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		1000	901	90	1000	895	90	1	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		1000	885	89	1000	891	89	1	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		1000	893	89	1000	877	88	2	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		1000	810	81	1000	844	84	4	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		1000	916	92	1000	902	90	2	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		1000	822	82	1000	842	84	2	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		1000	837	84	1000	852	85	2	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		1000	846	85	1000	863	86	2	79-130/10
127-18-4	Tetrachloroethylene	ND		1000	835	84	1000	831	83	0	72-124/13
108-88-3	Toluene	ND		1000	859	86	1000	862	86	0	78-121/10
79-01-6	Trichloroethylene	2800		1000	3480	68* [b]	1000	3590	79	3	75-119/10
75-69-4	Trichlorofluoromethane	ND		1000	642	64* [c]	1000	750	75	16	68-130/19
75-01-4	Vinyl chloride	ND		1000	758	76	1000	809	81	7	57-137/18
1330-20-7	Xylene (total)	ND		3000	2600	87	3000	2580	86	1	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45967-7	Limits
1868-53-7	Dibromofluoromethane	104%	101%	101%	80-123%
2037-26-5	Toluene-D8	98%	97%	99%	88-112%
460-00-4	4-Bromofluorobenzene	100%	99%	100%	79-114%

(a) AZ:D2
(b) Outside control limits due to high level in sample relative to spike amount. AZ:M3
(c) Outside control limits due to matrix interference. AZ:M2

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/26/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5		
Barium	200	.2	.5		
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3		
Calcium	5000	28	69		
Chromium	10	.4	.6		
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	6.5	<200
Lead	10	1	1.7		
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.20	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3		
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5		
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11386: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10, C45947-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/26/16

Metal	C45950-2 Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper	anr				
Iron	296	11900	12500	92.8	75-125
Lead					
Magnesium					
Manganese	146	618	500	94.4	75-125
Molybdenum					
Nickel					
Potassium					
Selenium					
Silicon					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP11386: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10, C45947-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/26/16

Metal	C45950-2 Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper	anr					
Iron	296	11900	12500	92.8	0.0	20
Lead						
Magnesium						
Manganese	146	612	500	93.2	1.0	20
Molybdenum						
Nickel						
Potassium						
Selenium						
Silicon						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP11386: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10, C45947-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11386 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/26/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper	anr			
Iron	12100	12500	96.8	80-120
Lead				
Magnesium				
Manganese	499	500	99.8	80-120
Molybdenum				
Nickel				
Potassium				
Selenium				
Silicon				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11386: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10, C45947-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11386
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 05/26/16

Metal	C45950-2 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper	anr			
Iron	296	415	40.3*(a)	0-10
Lead				
Magnesium				
Manganese	146	207	42.5*(a)	0-10
Molybdenum				
Nickel				
Potassium				
Selenium				
Silicon				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11386: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10, C45947-12

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11393 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/27/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.02	-0.033	<0.20

Associated samples MP11393: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11393 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/27/16

Metal	C45947-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.64	2.0	2	68.0N(a)	75-125

Associated samples MP11393: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference. AZ:M2

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11393 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 05/27/16

Metal	C45947-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.64	2.0	2	68.0N(a)	0.0	30

Associated samples MP11393: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference. AZ:M2

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C45947
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11393
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 05/27/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.0	2	100.0	85-115

Associated samples MP11393: C45947-1, C45947-2, C45947-3, C45947-4, C45947-5, C45947-6, C45947-7, C45947-8, C45947-9, C45947-10

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

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Automated Report

Technical Report for

AMEC Foster Wheeler

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

1420152042.02.6004

SGS Accutest Job Number: C46016

Sampling Date: 05/27/16

Report to:

AMEC Foster Wheeler
4600 E. Washington Street Suite 600
Phoenix, AZ 85034
alex.yiannakakis@amecfw.com; emily.corkery@amecfw.com

ATTN: Alex Yiannakakis

Total number of pages in report: 45

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

James J. Rhudy
Lab Director

Client Service contact: Elvin Kumar 408-588-0200

Certifications: CA (ELAP 2910) AK (UST-092) AZ (AZ0762) NV (CA00150) OR (CA300006) WA (C925) DoD ELAP (L-A-B L2242)

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SGS Accutest

Sample Summary

AMEC Foster Wheeler

Job No: C46016

Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Project No: 1420152042.02.6004

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
C46016-1	05/27/16	11:15	CAM	06/01/16	AQ	Ground Water	BP-26-333-GW
C46016-2	05/27/16	11:25	CAM	06/01/16	AQ	Ground Water	BP-27-333-GW
C46016-3	05/27/16	11:20	CAM	06/01/16	AQ	Ground Water	BP-28-333-GW
C46016-4	05/27/16	09:05	CAM	06/01/16	AQ	Ground Water	BP-29-370-GW
C46016-5	05/27/16	09:42	CAM	06/01/16	AQ	Ground Water	WR-274A-341-GW
C46016-6	05/27/16	00:00	CAM	06/01/16	AQ	Trip Blank Water	TRIP BLANK

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client:	AMEC Foster Wheeler	**Job No**	C46016
Site:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ	**Report Date**	6/11/2016 2:00:41 AM

5 Sample(s), 1 Trip Blank(s) and 0 Field Blank(s) were collected on 05/27/2016 and were received at Accutest on 06/01/2016 properly preserved, at 5.3 Deg. C and intact. These Samples received an Accutest job number of C46016. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Volatiles by GCMS By Method SW846 8260B

Matrix: AQ **Batch ID:** VN1506

- Sample(s) C45972-2MS, C45972-2MSD were used as the QC samples indicated.
- C46016-1, C46016-2, C46016-3, C46016-4, C46016-5: (pH=7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Metals By Method SW846 6010B

Matrix: AQ **Batch ID:** MP11427

- Sample(s) C45960-9FMS, C45960-9FMSD, C45960-9FSDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Arsenic, Cadmium, Chromium, Selenium are outside control limits for sample MP11427-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- RPD(s) for Serial Dilution for Barium, Iron, Manganese are outside control limits for sample MP11427-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 7470A

Matrix: AQ **Batch ID:** MP11423

- Sample(s) C45996-1MS, C45996-1MSD were used as the QC samples for metals.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data QualityObjectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used

Summary of Hits

Job Number: C46016
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/27/16

3

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C46016-1	**BP-26-333-GW**					
Benzene [a]		0.32 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.22 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.84	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		0.58	0.50	0.30	ug/l	SW846 8260B
Barium		322	200		ug/l	SW846 6010B
Chromium		20.6	10		ug/l	SW846 6010B
Iron		474	200		ug/l	SW846 6010B
Manganese		21900	15		ug/l	SW846 6010B
Mercury		0.48	0.20		ug/l	SW846 7470A
C46016-2	**BP-27-333-GW**					
Benzene [a]		0.54 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.21 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.56	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.77	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.50	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		5.6	0.50	0.30	ug/l	SW846 8260B
Barium		531	200		ug/l	SW846 6010B
Chromium		23.0	10		ug/l	SW846 6010B
Iron		1090	200		ug/l	SW846 6010B
Manganese		18500	15		ug/l	SW846 6010B
Mercury		0.78	0.20		ug/l	SW846 7470A
C46016-3	**BP-28-333-GW**					
Benzene [a]		0.36 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.22 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [a]		0.35 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		0.95	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		4.6	0.50	0.30	ug/l	SW846 8260B
Barium		308	200		ug/l	SW846 6010B
Chromium		15.1	10		ug/l	SW846 6010B
Manganese		15100	15		ug/l	SW846 6010B
Mercury		0.22	0.20		ug/l	SW846 7470A
C46016-4	**BP-29-370-GW**					
Benzene [a]		0.52 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.66 J	1.0	0.20	ug/l	SW846 8260B

Summary of Hits

Job Number: C46016
Account: AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ
Collected: 05/27/16

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
1,2-Dichloropropane [a]		0.43 J	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		4.6	0.50	0.20	ug/l	SW846 8260B
cis-1,2-Dichloroethylene [b]		6.1	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		0.67	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		45.8	0.50	0.30	ug/l	SW846 8260B
Trichloroethylene [b]		7.6	0.50	0.20	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Barium		314	200		ug/l	SW846 6010B
Chromium		12.9	10		ug/l	SW846 6010B
Manganese		11100	15		ug/l	SW846 6010B
Mercury		0.23	0.20		ug/l	SW846 7470A
C46016-5	**WR-274A-341-GW**					
Benzene [a]		0.77 J	1.0	0.20	ug/l	SW846 8260B
Chloroform [a]		0.40 J	0.50	0.20	ug/l	SW846 8260B
Carbon disulfide [a]		0.29 J	1.0	0.20	ug/l	SW846 8260B
1,1-Dichloroethane [a]		0.30 J	0.50	0.20	ug/l	SW846 8260B
1,2-Dichloropropane [b]		0.75	0.50	0.20	ug/l	SW846 8260B
Dichlorodifluoromethane [b]		1.7	0.50	0.20	ug/l	SW846 8260B
p-Dichlorobenzene [b]		1.1	0.50	0.20	ug/l	SW846 8260B
Tetrachloroethylene [b]		1.5	0.50	0.30	ug/l	SW846 8260B
Trichlorofluoromethane [a]		0.27 J	0.50	0.20	ug/l	SW846 8260B
Barium		304	200		ug/l	SW846 6010B
Chromium		23.4	10		ug/l	SW846 6010B
Manganese		15400	15		ug/l	SW846 6010B
Mercury		0.83	0.20		ug/l	SW846 7470A

C46016-6 **TRIP BLANK**

No hits reported in this sample.

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time. AZ:E4
(b) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C46016-1	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	N56259.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.32	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.22	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.35	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.84	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C46016-1	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	0.58	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-26-333-GW		
Lab Sample ID:	C46016-1	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	322	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	20.6	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	474	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	21900	15	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.48	0.20	ug/l	1	06/02/16	06/03/16	EB	SW846 7470A [1]	SW846 7470A [3]
Selenium	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5919
(2) Instrument QC Batch: MA5922
(3) Prep QC Batch: MP11423
(4) Prep QC Batch: MP11427

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C46016-2	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	N56260.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.54	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.30	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.21	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.56	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.77	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.50	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C46016-2	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	5.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%		80-123%
2037-26-5	Toluene-D8	100%		88-112%
460-00-4	4-Bromofluorobenzene	97%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-27-333-GW		
Lab Sample ID:	C46016-2	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	531	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	23.0	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	1090	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	18500	15	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.78	0.20	ug/l	1	06/02/16	06/03/16	EB	SW846 7470A [1]	SW846 7470A [3]
Selenium	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5919
(2) Instrument QC Batch: MA5922
(3) Prep QC Batch: MP11423
(4) Prep QC Batch: MP11427

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C46016-3	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	N56261.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.36	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.22	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.35	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	0.95	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C46016-3	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	4.6	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-28-333-GW		
Lab Sample ID:	C46016-3	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	308	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	15.1	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	< 200	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	15100	15	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.22	0.20	ug/l	1	06/02/16	06/03/16	EB	SW846 7470A [1]	SW846 7470A [3]
Selenium	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5919
(2) Instrument QC Batch: MA5922
(3) Prep QC Batch: MP11423
(4) Prep QC Batch: MP11427

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C46016-4	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	N56262.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.52	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.27	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.66	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane [b]	0.43	0.50	0.20	ug/l	J
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	4.6	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	6.1	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	0.67	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C46016-4	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	45.8	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	7.6	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.40	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	97%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BP-29-370-GW		
Lab Sample ID:	C46016-4	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	314	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	12.9	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	< 200	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	11100	15	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.23	0.20	ug/l	1	06/02/16	06/03/16	EB	SW846 7470A [1]	SW846 7470A [3]
Selenium	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5919
(2) Instrument QC Batch: MA5922
(3) Prep QC Batch: MP11423
(4) Prep QC Batch: MP11427

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C46016-5	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	N56263.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene [b]	0.77	1.0	0.20	ug/l	J
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform [b]	0.40	0.50	0.20	ug/l	J
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide [b]	0.29	1.0	0.20	ug/l	J
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane [b]	0.30	0.50	0.20	ug/l	J
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	0.75	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	1.7	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	1.1	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C46016-5	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	1.5	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane [b]	0.27	0.50	0.20	ug/l	J
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		80-123%
2037-26-5	Toluene-D8	99%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

(a) (pH= 7) Sample pH did not satisfy field preservation criteria. Sample was not analyzed within 7 day holding time.
(b) AZ:E4

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WR-274A-341-GW		
Lab Sample ID:	C46016-5	**Date Sampled:**	05/27/16
Matrix:	AQ - Ground Water	**Date Received:**	06/01/16
		Percent Solids:	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Barium	304	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 2.0	2.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Chromium	23.4	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Iron	< 200	200	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Lead	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Manganese	15400	15	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Mercury	0.83	0.20	ug/l	1	06/02/16	06/03/16	EB	SW846 7470A [1]	SW846 7470A [3]
Selenium	< 10	10	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]
Silver	< 5.0	5.0	ug/l	1	06/06/16	06/06/16	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA5919
(2) Instrument QC Batch: MA5922
(3) Prep QC Batch: MP11423
(4) Prep QC Batch: MP11427

RL = Reporting Limit

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C46016-6	**Date Sampled:**	05/27/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	N56264.D	1	06/09/16	MV	n/a	n/a	VN1506
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.20	ug/l	
75-25-2	Bromoform	ND	0.50	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.20	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	0.50	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	0.50	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	0.50	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	0.50	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.20	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	C46016-6	**Date Sampled:**	05/27/16
Matrix:	AQ - Trip Blank Water	**Date Received:**	06/01/16
Method:	SW846 8260B	**Percent Solids:**	n/a
Project:	Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ		

VOA 8260 Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	5.0	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
75-01-4	Vinyl chloride	ND	0.50	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	97%		80-123%
2037-26-5	Toluene-D8	100%		88-112%
460-00-4	4-Bromofluorobenzene	96%		79-114%

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Arizona Qualifiers
- Chain of Custody

Arizona Qualifiers

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

The following Arizona qualifiers have been applied to data and/or QC in this report.

Qual	Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL).

PHOENIX ACCUTEST® LABORATORIES

CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking # 7833 4792 9757
Accutest Quote #
Bottle Order Control #
Accutest NC Job #: C C46016

Client / Reporting Information

Company Name: AMEC FW
Address:
City: PHOENIX State: AZ Zip:
Project Contact: ALEX V.
Phone #: 520-247-8736
Sampler's Name: CHUCK MASON

Project Information

Project Name: BP ISCO
Street:
City: TUCSON State: AZ
Project #: 1420152042.02.6004
EMAIL:
Client Purchase Order #:

Requested Analysis: 8260B (6010), RCRA + TOTAL FE + M2, 7470-MERCURY

Matrix Codes: WW- Wastewater; GW- Ground Water; SW- Surface Water; SO- Soil; OI-Oil; WP-Wipe; LIQ - Non-aqueous Liquid; AIR; DW- Drinking Water (Perchlorate Only)

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NaHSO4	MEOH	ENCORE	8260B (6010)	RCRA + TOTAL FE + M2	7470-MERCURY	LAB USE ONLY
1	BP-26-333-GW	5/27/16	1115	CAM	W	4			1	3				X	X	X	
2	BP-27-333-GW		1125			4			1	3				X	X	X	11:40
3	BP-28-333-GW		1120			4			1	3				X	X	X	
4	BP-29-370-GW		0905			4			1	3				X	X	X	
	~~BP-29-370-GW~~		1140			~~4~~											
5	WR-274A-341-GW		0942			4			1	3				X	X	X	
6	TRIP BLANK					2				2				X			

Turnaround Time (Business days): Approved By / Date:
- [X] 10 Day
- [ ] 5 Day
- [ ] 3 Day
- [ ] 2 Day
- [ ] 1 Day
- [ ] Same Day

Emergency T/A data available VIA Lablink

Data Deliverable Information
- [ ] Commercial "A" - Results only
- [ ] Commercial "B" - Results with QC summaries
- [ ] Commerical "B+" - Results, QC, and chromatograms
- [ ] FULT1 - Level 4 data package
- [ ] EDF for Geotracker [ ] EDD Format
- Provide EDF Global ID
- Provide EDF Logcode:

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	5/31/16 10:15	1	2	5/31/16 1630	2 Fedex
Relinquished by: FedEx	Date Time: 6/1/16 1015	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal # INTACT	Appropriate Bottle / Pres. Y / N; Labels match Coc? Y / N	Headspace Y / N; Separate Receiving Check List used: Y / N; On Ice Y / N; Cooler Temp. 4.3/5.3

V3

C46016: Chain of Custody
Page 1 of 2

SGS Accutest Sample Receipt Summary

Job Number: C46016 **Client:** AMEC FW **Project:** BP ISCO

Date / Time Received: 6/1/2016 10:15:00 AM **Delivery Method:** FedEx **Airbill #'s:** 783247929757

Cooler Temps (Initial/Adjusted): #1: (4.3/5.3);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Therm ID:	IR3;		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☑		☐	☐
2. Trip Blank listed on COC:	☑		☐	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Comments

5.2

5

C46016: Chain of Custody

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GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VN1506-MB	N56248.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.20	ug/l	
108-86-1	Bromobenzene	ND	1.0	0.20	ug/l	
74-97-5	Bromochloromethane	ND	1.0	0.20	ug/l	
75-27-4	Bromodichloromethane	ND	1.0	0.20	ug/l	
75-25-2	Bromoform	ND	1.0	0.22	ug/l	
104-51-8	n-Butylbenzene	ND	2.0	0.20	ug/l	
135-98-8	sec-Butylbenzene	ND	2.0	0.20	ug/l	
98-06-6	tert-Butylbenzene	ND	2.0	0.28	ug/l	
108-90-7	Chlorobenzene	ND	1.0	0.20	ug/l	
75-00-3	Chloroethane	ND	1.0	0.20	ug/l	
67-66-3	Chloroform	ND	1.0	0.20	ug/l	
95-49-8	o-Chlorotoluene	ND	2.0	0.20	ug/l	
106-43-4	p-Chlorotoluene	ND	2.0	0.26	ug/l	
75-15-0	Carbon disulfide	ND	1.0	0.20	ug/l	
56-23-5	Carbon tetrachloride	ND	1.0	0.20	ug/l	
75-34-3	1,1-Dichloroethane	ND	1.0	0.20	ug/l	
75-35-4	1,1-Dichloroethylene	ND	1.0	0.20	ug/l	
563-58-6	1,1-Dichloropropene	ND	1.0	0.20	ug/l	
96-12-8	1,2-Dibromo-3-chloropropane	ND	2.0	0.40	ug/l	
106-93-4	1,2-Dibromoethane	ND	1.0	0.20	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.20	ug/l	
78-87-5	1,2-Dichloropropane	ND	1.0	0.20	ug/l	
142-28-9	1,3-Dichloropropane	ND	1.0	0.20	ug/l	
594-20-7	2,2-Dichloropropane	ND	1.0	0.20	ug/l	
124-48-1	Dibromochloromethane	ND	1.0	0.20	ug/l	
75-71-8	Dichlorodifluoromethane	ND	1.0	0.20	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	0.20	ug/l	
541-73-1	m-Dichlorobenzene	ND	1.0	0.20	ug/l	
95-50-1	o-Dichlorobenzene	ND	1.0	0.20	ug/l	
106-46-7	p-Dichlorobenzene	ND	1.0	0.20	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	1.0	0.20	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	0.30	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.20	ug/l	
591-78-6	2-Hexanone	ND	10	2.0	ug/l	
87-68-3	Hexachlorobutadiene	ND	2.0	0.20	ug/l	

Method Blank Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VN1506-MB	N56248.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	Result	RL	MDL	Units	Q
98-82-8	Isopropylbenzene	ND	1.0	0.20	ug/l	
99-87-6	p-Isopropyltoluene	ND	2.0	0.20	ug/l	
74-83-9	Methyl bromide	ND	2.0	0.20	ug/l	
74-87-3	Methyl chloride	ND	1.0	0.30	ug/l	
74-95-3	Methylene bromide	ND	1.0	0.20	ug/l	
75-09-2	Methylene chloride	ND	10	2.0	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
103-65-1	n-Propylbenzene	ND	2.0	0.20	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	1.0	0.30	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	1.0	0.20	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	0.20	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	1.0	0.22	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	2.0	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	2.0	0.20	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	2.0	0.20	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.20	ug/l	
127-18-4	Tetrachloroethylene	ND	1.0	0.30	ug/l	
108-88-3	Toluene	ND	1.0	0.20	ug/l	
79-01-6	Trichloroethylene	ND	1.0	0.20	ug/l	
75-69-4	Trichlorofluoromethane	ND	1.0	0.20	ug/l	
75-01-4	Vinyl chloride	ND	1.0	0.20	ug/l	
1330-20-7	Xylene (total)	ND	2.0	0.46	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	98%	80-123%
2037-26-5	Toluene-D8	100%	88-112%
460-00-4	4-Bromofluorobenzene	96%	79-114%

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VN1506-BS	N56245.D	1	06/09/16	MV	n/a	n/a	VN1506
VN1506-BSD	N56246.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	20	19.3	97	19.5	98	1	76-120/10
108-86-1	Bromobenzene	20	19.1	96	19.6	98	3	80-123/10
74-97-5	Bromochloromethane	20	20.0	100	20.3	102	1	79-124/10
75-27-4	Bromodichloromethane	20	19.9	100	19.9	100	0	75-121/10
75-25-2	Bromoform	20	17.7	89	17.8	89	1	62-127/10
104-51-8	n-Butylbenzene	20	19.3	97	19.8	99	3	74-129/10
135-98-8	sec-Butylbenzene	20	19.6	98	20.1	101	3	75-128/11
98-06-6	tert-Butylbenzene	20	19.1	96	19.7	99	3	74-127/11
108-90-7	Chlorobenzene	20	19.1	96	19.4	97	2	79-119/10
75-00-3	Chloroethane	20	18.4	92	19.2	96	4	60-115/14
67-66-3	Chloroform	20	19.1	96	19.5	98	2	75-122/10
95-49-8	o-Chlorotoluene	20	18.2	91	18.9	95	4	76-125/12
106-43-4	p-Chlorotoluene	20	19.6	98	20.1	101	3	76-126/11
75-15-0	Carbon disulfide	20	18.0	90	19.2	96	6	51-130/13
56-23-5	Carbon tetrachloride	20	21.0	105	20.9	105	0	72-128/13
75-34-3	1,1-Dichloroethane	20	19.3	97	19.8	99	3	70-121/10
75-35-4	1,1-Dichloroethylene	20	18.7	94	20.1	101	7	62-125/13
563-58-6	1,1-Dichloropropene	20	19.5	98	19.7	99	1	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	20	19.3	97	19.2	96	1	64-129/11
106-93-4	1,2-Dibromoethane	20	19.7	99	19.9	100	1	81-124/10
107-06-2	1,2-Dichloroethane	20	19.6	98	19.5	98	1	74-122/10
78-87-5	1,2-Dichloropropane	20	20.0	100	20.2	101	1	75-123/10
142-28-9	1,3-Dichloropropane	20	19.9	100	20.4	102	2	81-127/11
594-20-7	2,2-Dichloropropane	20	19.3	97	19.6	98	2	66-130/12
124-48-1	Dibromochloromethane	20	20.7	104	20.8	104	0	76-124/10
75-71-8	Dichlorodifluoromethane	20	18.2	91	18.9	95	4	26-163/26
156-59-2	cis-1,2-Dichloroethylene	20	20.1	101	20.6	103	2	75-128/10
10061-01-5	cis-1,3-Dichloropropene	20	21.1	106	21.2	106	0	76-131/10
541-73-1	m-Dichlorobenzene	20	19.0	95	19.5	98	3	79-121/10
95-50-1	o-Dichlorobenzene	20	19.0	95	19.4	97	2	79-120/10
106-46-7	p-Dichlorobenzene	20	19.1	96	19.6	98	3	79-120/10
156-60-5	trans-1,2-Dichloroethylene	20	17.5	88	18.0	90	3	67-116/11
10061-02-6	trans-1,3-Dichloropropene	20	19.6	98	19.8	99	1	73-125/10
100-41-4	Ethylbenzene	20	19.7	99	19.9	100	1	78-123/10
591-78-6	2-Hexanone	80	89.8	112	90.3	113	1	71-145/12
87-68-3	Hexachlorobutadiene	20	19.5	98	19.5	98	0	70-130/12

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VN1506-BS	N56245.D	1	06/09/16	MV	n/a	n/a	VN1506
VN1506-BSD	N56246.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	20	19.7	99	19.9	100	1	77-125/10
99-87-6	p-Isopropyltoluene	20	19.6	98	20.2	101	3	76-126/10
74-83-9	Methyl bromide	20	17.2	86	17.6	88	2	65-124/13
74-87-3	Methyl chloride	20	17.6	88	17.9	90	2	47-143/20
74-95-3	Methylene bromide	20	20.4	102	20.4	102	0	80-125/10
75-09-2	Methylene chloride	20	19.1	96	20.3	102	6	65-124/15
91-20-3	Naphthalene	20	20.1	101	20.3	102	1	66-120/12
103-65-1	n-Propylbenzene	20	19.1	96	19.7	99	3	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	20	19.7	99	20.0	100	2	79-126/10
71-55-6	1,1,1-Trichloroethane	20	19.4	97	20.3	102	5	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	20	19.8	99	20.3	102	2	78-127/10
79-00-5	1,1,2-Trichloroethane	20	19.5	98	19.7	99	1	79-122/10
87-61-6	1,2,3-Trichlorobenzene	20	18.9	95	19.1	96	1	70-128/12
96-18-4	1,2,3-Trichloropropane	20	19.8	99	19.8	99	0	66-127/10
120-82-1	1,2,4-Trichlorobenzene	20	19.1	96	19.3	97	1	72-125/11
95-63-6	1,2,4-Trimethylbenzene	20	19.2	96	19.7	99	3	76-124/10
108-67-8	1,3,5-Trimethylbenzene	20	19.5	98	20.1	101	3	79-130/10
127-18-4	Tetrachloroethylene	20	19.3	97	19.6	98	2	72-124/13
108-88-3	Toluene	20	19.3	97	19.8	99	3	78-121/10
79-01-6	Trichloroethylene	20	19.6	98	19.8	99	1	75-119/10
75-69-4	Trichlorofluoromethane	20	19.8	99	20.7	104	4	68-130/19
75-01-4	Vinyl chloride	20	19.0	95	20.1	101	6	57-137/18
1330-20-7	Xylene (total)	60	58.6	98	59.5	99	2	78-122/10

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
1868-53-7	Dibromofluoromethane	99%	100%	80-123%
2037-26-5	Toluene-D8	99%	100%	88-112%
460-00-4	4-Bromofluorobenzene	102%	102%	79-114%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45972-2MS	N56267.D	1	06/09/16	MV	n/a	n/a	VN1506
C45972-2MSD	N56268.D	1	06/09/16	MV	n/a	n/a	VN1506
C45972-2	N56255.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	C45972-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		20	18.9	95	20	19.9	100	5	76-120/10
108-86-1	Bromobenzene	ND		20	18.5	93	20	19.4	97	5	80-123/10
74-97-5	Bromochloromethane	ND		20	19.0	95	20	19.8	99	4	79-124/10
75-27-4	Bromodichloromethane	ND		20	19.2	96	20	19.9	100	4	75-121/10
75-25-2	Bromoform	ND		20	15.6	78	20	16.4	82	5	62-127/10
104-51-8	n-Butylbenzene	ND		20	18.6	93	20	19.8	99	6	74-129/10
135-98-8	sec-Butylbenzene	ND		20	19.4	97	20	20.5	103	6	75-128/11
98-06-6	tert-Butylbenzene	ND		20	19.1	96	20	20.0	100	5	74-127/11
108-90-7	Chlorobenzene	ND		20	18.5	93	20	19.4	97	5	79-119/10
75-00-3	Chloroethane	ND		20	17.1	86	20	17.5	88	2	60-115/14
67-66-3	Chloroform	ND		20	18.6	93	20	19.4	97	4	75-122/10
95-49-8	o-Chlorotoluene	ND		20	18.9	95	20	18.8	94	1	76-125/12
106-43-4	p-Chlorotoluene	ND		20	17.9	90	20	19.9	100	11	76-126/11
75-15-0	Carbon disulfide	ND		20	17.3	87	20	18.3	92	6	51-130/13
56-23-5	Carbon tetrachloride	ND		20	22.0	110	20	23.3	117	6	72-128/13
75-34-3	1,1-Dichloroethane	4.2		20	22.5	92	20	23.6	97	5	70-121/10
75-35-4	1,1-Dichloroethylene	0.42	J	20	19.1	93	20	20.2	99	6	62-125/13
563-58-6	1,1-Dichloropropene	ND		20	19.7	99	20	21.4	107	8	68-116/11
96-12-8	1,2-Dibromo-3-chloropropane	ND		20	18.1	91	20	19.8	99	9	64-129/11
106-93-4	1,2-Dibromoethane	ND		20	18.3	92	20	19.6	98	7	81-124/10
107-06-2	1,2-Dichloroethane	ND		20	19.3	97	20	20.4	102	6	74-122/10
78-87-5	1,2-Dichloropropane	ND		20	19.0	95	20	20.0	100	5	75-123/10
142-28-9	1,3-Dichloropropane	ND		20	18.8	94	20	19.8	99	5	81-127/11
594-20-7	2,2-Dichloropropane	ND		20	16.8	84	20	17.2	86	2	66-130/12
124-48-1	Dibromochloromethane	ND		20	19.1	96	20	20.0	100	5	76-124/10
75-71-8	Dichlorodifluoromethane	ND		20	19.6	98	20	18.6	93	5	26-163/26
156-59-2	cis-1,2-Dichloroethylene	2.3		20	21.4	96	20	22.5	101	5	75-128/10
10061-01-5	cis-1,3-Dichloropropene	ND		20	19.2	96	20	19.9	100	4	76-131/10
541-73-1	m-Dichlorobenzene	ND		20	18.4	92	20	19.3	97	5	79-121/10
95-50-1	o-Dichlorobenzene	ND		20	18.4	92	20	19.2	96	4	79-120/10
106-46-7	p-Dichlorobenzene	ND		20	18.5	93	20	19.4	97	5	79-120/10
156-60-5	trans-1,2-Dichloroethylene	1.4		20	18.3	85	20	19.4	90	6	67-116/11
10061-02-6	trans-1,3-Dichloropropene	ND		20	17.4	87	20	18.2	91	4	73-125/10
100-41-4	Ethylbenzene	ND		20	19.2	96	20	20.2	101	5	78-123/10
591-78-6	2-Hexanone	ND		80	81.8	102	80	90.9	114	11	71-145/12
87-68-3	Hexachlorobutadiene	ND		20	19.4	97	20	20.4	102	5	70-130/12

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: C46016
Account: AMECAZP AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
C45972-2MS	N56267.D	1	06/09/16	MV	n/a	n/a	VN1506
C45972-2MSD	N56268.D	1	06/09/16	MV	n/a	n/a	VN1506
C45972-2	N56255.D	1	06/09/16	MV	n/a	n/a	VN1506

The QC reported here applies to the following samples: **Method:** SW846 8260B

C46016-1, C46016-2, C46016-3, C46016-4, C46016-5, C46016-6

CAS No.	Compound	C45972-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
98-82-8	Isopropylbenzene	ND		20	19.5	98	20	20.4	102	5	77-125/10
99-87-6	p-Isopropyltoluene	ND		20	19.1	96	20	20.3	102	6	76-126/10
74-83-9	Methyl bromide	ND		20	15.8	79	20	15.8	79	0	65-124/13
74-87-3	Methyl chloride	ND		20	16.5	83	20	16.6	83	1	47-143/20
74-95-3	Methylene bromide	ND		20	19.5	98	20	20.4	102	5	80-125/10
75-09-2	Methylene chloride	ND		20	18.3	92	20	19.3	97	5	65-124/15
91-20-3	Naphthalene	ND		20	19.1	96	20	20.4	102	7	66-120/12
103-65-1	n-Propylbenzene	ND		20	18.6	93	20	19.8	99	6	75-125/10
630-20-6	1,1,1,2-Tetrachloroethane	ND		20	19.1	96	20	19.9	100	4	79-126/10
71-55-6	1,1,1-Trichloroethane	ND		20	20.5	103	20	21.1	106	3	73-125/11
79-34-5	1,1,2,2-Tetrachloroethane	ND		20	18.2	91	20	19.8	99	8	78-127/10
79-00-5	1,1,2-Trichloroethane	ND		20	18.2	91	20	19.3	97	6	79-122/10
87-61-6	1,2,3-Trichlorobenzene	ND		20	18.2	91	20	19.2	96	5	70-128/12
96-18-4	1,2,3-Trichloropropane	ND		20	18.8	94	20	20.1	101	7	66-127/10
120-82-1	1,2,4-Trichlorobenzene	ND		20	18.4	92	20	19.2	96	4	72-125/11
95-63-6	1,2,4-Trimethylbenzene	ND		20	18.2	91	20	19.4	97	6	76-124/10
108-67-8	1,3,5-Trimethylbenzene	ND		20	18.4	92	20	19.7	99	7	79-130/10
127-18-4	Tetrachloroethylene	ND		20	19.2	96	20	20.1	101	5	72-124/13
108-88-3	Toluene	0.39	J	20	19.0	93	20	20.1	99	6	78-121/10
79-01-6	Trichloroethylene	ND		20	19.7	99	20	20.4	102	3	75-119/10
75-69-4	Trichlorofluoromethane	ND		20	21.2	106	20	20.6	103	3	68-130/19
75-01-4	Vinyl chloride	13.9		20	31.0	86	20	31.1	86	0	57-137/18
1330-20-7	Xylene (total)	ND		60	56.5	94	60	59.6	99	5	78-122/10

CAS No.	Surrogate Recoveries	MS	MSD	C45972-2	Limits
1868-53-7	Dibromofluoromethane	99%	98%	99%	80-123%
2037-26-5	Toluene-D8	98%	99%	99%	88-112%
460-00-4	4-Bromofluorobenzene	102%	102%	96%	79-114%

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11423
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 06/02/16

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.02	-0.010	<0.20

Associated samples MP11423: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11423 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 06/02/16

Metal	C45996-1 Original	MS	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.025	2.2	2	108.8	75-125

Associated samples MP11423: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11423 Methods: SW846 7470A
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 06/02/16

Metal	C45996-1 Original	MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.025	2.4	2	118.8	8.7	30

Associated samples MP11423: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11423
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 06/02/16

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.0	2	100.0	85-115

Associated samples MP11423: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

7.1.3

7

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11427
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 06/06/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	27		
Antimony	6.0	1.2	1.2		
Arsenic	10	1.6	2.5	0.60	<10
Barium	200	.2	.5	0.0	<200
Beryllium	5.0	.2	.6		
Boron	100	1.8	3.2		
Cadmium	2.0	.2	.3	0.0	<2.0
Calcium	5000	28	69		
Chromium	10	.4	.6	-0.10	<10
Cobalt	5.0	.3	.4		
Copper	10	1.2	1.8		
Iron	200	5.3	11	-1.1	<200
Lead	10	1	1.7	0.30	<10
Magnesium	5000	16	23		
Manganese	15	.2	.2	0.20	<15
Molybdenum	20	.5	.6		
Nickel	5.0	.4	.6		
Potassium	10000	35	35		
Selenium	10	1.7	3.3	1.0	<10
Silicon	100	2.4	2.4		
Silver	5.0	.5	1.5	0.0	<5.0
Sodium	10000	11	25		
Strontium	10	.1	.2		
Thallium	10	1.7	4.8		
Tin	50	.8	1.3		
Titanium	10	.8	.8		
Vanadium	10	.6	.6		
Zinc	20	.5	3.1		

Associated samples MP11427: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11427
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 06/06/16

Metal	C45960-9F Original	MS	Spikelot MPIR5	% Rec	QC Limits
Aluminum	anr				
Antimony					
Arsenic	11.7	514	500	100.5	75-125
Barium	124	629	500	101.0	75-125
Beryllium					
Boron					
Cadmium	0.20	510	500	102.0	75-125
Calcium					
Chromium	0.40	527	500	105.3	75-125
Cobalt					
Copper					
Iron	7730	19900	12500	97.4	75-125
Lead	0.0	497	500	99.4	75-125
Magnesium					
Manganese	497	1010	500	102.6	75-125
Molybdenum					
Nickel	anr				
Potassium					
Selenium	1.8	500	500	99.6	75-125
Silicon					
Silver	0.0	480	500	96.0	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP11427: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11427
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 06/06/16

Metal	C45960-9F Original	MSD	Spikelot MPIR5	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony						
Arsenic	11.7	517	500	101.1	0.6	20
Barium	124	627	500	100.6	0.3	20
Beryllium						
Boron						
Cadmium	0.20	515	500	103.0	1.0	20
Calcium						
Chromium	0.40	527	500	105.3	0.0	20
Cobalt						
Copper						
Iron	7730	20000	12500	98.2	0.5	20
Lead	0.0	499	500	99.8	0.4	20
Magnesium						
Manganese	497	1010	500	102.6	0.0	20
Molybdenum						
Nickel	anr					
Potassium						
Selenium	1.8	504	500	100.4	0.8	20
Silicon						
Silver	0.0	479	500	95.8	0.2	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP11427: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11427
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 06/06/16

Metal	BSP Result	Spikelot MPIR5	% Rec	QC Limits
Aluminum	anr			
Antimony				
Arsenic	508	500	101.6	80-120
Barium	510	500	102.0	80-120
Beryllium				
Boron				
Cadmium	519	500	103.8	80-120
Calcium				
Chromium	534	500	106.8	80-120
Cobalt				
Copper				
Iron	12700	12500	101.6	80-120
Lead	509	500	101.8	80-120
Magnesium				
Manganese	533	500	106.6	80-120
Molybdenum				
Nickel	anr			
Potassium				
Selenium	505	500	101.0	80-120
Silicon				
Silver	479	500	95.8	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11427: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C46016
Account: AMECAZP - AMEC Foster Wheeler
Project: Broadway Pantano ISCO Study - Broadway & Pantano, Tucson, AZ

QC Batch ID: MP11427
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 06/06/16

Metal	C45960-9F Original	SDL 1:5	%DIF	QC Limits
Aluminum	anr			
Antimony				
Arsenic	11.7	24.1	106.0(a)	0-10
Barium	124	174	40.7*(b)	0-10
Beryllium				
Boron				
Cadmium	0.200	0.00	100.0(a)	0-10
Calcium				
Chromium	0.400	0.00	100.0(a)	0-10
Cobalt				
Copper				
Iron	7730	10700	38.7*(b)	0-10
Lead	0.00	0.00	NC	0-10
Magnesium				
Manganese	497	660	33.0*(b)	0-10
Molybdenum				
Nickel	anr			
Potassium				
Selenium	1.80	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP11427: C46016-1, C46016-2, C46016-3, C46016-4, C46016-5

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
(b) Serial dilution indicates possible matrix interference.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Phoenix
4625 East Cotton Ctr Blvd
Suite 189
Phoenix, AZ 85040
Tel: (602)437-3340

TestAmerica Job ID: 550-61716-1
Client Project/Site: BP-27-INJECTION-2

For:
AMEC Foster Wheeler E & I, Inc
4634 South 36th Place
Phoenix, Arizona 85040

Attn: Mr. Alex Yiannakakis

Authorized for release by:
4/19/2016 4:11:15 PM

Carlene McCutcheon, Project Manager II
(602)659-7612
carlene.mccutcheon@testamericainc.com

LINKS

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

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

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Definitions/Glossary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Qualifiers

Metals

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Glossary

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

Job ID: 550-61716-1

Laboratory: TestAmerica Phoenix

Narrative

Job Narrative
550-61716-1

Comments
No additional comments.

Receipt
The sample was received on 4/12/2016 1:24 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 13.1º C.

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

Sample Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-61716-1	BP-27-INJECTION-2	Water	04/11/16 16:57	04/12/16 13:24

Detection Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Client Sample ID: BP-27-INJECTION-2 — Lab Sample ID: 550-61716-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Manganese	76		0.10	0.027	mg/L	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Client Sample ID: BP-27-INJECTION-2

Lab Sample ID: 550-61716-1

Date Collected: 04/11/16 16:57

Matrix: Water

Date Received: 04/12/16 13:24

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Manganese	76		0.10	0.027	mg/L		04/13/16 11:43	04/14/16 18:43	1

QC Sample Results

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 550-87377/1-A
Matrix: Water
Analysis Batch: 87550

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 87377

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND	E8	0.010	0.0027	mg/L		04/13/16 11:43	04/14/16 18:25	1

Lab Sample ID: LCS 550-87377/2-A
Matrix: Water
Analysis Batch: 87550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 87377

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Manganese			1.00	1.02		mg/L		102	88 - 117		

Lab Sample ID: LCSD 550-87377/3-A
Matrix: Water
Analysis Batch: 87550

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 87377

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese			1.00	1.01		mg/L		101	88 - 117	1	20

Lab Sample ID: 550-61596-I-1-A MS
Matrix: Water
Analysis Batch: 87550

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 87377

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Manganese	0.027	E4	10.0	10.0		mg/L		100	75 - 125		

Lab Sample ID: 550-61596-I-1-B MSD
Matrix: Water
Analysis Batch: 87550

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 87377

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese	0.027	E4	10.0	9.98		mg/L		100	75 - 125	1	20

QC Association Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Metals

Prep Batch: 87377

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-61596-I-1-A MS	Matrix Spike	Total/NA	Water	3005A	
550-61596-I-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	3005A	
550-61716-1	BP-27-INJECTION-2	Total/NA	Water	3005A	
LCS 550-87377/2-A	Lab Control Sample	Total/NA	Water	3005A	
LCSD 550-87377/3-A	Lab Control Sample Dup	Total/NA	Water	3005A	
MB 550-87377/1-A	Method Blank	Total/NA	Water	3005A	

Analysis Batch: 87550

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-61596-I-1-A MS	Matrix Spike	Total/NA	Water	6010B	87377
550-61596-I-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	6010B	87377
550-61716-1	BP-27-INJECTION-2	Total/NA	Water	6010B	87377
LCS 550-87377/2-A	Lab Control Sample	Total/NA	Water	6010B	87377
LCSD 550-87377/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	87377
MB 550-87377/1-A	Method Blank	Total/NA	Water	6010B	87377

Lab Chronicle

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Client Sample ID: BP-27-INJECTION-2

Lab Sample ID: 550-61716-1

Date Collected: 04/11/16 16:57

Matrix: Water

Date Received: 04/12/16 13:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			87377	04/13/16 11:43	SGO	TAL PHX
Total/NA	Analysis	6010B		1	87550	04/14/16 18:43	BLB	TAL PHX

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

Certification Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Laboratory: TestAmerica Phoenix

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Arizona	State Program	9	AZ0728	06-09-16

Analysis Method	Prep Method	Matrix	Analyte

Method Summary

Client: AMEC Foster Wheeler E & I, Inc
Project/Site: BP-27-INJECTION-2

TestAmerica Job ID: 550-61716-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PHX

Protocol References:

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

Laboratory References:

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-0013-550 (0116)

CHAIN OF CUSTODY FORM

[ ] Phoenix - 4625 E. Cotton Center Blvd., Suite 189, Phoenix, AZ 85040 (602) 437-3340

61716

4/19/2016

Page 1 of 1

Client Name/Address: AMEC

Project/PO Number: C.C.

Project Manager: ALEX YANNIKAKIS

Phone Number: 520-247-8736

Sampler: EMILY CORKERY

Email Address:

Analysis Required: JUST MANGANESE

Special Instructions: ~2% SOLUTION PERMANGANATE

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	JUST MANGANESE									Special Instructions
BP-27-INJECTION-2	W	250ml	1	4/11/16	1657	NHO_3	X									

550-61716 Chain of Custody

Relinquished By:	Date/Time:	Received By:	Date/Time:	Turnaround Time: (Check) ASAP
	4/12/16 1324			same day ____ 72 hours ____
Relinquished By:	Date/Time:	Received By:	Date/Time:	24 hours ____ 5 days ____
				48 hours ____ normal ____
Relinquished By:	Date/Time:	Received in Lab By: Carla McCuster	Date/Time: 4/12/16 13:24	Sample Integrity: (Check) intact X on ice NO

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

Login Sample Receipt Checklist

Client: AMEC Foster Wheeler E & I, Inc

Job Number: 550-61716-1

Login Number: 61716
List Number: 1
Creator: Stimson, Stephanie

List Source: TestAmerica Phoenix

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	No analysis requiring residual chlorine check assigned.

Carus Remediation Technologies
Remediation Report

24th May, 2016

Customer: AMEC
4600 E Washington St.
Suite 600
Phoenix, AZ 85034

Cc: T. Lizer

Attention: Alex Yiannakakis

From: L. Mueller

TECH # 16-085

Subject: RemOx® L ISCO Reagent Residual Permanganate Analysis

Background
A sample was received from the BP ISCO project located in Tuscon, AZ on May 24th, 2016. The sample was analyzed for residual sodium permanganate.

Experimental
Prior to analyses the water sample was filtered with a 0.22 µm filter, diluted in a volumetric flask and read for residual permanganate at 525nm using a HACH DR5000 Spectrophotometer. The values obtained are reported in Table 1.

Table 1: Colorimetric Analysis at 525 nm

Sample Labels	Absorbance @ 525nm	Dilution	Conc. $NaMnO_4$ (ppm)
BP-27-Inection	0.264	10x	108.7

RemOx® L ISCO reagent is a registered trademark of Carus Corporation

Carus Remediation Technologies
Remediation Report

31st May, 2016

Customer: AMEC
4600 E Washington St.
Suite 600
Phoenix, AZ 85034

Cc: T. Lizer

Attention: Alex Yiannakakis

From: L. Mueller

TECH # 16-090

Subject: RemOx® L ISCO Reagent Residual Permanganate Analysis

Background
A sample was received from the BP ISCO project located in Tuscon, AZ on May 31st, 2016. The sample was analyzed for residual sodium permanganate.

Experimental
Prior to analyses the water sample was filtered with a 0.22 µm filter, diluted in a volumetric flask and read for residual permanganate at 525nm using a HACH DR5000 Spectrophotometer. The values obtained are reported in Table 1.

Table 1: Colorimetric Analysis at 525 nm

Sample Labels	Absorbance @ 525nm	Dilution	Conc. $NaMnO_4$ (ppm)
BP-27-Inection	0.708	5x	146.0

RemOx® L ISCO reagent is a registered trademark of Carus Corporation

APPENDIX C

PUMPING TEST RESULTS

Table C.1 Summary of Aquifer Parameters

Groundwater System	Well Type	Aquifer Thickness (b)[a] (feet)	Effective Porosity (n) (unitless)	Flow Direction	Gradient (Dh/Dl) (ft/ft)	Average Transmissivity (T) (gpd/ft)	Hydraulic Conductivity (K)[b]		Groundwater Velocity (Q)[c] (ft/day)	Effective Velocity (v)[d] (ft/day)
							(gal/day/ft^2)	(ft/day)		
Regional Aquifer	Pumped Well (BP-29)	60	0.30	westerly	0.0022	41,874	698	93	0.21	0.68
	Observation Wells (BP-28)	70	0.30	westerly	0.0022	43,560	622	83	0.18	0.61

Notes:

[a] Estimated aquifer thickness based on water elevation and bottom of Layer 5 in Model

[b] Estimated hydraulic conductivity K=T/b.

[c] Estimated groundwater velocity Q=K*Dh/Dl.

[d] Effective groundwater velocity v=Q/n.

Gradient information obtained from 2015 Groundwater Report

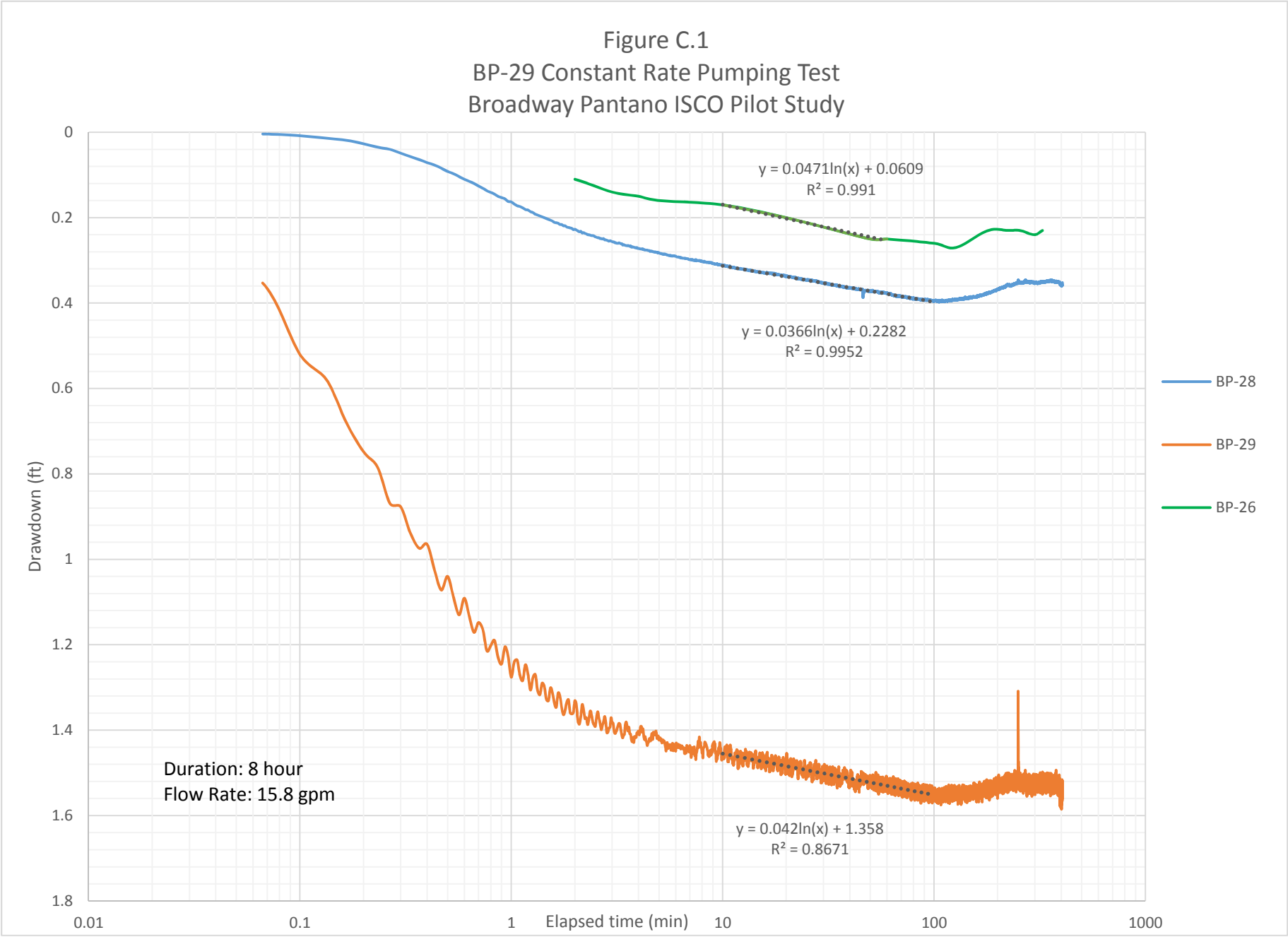


Figure C.1
BP-29 Constant Rate Pumping Test
Broadway Pantano ISCO Pilot Study
y = 0.0471ln(x) + 0.0609
R² = 0.991
y = 0.0366ln(x) + 0.2282
R² = 0.9952
y = 0.042ln(x) + 1.358
R² = 0.8671
Duration: 8 hour
Flow Rate: 15.8 gpm
Drawdown (ft)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
0.01
0.1
1
10
100
1000
Elapsed time (min)
BP-28
BP-29
BP-26

APPENDIX D

FIELD DATA SHEETS

Date	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells					Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
		Flow Rate	Totalizer	Pressure			~~Oxidant Conc.~~	ORP	pH	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
	(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	(ppm)	Y/N	Y/N	Y/N			
BP-27 (Injection Well)																	
02/29/16	308.34	NA	→		NA	NA				@333' Ø				N	CLEAR	BASELINE	
@320'					↓	↓	DO = mg/L 5.50	6.89	241.9	TEMP = 29.5°C	COND = 727 µS/cm	Y	Y			SAMPLING	
@333					↓	↓	4.87	228.8	7.06	29.14	742	Y	Y				
BP-29 (Lateral Pumping)																	
02/29/16	307.62						DO = mg/L 3.79	147.6	6.62	Temp = 27.70C	Cond = 741						
		5.16 gpm															
WR-274A (Downgradient Pumping)																	
02/29/16	308.34	5.12	34.58				DO = mg/L 7.73	164.8	6.23	Temp = 26.87	Cond = 742						
		↓															
BP-26 (Monitoring Well)																	
02/29/16	306.92																
@320							DO = mg/L 5.55	6.93	181.1	TEMP = °C 27.42	COND = 736 µS/cm						
@333							4.30	265.7	7.00	28.40	741						
@340							3.41	259.5	6.50	27.14	744						
BP-28 (Monitoring Well)																	
02/29/16	307.61						~~DO mg/L~~			0.05	0.2						
@320							DO = mg/L 9.07	196.3	6.82	TEMP = °C 31.96	COND = µS/cm 374	Y	Y				
@333							9.55	236.2	6.47	30.30	680	Y	Y				
@345							10.55	75.1	7.00	30.18	768	Y	Y				

Date	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells					Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
		Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
	(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	(ppm)	Y/N	Y/N	Y/N			
BP-27 (Injection Well)																	
03/01	307.38	—	—	—	—	—	—	—	—	—	—	N	N	03/01	PURPLE		
03/02	307.44	—	—	—	—		20	~~228~~									Morning @~8C
3/02	307.39	—	—	—	—	—	20	481	– 2x diluted								afternoon @~145
BP-29 (Lateral Pumping)																	
3/01	307.57	—	—	—			Ø nd	—							CLEAR		~~AA~~
3/02	307.58	—	—	—			Ø nd	231									~~AA~~ A
3/02	307.52	—	—	—			Ø nd	233									A
WR-274A (Downgradient Pumping)																	
3/01	308.27	—	—	—			Ø nd	—									~~AA~~
3/02	308.27	—	—	—			Ø nd	246									~~AA~~
3/02	308.23	—	—	—			Ø nd	242									A
BP-26 (Monitoring Well)																	
3/01	306.86						Ø nd	—									
3/02	306.90						Ø nd	216									M
3/02	306.82						Ø nd	220									A
BP-28 (Monitoring Well)																	
3/01	307.51						Ø ND	—									
3/02	307.52						Ø ND	252									M
3/02	307.44						Ø nd	243									A

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
~~03/04~~	~~0800~~	~~308.28~~						~~Ø nd~~	~~199~~								
BP-27 Groundwater (Injection Well)																	
03/04	1000	307.42			0	orp =	1x dil → 2x dil	5.0	356	—							
03/04	1458	307.37			0			5.0	—	8.4							
					0												
BP-29 (Lateral Pumping)																	
03/04	0845	307.57						Ø nd	183	—							
03/04	1355	307.44						Ø nd	—	7.8							
WR-274A (Downgradient Pumping)																	
03/04	0800	308.28						Ø nd	199	—							
03/04	1445	308.20							—	7.2							
BP-26 (Monitoring Well)																	
03/04	0812	306.88						Ø nd	98	—						moved transducer	
03/04	1436	306.73						Ø nd	—	7.2							
BP-28 (Monitoring Well)																	
03/04	0940	307.41						Ø nd	228	—						moved transducer	
03/04	1427	307.34						Ø nd	—	7.2							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
			—	—	—												
BP-27 Groundwater (Injection Well)																	
03/07	0950	307.24			0			20.0	—	8.4							1st
					0												
					0												
BP-29 (Lateral Pumping)																	
03/07	0915	307.38	—	—	—			Ø nd	—	7.8							1st
WR-274A (Downgradient Pumping)																	
03/07	0837	308.06	—	—	—			Ø nd	—	7.2							1st
BP-26 (Monitoring Well)																	
03/07	0851	306.64						Ø nd	—	7.2						moved transducer	1st
BP-28 (Monitoring Well)																	
03/07	0948	307.29						Ø nd	—	7.2						moved transducer	1st

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
BP-27 Groundwater (Injection Well)																	
03/09	1301	307.33			0			20.0	*546	*7.33							*to modification
					0												
					0												
BP-29 (Lateral Pumping)																	
03/09	1220	307.53	—	—	—			Ø nd	180	7.45							
WR-274A (Downgradient Pumping)																	
03/09	0935	308.26	—	—	—			Ø nd	163	7.21							
BP-26 (Monitoring Well)																	
03/09	1028	306.86						Ø nd	188	7.42							1030. moved transducer
BP-28 (Monitoring Well)																	
03/09	1232	307.48						Ø nd	180	7.36							1233 moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
03/11	1130	start	DH ORP	, @		depth	1132										
BP-27 Groundwater (Injection Well)																	
03/11	1100	307.39		—	0	—	—	5.0	477	7.64		—	—	03/01	lt Purple		
					0												
					0												
BP-29 (Lateral Pumping)																	
03/11	1045	307.55	—	—	—			Ø nd	157	7.42		—	—	—	clear		
WR-274A (Downgradient Pumping)																	
03/11	~~0940~~ 0940	308.29	—	—	—			Ø nd	234	7.39		—	—	—	Clear		
BP-26 (Monitoring Well)																	
03/11	1030	306.87						Ø nd	240	7.29		—	—	—	Clear		moved 1030 transducer
BP-28 (Monitoring Well)																	
03/11	1050	307.54						Ø nd	189	7.47		—	—	—	Clear		1051 moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
																* 237 ORP 7.22 PH	calibration ORP + PH
BP-27 Groundwater (Injection Well)																	
03/14	0953	307.38		—	0	—	—	5.0	482	7.56		—	—	03/01	Lt Purple		
					0												
					0												
BP-29 (Lateral Pumping)																	
03/14	0922	307.54	—	—	—			Ø nd	180	7.60		—	—	—	clear		
WR-274A (Downgradient Pumping)																	
03/14	0905	308.24	—	—	—			Ø nd	228	7.21		—	—	—	clear		
BP-26 (Monitoring Well)																	
03/14	0937	306.83						Ø nd	207	7.38		—	—	—	clear		0936 moved transducer
BP-28 (Monitoring Well)																	
03/14	0945	307.45						Ø nd	202	7.33		—	—	—	clear		0941 moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
																Calibration	ORP + PH 257 7.46
BP-27 Groundwater (Injection Well)																	
03/16	0807	307.88		—	0	—	—	5.0	520	7.98		—	—	03/01	Lt Purple		
					0												
					0												
BP-29 (Lateral Pumping)																	
03/16	0752	307.48	—	—	—			Ø nd	43	7.64		—	—	—	clear		
WR-274A (Downgradient Pumping)																	
03/16	0734	308.18	—	—	—			Ø nd	206	7.64		—	—	—	clear		
BP-26 (Monitoring Well)																	
03/16	0745	306.74						Ø nd	200	7.60		—	—	—	clear		0743 moved transducer
BP-28 (Monitoring Well)																	
03/16	0802	307.39						Ø nd	111	7.74		—	—	—	clear		0759 moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
															03/23	ORP Cal solution 240 mv test 234 mv	
															03/28	ORP cal 241	
BP-27 Groundwater (Injection Well)																	
03/21	1004	307.32		—	0	—	—	2.0	502	7.51		—	—	03/01	~~Lt~~ Pink	no dilution	
03/23	1515	307.41		—	0	—	—	2.0	496	7.56		—	—	"	pink	no dilution	
03/28	1004	307.18			0	—	—	2.0	482	7.57		Y	Y	"	Lt Pink	no dilution	
BP-29 (Lateral Pumping)																	
03/21	0947	307.49	—	—	—			Ø nd	34	7.45		—	—	—	clear	none	N/A
03/23	1450	307.59	—	—	—			Ø nd	238	7.33		—	—	—	clear	none	N/A
03/28	0948	307.34						Ø nd	227	7.30					clear	none	N/A
WR-274A (Downgradient Pumping)																	
03/21	0930	308.19	—	—	—			Ø nd	205	7.75		—	—	—	clear	none	N/A
03/23	1430	308.28	—	—	—			Ø nd	218	7.25		—	—	—	clear	none	N/A
03/28	0937	308.00										Y	Y	—	clear	none	N/A
BP-26 (Monitoring Well)																	
03/21	0940	306.78						Ø nd	202	7.59		—	—	—	clear	none	0935 moved transducer
03/23	1438	306.91						Ø nd	228	7.55		—	—	—	clear	none	1437 moved transducer
03/28	0943	306.59						Ø nd	* 197	7.51 *		Y	Y	—	clear	none	0939 moved transducer
BP-28 (Monitoring Well)																	
03/21	0956	307.44						Ø nd	117	7.43		—	—	—	clear	none	0953 moved transducer
03/23	1506	307.56						Ø nd	224	7.37		—	—	—	clear	none	1505 moved tra
03/28	1000	307.25						Ø nd	180 / 181	7.35 / 7.30	333 / 345	Y	Y		clear	none	0950 moved transducer

* After water levels are taken from BP-26 & 28 w/ transducers, I moved them back in place.

BP-26 - 333' 197 ORP, 7.51 ph / 345' ORP 198; 7.41 ph

333' BP-28 ORP 180 Ph 7.35

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
~~03/~~																	
BP-27 Groundwater (Injection Well)																	
03/28	0905	307.08		5862	0	—	—	Ø nd	146	7.41		N	N	03/01	clear	~~recirc~~	
04/01	1143	304.08			~~24~~ 0	—	—	Ø nd	151	7.48		N	N	03/01	clear	recirc	
					0												
BP-29 (Lateral Pumping)																	
04/01	1128	307.29	—	—	—			Ø nd	148	7.43		N	N	—	clear	recirc	
WR-274A (Downgradient Pumping)																	
03/29	0900	307.92	16	352.8	24			Ø nd	198	7.92		~~Y~~ N	Y	Collected sample 0922	clear	03/29/16 0912 pump start	
04/01	1115	313.15	15.98	21003.8	24			Ø nd	167	7.66		N	N	—	clear		
BP-26 (Monitoring Well)																	
3/29	9:50							0+00.05	211	7.28		N	N			recirc	
04/01	1121	306.73						Ø nd	154	7.51		N	N	—	clear	recirc ~~Alone~~	moved transducer
BP-28 (Monitoring Well)																	
04/01	1137	307.29						Ø nd	149	7.45		N	N	—	clear	recirc	moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/05																	ORP = Cal solution Hanna 240 pH 7
BP-27 Groundwater (Injection Well)																	
04/05	0853	304.84		—	0	—		Ø nd	210	7.38		—	—	03/01	clear		
04/05	1118	307.89		—	0	—		Ø nd ~~0.07~~	208	7.42		—	—	03/01	clear		
					0												
BP-29 (Lateral Pumping)																	
04/05	0846	307.36	—	—	—			Ø nd	214	7.41							
04/05	1100	307.37	—	—	—			Ø nd	138	7.58							
WR-274A (Downgradient Pumping)																	
04/05	0838	313.52	15.98	111422	24			Ø nd	220	7.36		—	—	—	clear	recirc	
04/05	1044	311.36	10.12	112394	18			~~Ø nd~~ 0.07	387	7.72		—	—	—	~~clear~~	water has lt pink tint	
BP-26 (Monitoring Well)																	
04/05	0843	306.96						Ø nd	213	7.30		—	—	—	clear		moved transducer 0840
04/05	1048	306.85						Ø nd	213	7.35		—	—	—	clear		
04/05	1125							0.01									
BP-28 (Monitoring Well)																	
04/05	0850	307.08						Ø nd	215	7.39		—	—	—	clear		0847 moved transducer
04/05	1053	301.13						Ø nd	212	7.47		—	—	—	clear		

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
																ORP Cal. 250 0800 PH 7.34	
BP-27 Groundwater (Injection Well)																	
04/08	0935	304.68		—	0	—	—	0.15	271	7.66		N					
					0												
					0												
BP-29 (Lateral Pumping)																	
04/08	0922	301.23	—	—	—			Ø nd	101	7.76		N			Clear	none	none
WR-274A (Downgradient Pumping)																	
04/08	0815	313.33	16.17	179346	24.5			See notes	216	7.43		N	~~04/05~~	04/05	Clear	recirc	none
BP-26 (Monitoring Well)																	
04/08	0827	306.82						0.15	419	7.45		N			very lt. pink	none	0824 moved transducer
04/08	~~1140~~							0.15 0.15 0.15	423 428 451	7.52 7.51 7.54		N	Y	04/05	depth time	320, 333, 345 1120 1126 1133	
BP-28 (Monitoring Well)																	
04/08	0904	306.89						Ø nd	218	7.56		N			Clear	none	0900 moved transducer

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
																ORP Cal. 249 0050 ?H 7.37	
BP-27 Groundwater (Injection Well)																	
04/11	0745	304.82		—	0	—	—	Ø nd	92	8.35		N	N		Clear		
↓	915	@320'			0			0.05	116	7.70	0/0	Y	Y		↓		
	920	@333'			0			0.05	164	7.56	0/0	Y	Y				
BP-29 (Lateral Pumping)																	
04/11	0728	307.8	—	—	—			Ø nd	-41	7.57		N	N				PUMP ON-1040 TURNED OFF AT 50M
↓		~~333~~						Ø	~~230~~	~~7.46~~		Y	Y				PUMP ON-1050 PUMP OFF-1106
		~~345~~						Ø	206	7.94	0/0	Y	Y				
WR-274A (Downgradient Pumping)																	
04/11	0700	313.45	16.18	246052	24.5			0.0 nd	358	7.79		N	N				PUMP OFF PUMP ON-1020
↓	~~1020~~																PUMP OFF-1038
	1020							Ø	357	7.40	0/0	Y	Y				
BP-26 (Monitoring Well)																	
04/11	0704	306.97						0.20	388	7.62		N	N				0703 moved transducer
↓	845	@333'						0.3	275	7.~~84~~	0.1/0.3	Y	Y				740 move transducer 1433
	900	@345						0.20	479	7.52	0.1/0.4	Y	Y				
BP-28 (Monitoring Well)																	
04/~~11~~	0714	306.94						Ø nd	238	7.58		N	N				0712 moved transducer
↓	6945	333						Ø	234	7.46	0.1/0.3	Y	Y				752 move transducer ~~-234~~ 1425
	0930	345						Ø	235	7.77	0/0.1	Y	Y				

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
4/11	1450		0	248536												START DOSING	
	1510		10.19	~~248607~~													
	1533		10.18	248888		100:1	1%	10 50 (1 DILUTION, 2 DILUTIONS)	568	5.							
BP-27 Groundwater (Injection Well)																	
4/11	14:33	307.09			0												
					0												
					0												
BP-29 (Lateral Pumping)																	
4/11	14:46	307.25	0	7054.79													
	1531							∅	304	7.44							
WR-274A (Downgradient Pumping)																	
4/11	14:42	308.00	∅	247230													START PUMP @ 14:55
	15:10		10.03		16 psi												
	15:23		10.04	247507	16 psi			∅	145	7.65						CLEAR	
BP-26 (Monitoring Well)																	
4/11	14:43	306.57															14:43 - MOVE TRANS
	1527							0.5	456	7.39						LT PINK	
BP-28 (Monitoring Well)																	
4/11	14:50	307.17															1450 MOVE TRANS
	1529							∅	418	7.50							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
4/11	1657		~~10.00~~	10.21	~~16~~			~~3~~ 50 2x dilute	571	✓							
BP-27 Groundwater (Injection Well)																	
	1723	305.72			0			50	583	✓							
					0												
					0												
BP-29 (Lateral Pumping)																	
	1720	307.11						Ø	-16	7.56							
					1st Flow meter												
WR-274A (Downgradient Pumping)																	
	1702	311.11	10.06	Totalizer #1	16			Ø	256	7.47							
	1830	—	10.06	249285	16										Appx 16 gallons of Permanganate has been injected into BP-27		
			10.20	290624 = 2nd FM													
BP-26 (Monitoring Well)																	
	1757	@320						0.12	452	7.57							
		@333						0.07	487	7.55							
		@345						0.15	490	7.50							
BP-28 (Monitoring Well)																	
	1737	@320						0	119	7.58							
	~~1738~~ ~~1739~~	@333						0	136	7.58							
↓	1739	@345						0.05	132	7.56							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/12	0955							50	608	8.41		N	N		Purple	ORP Cal 249	
BP-27 Groundwater (Injection Well)																	
04/12	0950	305.74	~~10.18~~	260072	0	100/1		* see below →				N	N			recirc	none
					0												
					0												
BP-29 (Lateral Pumping)																	
04/12	0906	307.21	Ø	7054.79	Ø			Ø nd	129	7.64		N	N		Clear	none	none
WR-274A (Downgradient Pumping)																	
04/12	0835	311.35	10.06	257922	16			Ø nd	241	7.54		—	—	—	Clear	recirc	none
BP-26 (Monitoring Well)																	
04/12	0853	306.86						Ø				—	—	—		0850 moved transducer	
	1050	320 333						0.15 0.15	475 481	7.52 7.50					Pink tint		
		345						0.15	487	7.56							
BP-28 (Monitoring Well)																	
04/12	0937	307.09						—				—	—	—		0930 moved transducer	
	1115	320 333						0.5	491 518	7.56 7.64				04/12	Purple		
		345						0.8 10	555	7.58					↓		

* was not able to get bailer down, string sticking to walls of PVC. Tried with all three spools of string. (1 [illegible] all [illegible]) Dry string will go down most times.

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/12	1542	—	10.18	263 654	16	100/1		50	626	8.23		N	N		Purple	inject	none
BP-27 Groundwater (Injection Well)																	
04/12	1538	305.71			0	100/1		50	612	7.58						recirc	none
					0												
					0												
BP-29 (Lateral Pumping)																	
04/12	1521	307.11	—	7054.79	—			Ø nd	.96	7.47		N	N		Clear	none	none
WR-274A (Downgradient Pumping)																	
04/12	1508	311.24	10.04	261867	16			0.01	417	7.40		N	N		clear	recirc	none
BP-26 (Monitoring Well)																	
04/12	1513	306.77						0.15	484	7.53		N	N		Pink tint		~~*~~ none
BP-28 (Monitoring Well)																	
04/12	1531	307.01						10	527	7.62		N	N	04/12	Purple	none	1524 novel transducer

* reason for no multi depth permanganate field test - ran out of test strips. Garrett is bringing me some tomorrow 04/13 around noon.

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/13	1245		10.13	276622	16	100%		50	650	8.56		N	N		Purple	none	ORP Cal. 247
BP-27 Groundwater (Injection Well)																	
04/13	0910	305.73	~~10~~	~~276~~	0	—	—	50	622	8.09		N	N	03/01	Purple	recirc	none
					0												
					0												
BP-29 (Lateral Pumping)																	
04/13	0900	307.29	—	—	—			0.03	291	7.52		N	N	—	Clear	none	none
WR-274A (Downgradient Pumping)																	
~~04/13 0850~~	0850	311.31	9.98	274975	16			>0.05	389	7.44		N	N	—	Clear	recirc	none
BP-26 (Monitoring Well)																	
04/13	0856	306.82						—				N	N			none	0852 moved transducer
04/13	1355	320 333						0.15 0.10	503 504	7.46 7.51		N	N		Pink tint	none	
↓		345						0.15	512	7.42		N	N		↓	none	
BP-28 (Monitoring Well)																	
04/13	0906	307.06						—		7.85		N	N			none	0902 moved transducer
↓	1315	320 333						5.0 10.0	617 632	~~5.0~~ 8.03		N	N		Purple	none	added 4th Hydra @ 355'
↓		345 355						10.0 10.0	633 632	8.35 8.15		N	N		Purple	none	None

* Except for water levels readings were collected from 1245 — had to wait for test strips.

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/15	0910	—	10.13	303962	16.5	100/1	—	50	636	8.46		N	N	—	Purple	none	ORP cal 249
04/15	1535	—	10.12	307046	16.5												
BP-27 Groundwater (Injection Well)																	
04/15	0900	305.21		—	0	—	—	50	618	7.98		N	N	—	Purple	injecting	none
					0												
					0												
BP-29 (Lateral Pumping)																	
04/15	0842	307.67	—	—	—			Ø nd	431	7.52		N	N	—	Clear	none	none
WR-274A (Downgradient Pumping)																	
04/15	0825	310.87	9.96	301868	16.5			.20	543	7.74		N	N	—	Lt Pink	recirc	none
04/15	1230	—	—	—	—			1.0	—	—		—	—	—	—	—	—
04/15	1537		9.93	304915	16.5												
BP-26 (Monitoring Well)																	
04/15	0835	306.42						—	—	—		~~ORP~~	~~pH~~	Oxid	Purple	none	0831 moved transducer
		320						~~.20~~	~~620~~	~~8.22~~	320	~~509~~	7.65	.15	↓		
		333						~~50~~	~~627~~	~~8.16~~	333	535	7.58	.15			
		345							~~638~~	~~7.86~~	345	535	7.62	.15			
		~~355~~								7.73							
BP-28 (Monitoring Well)																	
04/15	0852	306.70						—	—	—		N	N	—	Purple	none	0844 moved transducer
		320						.20	620	8.22		↓	↓		↓		
		333						50	627	8.16							
		345						50	638	7.86							
		355						50	595	7.73							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
4/18	1155	—	7.90	345829	16	100/1	[illegible]	5	540	8.17		N	N		purple	None	No
BP-27 Groundwater (Injection Well)																	
~~4/18~~	~~1215~~	~~306.16~~			0			50	545	8.32		N	N		purple	None	No
4/18	1230	305.49			0												
					0												
BP-29 (Lateral Pumping)																	
4/18	1245	307.21						.05	271	7.53		N	N		clear		
WR-274A (Downgradient Pumping)																	
4/18	1300	311.09	7.88	346395	16			.07	451	7.61		N	N		clear		
BP-26 (Monitoring Well)																	
4/18	1215	306.76						5	565	7.64		N	N		purple	None	No
		320						7	577	7.77							
		333						3	576	7.72							
		345						3	584	7.73							
		355						.5	565	8.07							
BP-28 (Monitoring Well)																	
4/18	1310	307.0						10	531	7.59		N	N		Purple	None	No
		320						10	521	8.16							
		333						5	551	8.00							
		345						10	539	8.01							
		355						10	504	7.89							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/20	0847	—	10.08	375991	16	100/1	—	50	633	8.44		N				none	ORP CAL 235
BP-27 Groundwater (Injection Well)																	
04/20	0910	305.38		—	0	—		10	591	7.80					Pink	inject	
					0												
					0												
BP-29 (Lateral Pumping)																	
04/20	0901	307.13	—	—	—			>0.05	461	7.56						none	none
WR-274A (Downgradient Pumping)																	
4/20	0845	311.16	9.76	372256	16			10	618	7.67					Pink	recirc	
BP-26 (Monitoring Well)																	
04/20	0851	306.68														none	0849 moved transducer
	1010	320 333						1.5 5	598 613	7.58 7.53					Pink		
		345 355						5 5	606 608	7.67 7.65							
BP-28 (Monitoring Well)																	
04/20	0856	306.55														none	0854 moved transducer
	0945	320 333						20 50	643 637	7.31 7.48					Purple		
		345 355						50 50	599 616	7.82 7.79							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/22	0845	—	—	384513 before	—										—	~~shutdown~~	shutdown
↓	0930	—	10.66 ~~9.78~~	384685 ~~380686~~	16	100%	—	2x 50	656	7.63					Purple	none	ORP cal 248
↓																	
BP-27 Groundwater (Injection Well)																	
04/22	0915	306.96		—	0	—										—	shutdown
→ Sample taken →	1125				0							N	Y			injecting	none
→ Sample ↓	1115				0							Y	N				
BP-29 (Lateral Pumping)																	
04/22	0906	307.14	—	—	—			—								—	shutdown
↓																	
↓																	
WR-274A (Downgradient Pumping)																	
04/22	0857	307.87	—	380528 before	—			—							—	~~shutdown~~	shutdown
↓	0930	—	* 9.78 *	380686	16			2x 20	617	7.73					Purple	none	none
↓																	
BP-26 (Monitoring Well)																	
04/22	0902	306.46						—								0859 moved transducer	shutdown
↓		320						2x 20	625	7.64		N			Purple		
		333						2x 15	620	7.68		Y	N	—	Pink	none	none
↓		345						1x 5	613	7.75		Y			↓		
		355						1x 5	620	7.67		N	N	—			
BP-28 (Monitoring Well)																	
04/22	0911	307.09						—								0908 moved transducer	shutdown
↓		320						2x 50	636	7.74		N					
		333						50	633	7.76		N	N		Purple	none	none
→ Sample	1320	345						50	646	7.68		Y	355				
→ Sample	1328	355						50	652	7.73		Y	Y		purple	"	"

* befor restart

1328

1445 22.29.370.Gw

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/25	~~0900~~ ~~0932~~	—	10.68	415700	17	100/1	—	2x 50	635	7.78		N	N	—		none	shutdown appx Sun. 1400
BP-27 Groundwater (Injection Well)																	
04/25	0951	305.67		—	0	—	—	2x 10	612	7.76				—		injecting	none
					0												
					0												
BP-29 (Lateral Pumping)																	
04/25	0914	306.94	—	—	—			70.05	386	7.48				—	Clear	none	none
WR-274A (Downgradient Pumping)																	
04/25	0830	310.89	10.22	410331	~~10~~ 17			2x 20	622	7.71				—	Lt Purple	none	none
								~~2x 20~~								~~None~~	
BP-26 (Monitoring Well)																	
04/25	0908	306.50						—						—		—	0902 moved transducer
	1106	320						2x ~~0~~ 15	599	7.73					Purple	none	none
		333						15	625	7.75							
		345						15	633	7.72							
		355						20	604	7.78							
BP-28 (Monitoring Well)																	
04/25	0922	306.75						—						—	Lt Purple	—	0917 moved transducer
	1141	320						2x 50	628	7.75						none	none
		333						50	632	7.71							
		345						50	634	7.69							
		355						50	634	7.70							

Date	Time	Water Level	From Well Head: Flow Rate	From Well Head: Totalizer	From Well Head: Pressure	Dosatron Setting	Solution Conc.	Field Tests for Individual Wells: Oxidant Conc.	Field Tests for Individual Wells: ORP	Field Tests for Individual Wells: pH	Field Tests for Individual Wells: Iron Soluble/ Total	Laboratory: VOC Sample Taken	Laboratory: Metals Sample Taken	Laboratory: First Pink Water Taken	Water Color	Operational Changes	Shut Downs? Actions Taken?
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
04/27	0817	—	10.69	445920	17	100/1		1x mg/L 122.9 * 100	608	8.10		—	N		Purple		ORP cal 248
04/27	1246											Y					
BP-27 Groundwater (Injection Well)																	
04/27	0815	305.06		—	0	—		2x ppm 50	1x 580 *	8.18		—			Purple		
					0												
					0												
BP-29 (Lateral Pumping)																	
04/27	0805	307.08	—	—	—			ppm 0.0	—	—		—					
04/27	1306							∅ <0.05 0.0	553	7.65		Y					
								~~<0.05 0.0~~									
WR-274A (Downgradient Pumping)																	
~~04/27~~ 04/27	0750 ~~1230~~	311.07	10.08	439014	17			1.0	—	—		N	N	1	A Purple		
04/27	1240											Y					
BP-26 (Monitoring Well)																	
04/27	0759	306.60						ppm Mg/L	—	—		—					0754 moved transducer
	1210	320						*2 21.94	637	7.56		N					
	1222	333						20 25.49	640	7.62		Y	N		Purple		
	1228	345						20 23.43	643	7.71		Y					
	1237	355						20 26.43	646	7.65		N					
BP-28 (Monitoring Well)																	
04/27	0811	306.81						ppm mg/L	646	—		—					0807 moved transducer
	1027	320						<50/72.0 mg/L	~~7.68~~	7.68		N					
	1038	333						* 100 97.7	648	7.73		N			Purple		
	1050	345						100 101.4	652	7.75		Y					
	1058	355						100 103.6	656	7.73		Y					

* Could not get bailer down again with more permanganate.

* permanganate field test shows me that the readings are < 50 [illegible]

*2 field test shows more than 20 less than 50.

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.		ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)		(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																		
04/29	0722	—	10.72	476205	17	100/1	—	—					N	N	—	Purple	None	none
	1000							100	134 ~~125~~	674	7.64		↓	↓		↓		
BP-27 Groundwater (Injection Well)																		
04/29	0745	305.01		—	0	—	—						↓	↓	—	↓	injecting	none
	0952	333			0			100	125	651	7.71		↓	↓		↓		
					0								↓	↓		↓		
BP-29 (Lateral Pumping)																		
04/29	0732	306.98	—	—	—			—		~~656~~	~~7.67~~		↓	↓	—	↓	none	none
								—		~~656~~	~~7.67~~		↓	↓		↓		
	1015							0	0	557	7.66		↓	↓		↓		
WR-274A (Downgradient Pumping)																		
04/29	0720	311.01	9.98	467181	17			~~20~~	~~32.19~~				↓	↓		↓	Pumping	none
	1009							20	32.15	656	7.67		↓	↓		↓		
													↓	↓		↓		
BP-26 (Monitoring Well)																		
04/29	0727	306.50						~~test strip~~	color meter	320' 333'	→ 20	36.17	↓	↓	—	↓	none	0723 moved transducer
	0907	320						32.73		659	7.75		↓	↓		↓		
		333						20		659	7.71		↓	↓		↓		
		345						20	35.12	658	7.68		↓	↓		↓		
		355						20	39.28	658	7.70		↓	↓		↓		
BP-28 (Monitoring Well)																		
04/29	0739	306.72						~~test strip~~	color meter				↓	↓	—	↓	none	0734 moved transducer
	0930 ~~0907~~	320						>50	81.71		7.81		↓	↓		↓		
		333						100	103.0	642 ~~658~~	7.80		↓	↓		↓		
		345						100	114.6	659	7.73		↓	↓		↓		
		355						100	113.4	661	7.75		↓	↓		↓		

* Colorimeter (DR/890) tests were 1:1 dilution.
test strips 2 x dilution

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.		ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)		(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																		
05/02	0847	—	10.70	523348	17	100:1	—	—		—			—	—	—			ORP cal 246
								100	118.	639	8.14		N	N	—	Purple	None	
BP-27 Groundwater (Injection Well)																		
05/02	0853	305.13		—	0		—											
					0			100	110.5	644	8.09		Y	N	—	Purple	injecting	none
05/02	1325	—		—	0	—	—	—	—	—	—		—	—	—		Dosatron off @ 1325	none
BP-29 (Lateral Pumping)																		
05/02	0840	307.23	—	—	—			test strip	DR 890									
05/02	1340	—	—	—	—			0	0	331	7.72		Y	N	—	Clear	none	
WR-274A (Downgradient Pumping)																		
05/02	0828	311.20	9.88	510705	17													
05/02	1352	—	—	—	—			20	38.33	619	7.65		Y	N	—	Purple	none	
BP-26 (Monitoring Well)																		
05/02	0835	306.77																0831 moved transducer
↓	1359	320						20	37.76	607	8.05		Y	N	—	Purple	none	
		333						20	50.02	633	8.04							
		345						20	49.33	634	8.16							
		355						20	49.56	638	8.09							
BP-28 (Monitoring Well)																		
05/02	0845	306.98						—		—	—		—	—	—	—	—	0842 moved transducer
↓	1423	320						100	120.8	636	7.85		Y	N	—	Purple	none	none
		333						100	116.4	639	7.96							
		345						100	111.7	637	7.98							
		355						100	113.1	641	8.08							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/03	0750	—	11.01	537803	16	—	—	—	—	—		N	N	—	Purple	none	—
								42	635	8.08		↓	↓				
BP-27 Groundwater (Injection Well)																	
05/03	0744	305.11		—	0	—	—	102.2	639	7.98		↓	↓	—	Purple	none	—
					0												
					0												
BP-29 (Lateral Pumping)																	
05/03	0732	307.21	—	—	—			0	327	7.50		↓	↓	—	clear	none	—
WR-274A (Downgradient Pumping)																	
05/03	0715	311.16	10.18	523859	16			—	—	—		↓	↓	—	—	—	—
	0911							20 | 41	633	7.88		↓	↓		Purple	none	—
BP-26 (Monitoring Well)																	
05/03	0740	306.52						—	—	—		↓	↓	—	—	—	0735 moved transducer
		320						20 | 47.04	659	7.69		↓	↓		Purple	out of test strips.	
		333						59.73	666	7.70							
		345						58.37	669	7.64		↓	↓				
		355						62.56	673	7.64							
BP-28 (Monitoring Well)																	
05/03	0725	306.80						—	—	—		↓	↓	—	—	—	0721 moved transducer
		320						96.87	655	7.70		↓	↓		Purple		
		333						97.19	659	7.71							
		345						94.14	670	7.71		↓	↓				
		355						95.54	669	7.66							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/04	0720	~~553903~~	11.02	553903	16	—	—	—	—	—		N	N		Purple	none	ORP CAL ~~#~~ 241
BP-27 Groundwater (Injection Well)																	
05/04	0719	305.08		—	0	—	—	98.37	648	7.91					Purple		
					0												
					0												
BP-29 (Lateral Pumping)																	
05/04	0705	307.01	—	—	—			0	306	7.48							
															clear		
WR-274A (Downgradient Pumping)																	
05/04	0652	311.06	10.23	538863	16			—	—	—							
	0827	—	—	—	—			45.05	641	7.89					Purple		
BP-26 (Monitoring Well)																	
05/04	0659	306.51						—	—	—							0655 need transduce
	0835	320 333						62.08 62.21	668 671	7.71 7.73					Purple		
		345 355						63.33 63.38	673 674	7.68 7.70							
BP-28 (Monitoring Well)																	
05/04	0713	306.70						—	—	—							0709 need transducer
	0851	320 333						61.82 61.92	671 673	7.76 7.77					Purple		
		345 355						66.35 67.00	669 672	7.77 7.78							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/06	0812	—	11.02	586191	16	—	—	—	—	—		N	N			none	ORP CAL 243
															Purple		
BP-27 Groundwater (Injection Well)																	
05/06	0809	305.01		—	0	—	—	43.90	643	7.73							
					0										Purple		
					0												
BP-29 (Lateral Pumping)																	
05/06	0755	306.94	—	—	—			—	—	~~7.~~							
05/06	1022	—	—	—	—			0.16	626	7.84					Clear		
WR-274A (Downgradient Pumping)																	
05/06	0740	311.04	10.06	548563	16			—	—	—				—	—		
↓	0910	—	—	—	—			41.76	617	7.67				—	Purple		
↓																	
BP-26 (Monitoring Well)																	
05/06	0750 ~~306.54~~	306.54						—	—	—							0744 moved transducer
↓	0945	320 333						55.30 49.42	627 657	7.63 7.65					Purple		
↓		345 355						49.37 50.88	649 645	7.66 7.64							
BP-28 (Monitoring Well)																	
05/06	0804	306.73						—	—	—							0800 moved transducer
↓	1007	320 339						60.80 66.72	647 650	7.67 7.67					Purple		
↓		345 355						66.61 76.20	658 660	7.71 7.70							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/09	0816	—	11.02	633744	16			~~3~~	678	7.25	333' .1	total iron					ORP CAL 272
											~~33~~	N	N				
BP-27 Groundwater (Injection Well)																	
05/09	0705	304.93			0							Y	Y				
	1049 ~~1047~~	320			0			16.06	620	7.74					Purple		
		333			0			13.40	639	7.78							
BP-29 (Lateral Pumping)																	
05/09	0657	302.0										Y	Y	05/09			
	1047	~~320~~ 370	Temp depth					10.20	631	7.76	370' ~~0~~	total iron			Lt Purple		
		~~333~~															
WR-274A (Downgradient Pumping)																	
05/09	0650	311.09	10.18	612281	16			0819 35.13	678	7.25	~~10~~	Y	Y		Purple		
BP-26 (Monitoring Well)																	
05/09	0654	306.59									320' .2	total iron					0652 moved transducer
	0930	320						44.01	665	7.70	345' .1	total iron	Y	Y	Purple		
		333						82.81	674	7.69							
		345						84.34	675	7.70							
		355						82.51	680	7.70							
BP-28 (Monitoring Well)																	
05/09	0702	306.79										Y	Y				0700 moved transducer
	0913	320						54.06	651	7.73							
		333						44.15	665	7.66					Purple		
		345						46.51	669	7.73	~~345'~~	total iron					
		355						47.49	671	7.72	~~0~~						

Date: 05/11/16

05/11/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0802		10.96	644258	16		—	—	—	—	—	—	—	—	—	—	not injecting
BP-27 Groundwater (Injection Well)																
0800	304.91										N	N	N	N	N	
1641	—				333	—	10.19	657	7.60	Lt Purple						
BP-29 (Lateral Pumping)																
0749	306.98	~~10.72~~	7605.14	~~17.0~~ ~~16.5~~	—	—	~~8.06~~	~~659~~	~~7.75~~	~~Lt Purple~~	N	N	N	N	N	
0940		10.72	7696.76	16.5	—	—	8.06	659	7.75	Lt Purple						
WR-274A (Downgradient Pumping)																
0739	311.08	10.08	640225	16	341	~~32.22~~	32.22	634	8.00	Purple	N	N	N	N	N	
BP-26 (Monitoring Well)																
0746	306.59				—	—	—	—	—	—	—	—	—	—	—	0743 removed transducer
0950	320				—	—	57.56	646	7.85	Purple		N	N	N	N	
	333				—	—	71.50	652	7.75							
	345				—	—	72.01	653	7.70							
	355				—	—	74.84	653	7.89							
BP-28 (Monitoring Well)																
0756	306.78				—	—	—	—	—	—						transducer removed 05/09/16 not working
1007	320				—	—	42.74	647	7.81	Purple						
	333				—	—	39.58	647	7.86							
	345				—	—	39.63	648	7.89							
	355				—	—	36.54	647	7.99							

Date: 05/13/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0836		16.30	710030	24		—				—	NA	NA	N	N	N	ORP CAL 244 ORP + PH CAL 254
BP-27 Groundwater (Injection Well)																
0831	303.94				—					—						—
1132					333	—	32.49	652	7.31	Purple						—
BP-29 (Lateral Pumping)																
0824	307.03	—	—	—	—											
1115	—	16.14	~~7711~~.58	25	370	—	@ 1136 10.53	634	7.30	Purple						1115 BP-29 pump on 60 Hz
WR-274A (Downgradient Pumping)																
0818	312.71	15.48	683372	24	—											1113 pump is off total #1 685602
1127	—	—	—	—	341	~~30.11~~	30.11	644	7.21	Purple						—
BP-26 (Monitoring Well)																
0821	306.74				—											0819 moved transducer
1158	—				320	—	62.47	674	7.18							—
					333	—	69.02	677	7.19							—
					345	—	68.52	679	7.32							—
					355	—	74.14	682	7.32							—
BP-28 (Monitoring Well)																
0828	306.73				—											~~0825 moved transducer~~ just the cap
1213	—				320	—	38.96	671	7.31							—
					333	—	38.99	672	7.34							—
					345	—	35.49	673	7.46							—
					355	—	35.48	672	7.48							—

05/13/1

Date: 05/16/16

05/16/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0937		16.30	781046	24.3		—					N	N	N	N	N	none
BP-27 Groundwater (Injection Well)																
0935	303.58															
1358					333	—	9.63	581	8.09	Lt Purple						none
BP-29 (Lateral Pumping)																
0917	308.09	16.21	755203	24.3												Addressed small Leak @ well head piping. Pumping
1405					370	—	11.79	594	7.98	Lt Purple						none
WR-274A (Downgradient Pumping)																
0909	307.50	0	685602	0												
1353					341	—	6.02	480	7.96	Lt Purple						none
BP-26 (Monitoring Well)																
0913	306.67															0911 moved transducer
1415					320	—	12.45	604	8.04	Lt Purple						none
					333	—	18.30	611	8.05							
					345	—	21.19	613	7.99							
					355	—	19.75	613	8.02							
BP-28 (Monitoring Well)																
0923	306.72															~~0918. moved transducer~~ Or habit
1445					320	—	18.35	611	8.07	Lt Purple						none
					333	—	18.40	612	8.09							
					345	—	14.94	620	8.09							
					355	—	9.87	619	8.09							

Date: 05/17/16

05/17/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0709		16.32	802486	24.5		—					—	—	N	N	N	
BP-27 Groundwater (Injection Well)																
0707	303.59				320	—	11.99	614	7.87	Lt Purple	—	—	Y	~~Y~~ N	Y	
					333	—	11.38	633	7.88	"	—	—	Y	~~Y~~ N	Y	
BP-29 (Lateral Pumping)																
0654	308.07	16.21	97012.2	24.5	—						—	—				shut down BP-29 @ 1041 start WR-274. Ran 4 min then sampled. Restarted 1047.
							15.47	612	7.90	Lt Purple	—	—				
WR-274A (Downgradient Pumping)																
0646	307.51	—									—	—				
							7.01	630	7.92	Lt Purple	—	—				
BP-26 (Monitoring Well)																
0651	306.06										—	—				0648 moved transducer
	1100				320	—	11.69	627	7.84	Lt Purple						
					333	—	11.57	626	8.01							
					345	—	12.17	625	8.08							
					355	—	15.26	626	8.14							
BP-28 (Monitoring Well)																
0700	306.73										—	—				
	1125				320	—	17.32	636	8.10	Lt Purple						
					333	—	15.52	637	8.12							
					345	—	12.53	638	8.15							
					355	—	13.12	636	8.04							

FRAC TANK 1/2 FULL

Date: 05/17/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
1750		10.22	809304	17		—	83.83	641	8.08	Purple	—	—	N	N	N	none
BP-27 Groundwater (Injection Well)																
1610	304.95				333	—	84.71	647	8.03	Purple						injecting
BP-29 (Lateral Pumping)																
1601	307.58	10.06	103655	17	370	~~[illegible]~~ 1810	18.12	628	7.86	Lt Purple						Pumping
WR-274A (Downgradient Pumping)																
1553	307.41	0	685724	0	341	1815 →	7.20	632	7.94							
BP-26 (Monitoring Well)																
1556	306.0				—		~~13.03~~	~~635~~		—						1554 moved transducer
1835					320		13.03	635	7.83	Lt Purple						
					333		14.33	634	7.89							
					345		17.79	638	8.00							
					355		17.37	644	8.00							
BP-28 (Monitoring Well)																
1605	306.60				—		—									
1855					320		18.30	643	8.16	Lt Purple						
					333		16.27	651	8.14							
					345		12.94	655	8.05							
					355		13.52	660	7.98							

05/17/16

Date: 05/19/16

05/18/

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0626		10.03	81,680 ~~111021~~	17		0917 →	74.11	666	7.61	Purple	—	—	N	N	N	none
BP-27 Groundwater (Injection Well)																
0624	304.94				—											Injecting
0920					333	—	74.31	670	7.72	Purple						
BP-29 (Lateral Pumping)																
0614	307.68	10.23	111021	17	~~370~~		~~16.80~~	~~675~~	~~7.69~~							Pumping
0924	—				370	—	16.80	675	7.69	Lt Purple						
WR-274A (Downgradient Pumping)																
0604	307.60	0	685724	0	—		~~25.75~~	~~668~~	~~7.79~~							none
0928					341		25.75	668	7.79	Lt Purple						
BP-26 (Monitoring Well)																
0612	306.16				—											0609 moved transducer
0932					320		15.56	664	7.62	Lt Purple						
					333		15.81	657	7.70							
					345		17.64	654	7.80							
					355		18.70	655	7.87							
BP-28 (Monitoring Well)																
0620	306.75				—											
0945					320		18.63	662	7.75	Lt Purple						
					333		21.50	658	7.82							
					345		32.95	658	7.85							
					355		32.09	661	7.87							

Date: 05/18/16

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
1438		10.22 ~~10.03~~	821752 ~~115884~~	17 ~~17~~		1631 time	72.22	648	7.69	Purple	—	—	N	N	N	none
BP-27 Groundwater (Injection Well)																
1437	304.98				—											Injecting
—					—											
BP-29 (Lateral Pumping)																
1430	307.66	10.03	115884	17	—											Pumping
1635	—				—	~~1631~~	18.74	653	7.67	Lt Purple						
WR-274A (Downgradient Pumping)																
1423	307.57	—			—											none
BP-26 (Monitoring Well)																
1426	306.12				—											
1640					320		18.95 ~~23.06~~	654 ~~645~~	7.71 ~~7.64~~	Lt Purple						
					333		20.81 ~~34.25~~	655 ~~647~~	7.77 ~~7.73~~							
					~~345~~											
					355		22.88	651	7.76							
BP-28 (Monitoring Well)																
1433	306.74				—											
1652					320		23.06	645	7.64	Lt Purple						
					333		34.25	647	7.73							
					~~345~~											
					355		48.51	657	7.77							

05/18/

Date: 05/20/14

05/20/1

Time	Water Level	From Well Head			Field Tests for Individual Wells								Laboratory			Changes/ Shut Downs/ Transducer Moevment / Comments
		Flow Rate	Totalizer	Pressure	Sample Depth / Location	Oxidant Conc.	Colormetric Conc.	ORP	pH	Water Color	Soluble Iron	Total Iron	VOC Sample Taken	Metals Sample Taken	Just Mn	
	(btoc)	(gpm)	(gallons)	(psi)	(btoc)	(ppm)	(ppm)	(mV)			(ppm)	(ppm)	Y/N	Y/N	Y/N	
BP-27 Sample Port (Injection Well)																
0935		10.24	847994	17		1152	69.69	615	8.01	Purple			N	N	N	
BP-27 Groundwater (Injection Well)																
						1203										Injecting
0932	304.93				333		75.39	652	7.90							
BP-29 (Lateral Pumping)																
0925	307.65	10.09	141682	17												pumping
1159					370		12.56	617	8.03	Lt Purple						
WR-274A (Downgradient Pumping)																
0917	307.55															
1155					341		32.24	632	7.81	Purple						
BP-26 (Monitoring Well)																
0920	306.12															0918 moved transducer
1208					320		22.09	649	7.88	Purple						
					333		26.87	649	7.90							
					345		25.07	648	7.90							
					355		25.63	649	7.87							
BP-28 (Monitoring Well)																
0929	306.71															
1228					320		37.80	651	7.88	Purple						
					333		53.33	657	7.98							
					345		58.76	654	7.99							
					355		63.54	653	7.99							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/23	1021	—	10.21	892653	17	200:1	—	—	—	—		—		—	—	—	—
BP-27 Groundwater (Injection Well)																	
05/23	1019	304.84		—	0		—	—	—	—		—		—	—	—	—
	1459	—		—	0	320'	—	115.1	587	7.95		Y	Y	—	Purple	—	—
					0	333'	—	~~115~~ 118.8	1000	~~587~~ 2.25							
BP-29 (Lateral Pumping)																	
05/23	1007	307.63	10.06	855870	17			—	—	—						—	—
	1510	—	—	—	@370'			14.93	685	7.61				—	Lt Purple		
WR-274A (Downgradient Pumping)																	
05/23	0945	307.53 @SAMPLING	9.54	685853	19			—	—	—				—			—
BP-26 (Monitoring Well)																	
~~1004~~ 05/23	1004	306.10						—	—	—				—			Poor mand transducer
	1523	320' 333'						30.47 39.87	667 686	7.75 7.78				—	Lt Purple		
		355'						38.16	682	7.81							
BP-28 (Monitoring Well)																	
05/23	1016	306.69						—	—	—				—			—
	1535	320' 333'						37.31 43.13	680 678	7.90 7.91				—	Lt Purple		
		355'						43.89	677	7.66							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/24	0700	—	10.26	904734	17	—	—										
	0931							14.89	665	7.89							
	1235							18.98	663	7.88							
BP-27 Groundwater (Injection Well)																	
05/24	0726	304.89		—	0	off	—	—	~~661~~	—							
	0923			—	0	—	—	15.24	661	7.81							
	1238				0			16.08	657	7.79							
BP-29 (Lateral Pumping)																	
05/24	0714	307.63	10.00	197217	17			~~14.11~~	~~655~~	~~7.65~~						Shut down Dosatron	None
	0928	—	—	—	—			14.11	655	7.65						pumping	
	1242							14.91	638	7.60							
WR-274A (Downgradient Pumping)																	
05/24	0705	307.58	—	—	—			~~247~~	—	—							
	0920	—	—	—	—			24.77	691	7.46							
	1247							25.43	680	7.70			ORP	Oxidant Conc.	pH		
BP-26 (Monitoring Well)																	
05/24	0710	306.14						—				05/24 1252					0707 moved transducer
	0935	320 333						39.58 53.20	662 664	7.63 7.85			665 674	40.05 55.50	7.73 7.75		
		345 355						74.50 73.60	670 669	7.87 7.99			679 672	76.13 73.48	7.86 7.84		
BP-28 (Monitoring Well)																	
05/24	0722	306.74						—				05/24 1305					
	0955	320 333						37.29 45.23	671 673	7.99 7.95			659 661	54.21 65.29	8.02 7.98		
		345 355						40.66 39.78	672 672	7.96 7.97			664 665	69.17 71.03	7.98 7.81		

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/25	0619		10.64	919656	15	—	—	~~16.06~~		~~7.53~~		N	N	N	Lt Purple	—	ORP CAL 244 ORP-PH 253 PH 8.21
	0805	—						16.06	606	7.53							
BP-27 Groundwater (Injection Well)																	
05/25	0618	304.86		—	0	—									Lt Purple	—	
	0840				0			19.04	634	7.85							
					0												
BP-29 (Lateral Pumping)																	
05/25	0612	307.65	10.57	212001	15			—							Lt Purple	—	
	0809	—						15.83	646	7.70							
WR-274A (Downgradient Pumping)																	
05/25	0605	307.55	—	—	—			—							Lt Purple	—	
	0816	—						22.86	642	7.66							
BP-26 (Monitoring Well)																	
05/25	0609	306.11						—							Lt Purple	—	0600 moved transducer
	0819	320 333						35.07 42.07	658 661	7.74 7.77							
		345 355						42.59 41.60	662 662	7.78 7.78							
BP-28 (Monitoring Well)																	
05/25	0615	306.72						—							Purple	—	
	0834	320 333						53.01 54.18	656 663	7.78 7.79							
		345 355						51.02 54.72	665 667	7.79 7.78							

Date	Time	Water Level	From Well Head			Dosatron Setting	Solution Conc.	Field Tests for Individual Wells				Laboratory			Water Color	Operational Changes	Shut Downs? Actions Taken?
			Flow Rate	Totalizer	Pressure			Oxidant Conc.	ORP	pH	Iron Soluble/ Total	VOC Sample Taken	Metals Sample Taken	First Pink Water Taken			
		(btoc)	(gpm)	(gallons)	(psi)	(# : #)	(%)	(ppm)	(mV)		(ppm)	Y/N	Y/N	Y/N			
BP-27 Sample Port (Injection Well)																	
05/27	0843	—	10.70	951698	15	—	—										1335 Shut down BP-29
BP-27 Groundwater (Injection Well)																	
05/27	0733	304.80			0	—	—										
	1246	333			0			18.89	560	8.02		Y	Y		Lt Purple		
					0												
BP-29 (Lateral Pumping)																	
05/27	0726	307.64	10.60	243794	15			—									Flow meter total #1 245356
	1237	370						14.15	655	7.93		Y	Y				
	1335		10.58	245	15												
WR-274A (Downgradient Pumping)																	
05/27	0719	307.57	start 685995		15			—									
			stop 686090		15												
	1230	341						21.71	583	8.07		Y	Y				
BP-26 (Monitoring Well)																	
05/27	0723	306.12						—									0720 moved transducer
	1310	320						32.82	670	7.90		—	—				
		333						35.88	649	7.88		Y	Y				
		345						41.33	622	7.88		—	—				
		355						41.34	668	7.91		—	—				
BP-28 (Monitoring Well)																	
05/27	0730	306.74						—									
	1330	320						26.32	666	7.86		—	—				
		333						19.47	654	7.89		Y	Y				
		345						20.12	657	7.87		—	—				
		355						20.38	661	7.85		—	—				

APPENDIX E

PLOTS OF ISCO TEST DATA

Figure E.1

PCE and $NaMnO_4$ Concentrations vs Time in Well BP-26

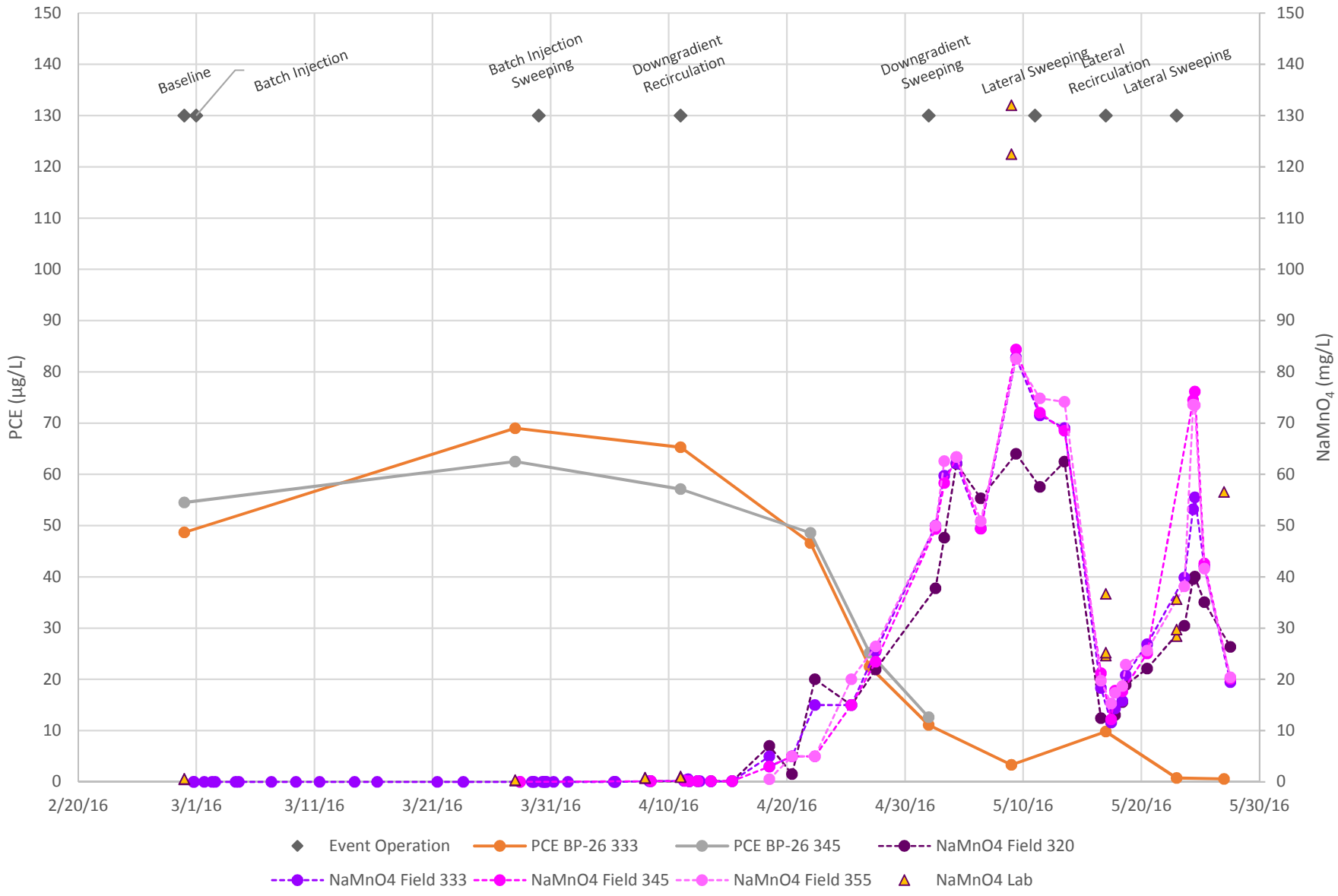


Figure E.2
PCE and $NaMnO_4$ Concentrations vs Time in Well BP-27

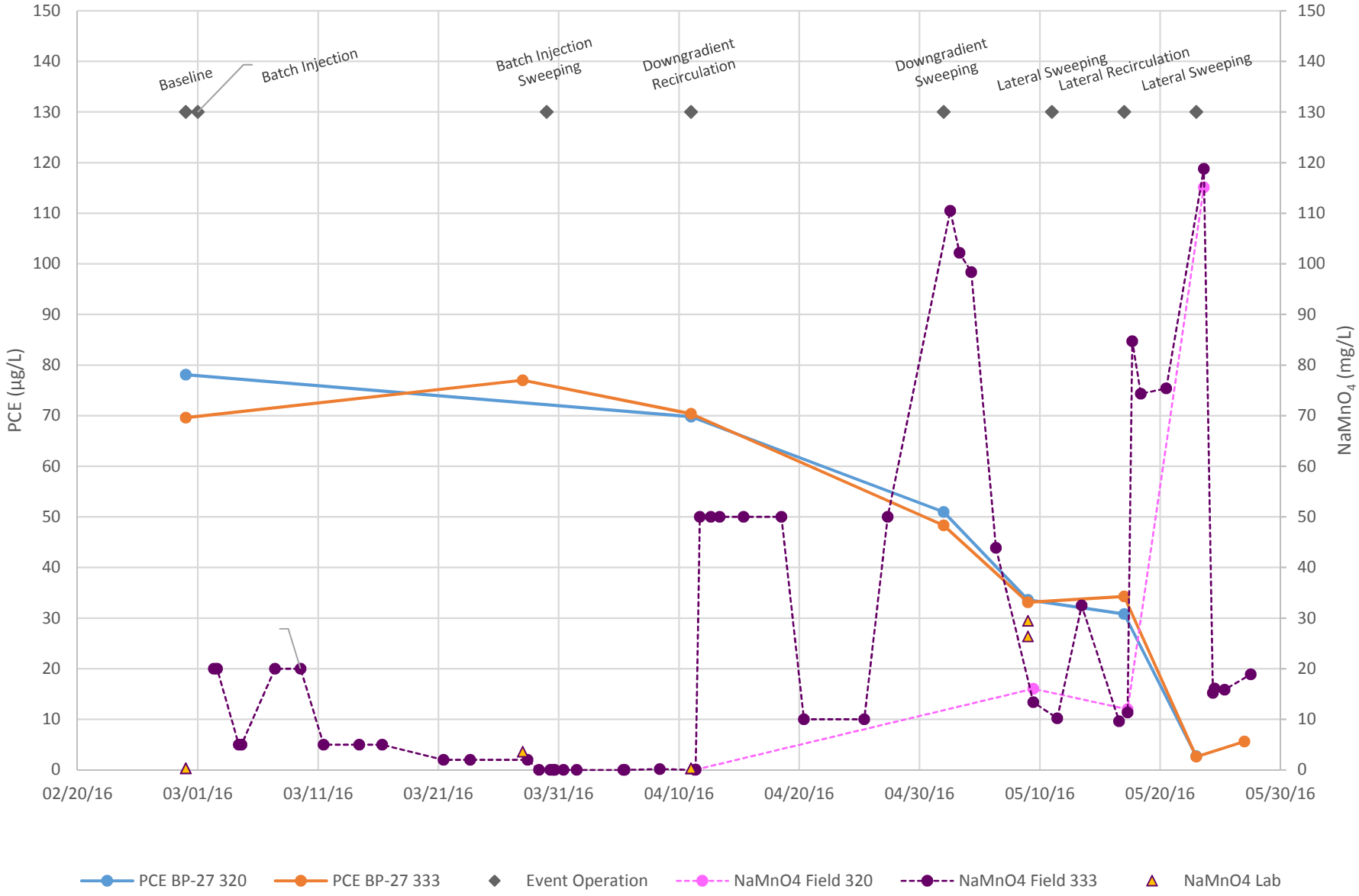


Figure E.3
PCE and $NaMnO_4$ Concentrations vs Time in BP-28

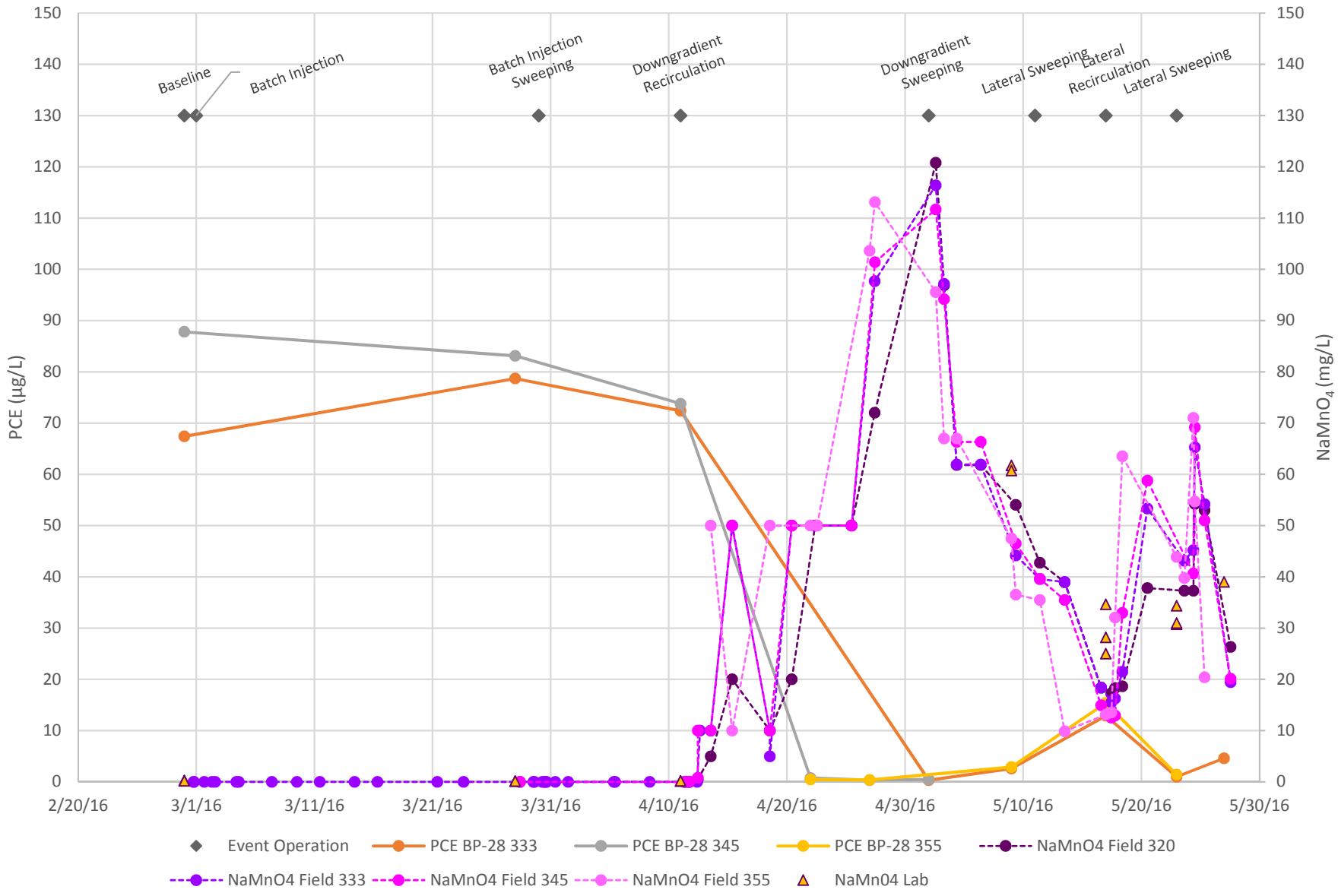


Figure E.4

PCE and $NaMnO_4$ Concentration vs Time in BP-29 at 370 feet bgs

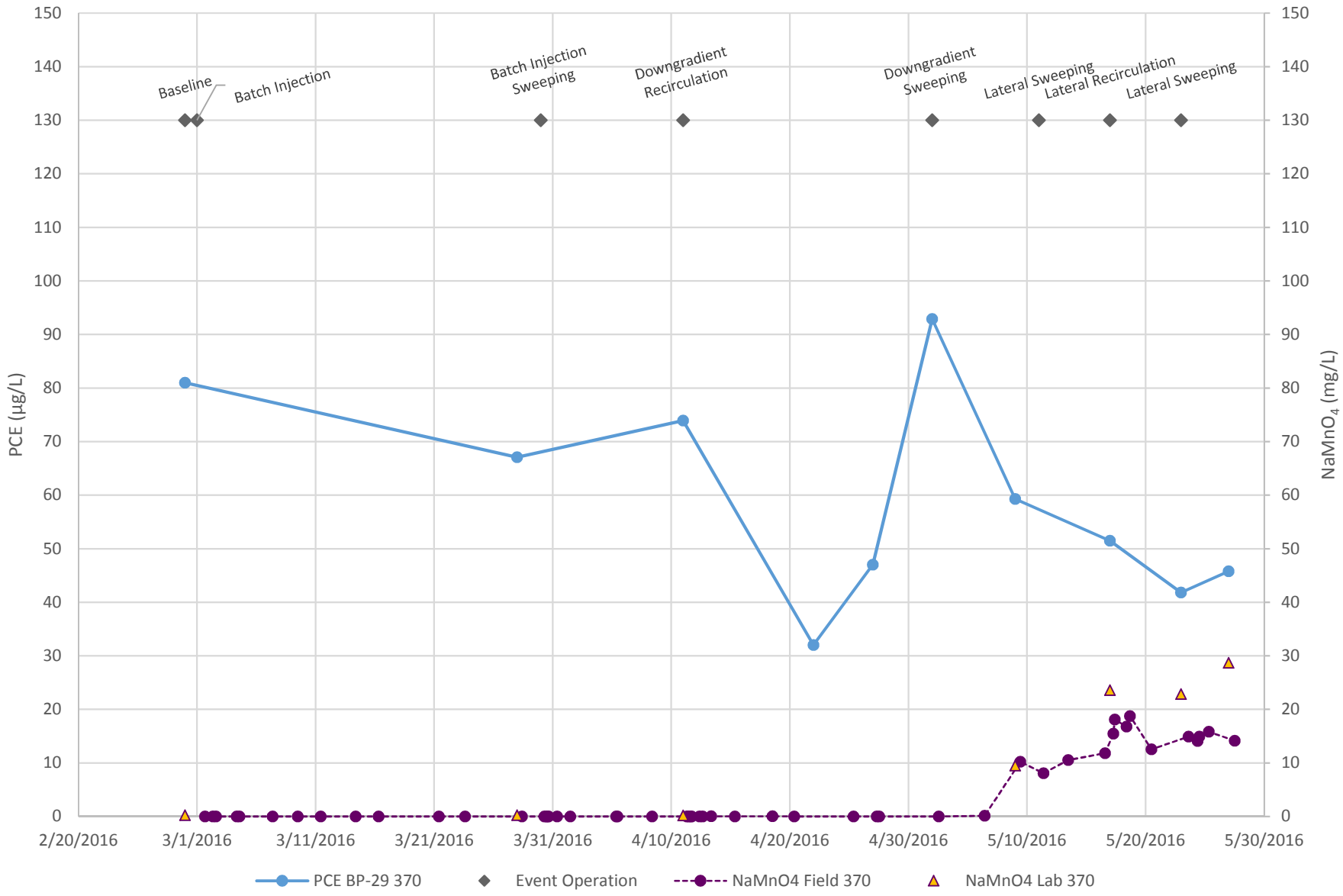


Figure E.5

PCE and $NaMnO_4$ Concentrations vs Time in WR-274 at 341 feet bgs

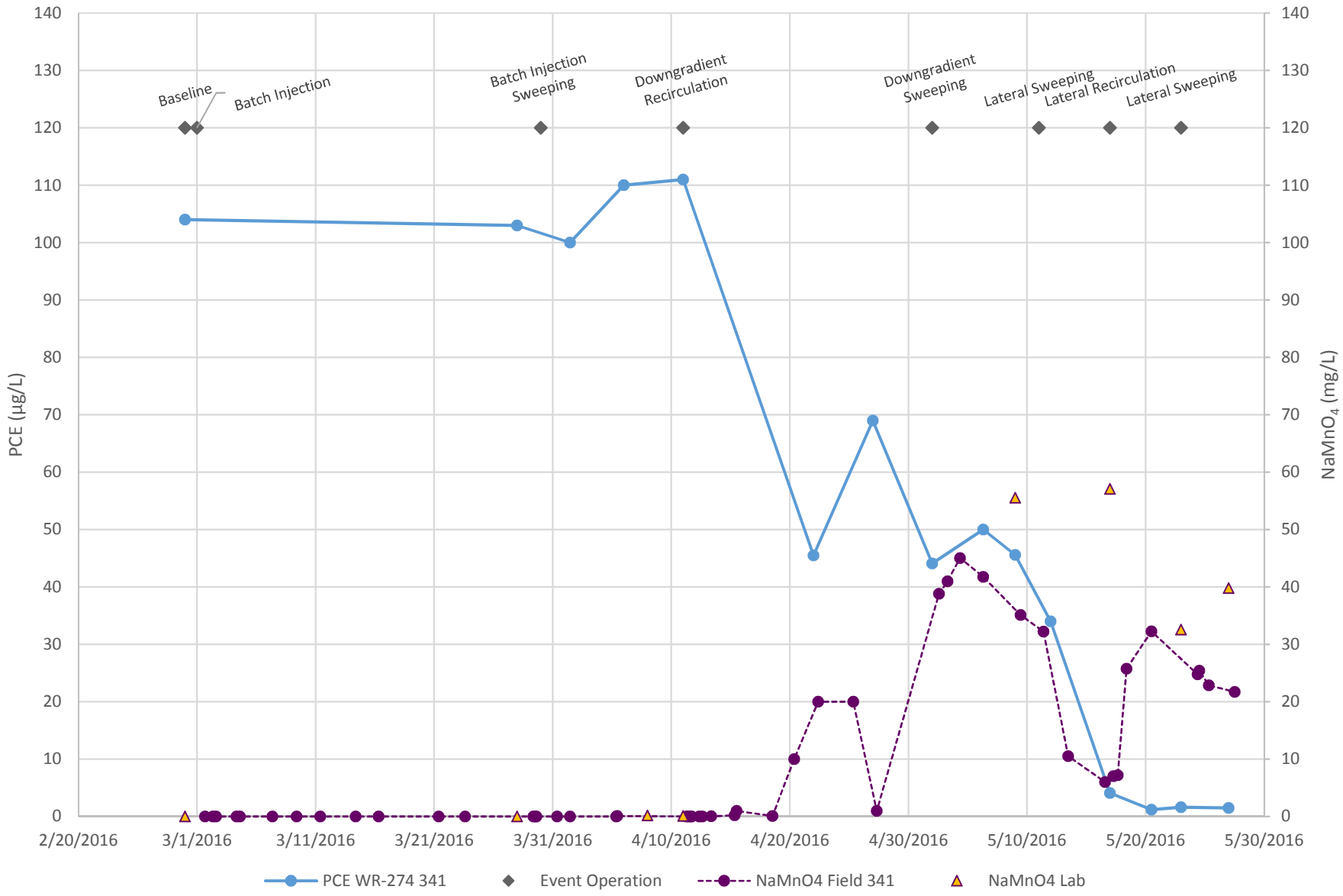


Figure E.6

Select Volatile Organic Compound Concentrations over Time at BP-26 at 333 feet bgs

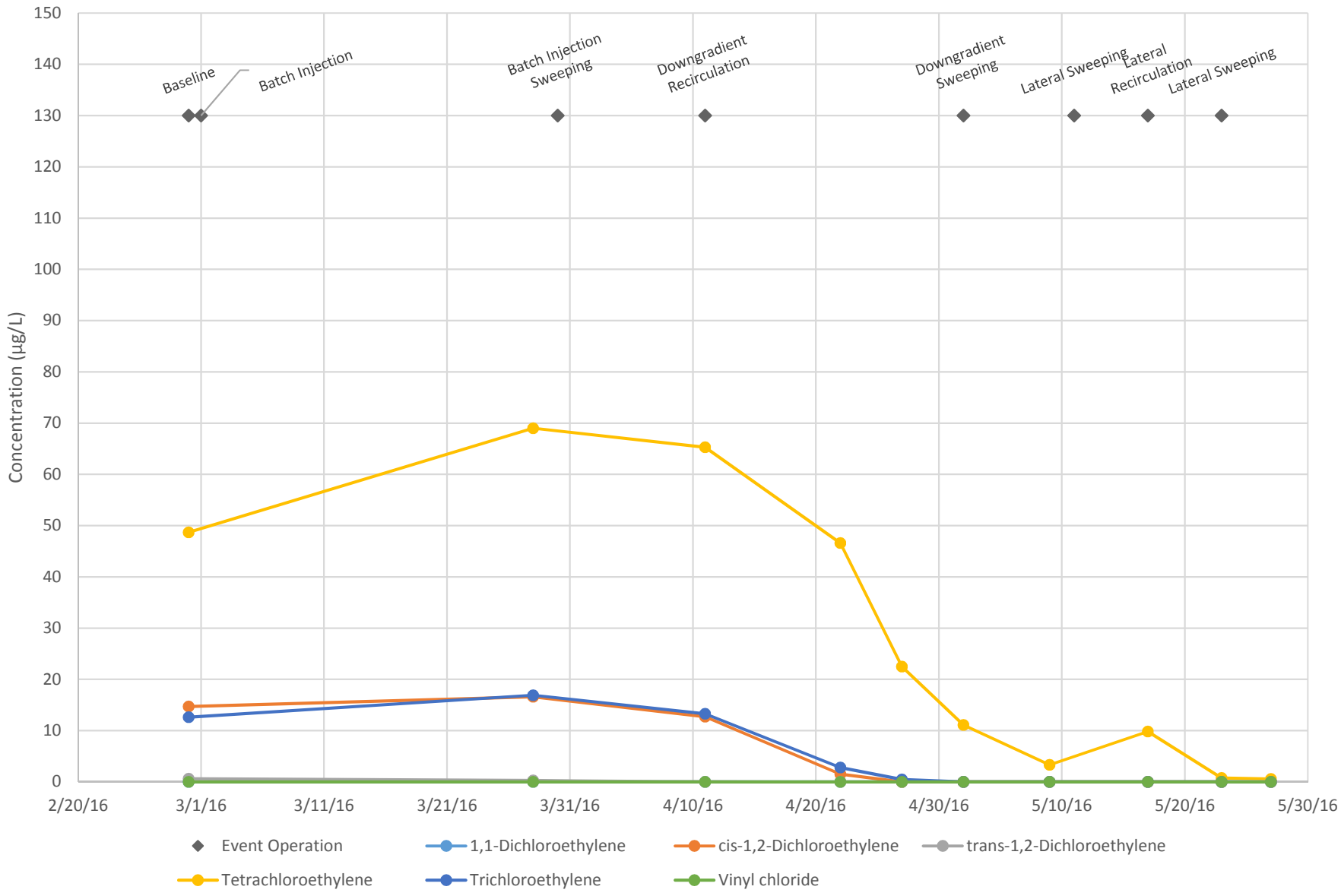


Figure E.7
Chromium and $NaMnO_4$ Concentrations vs Time at BP-26

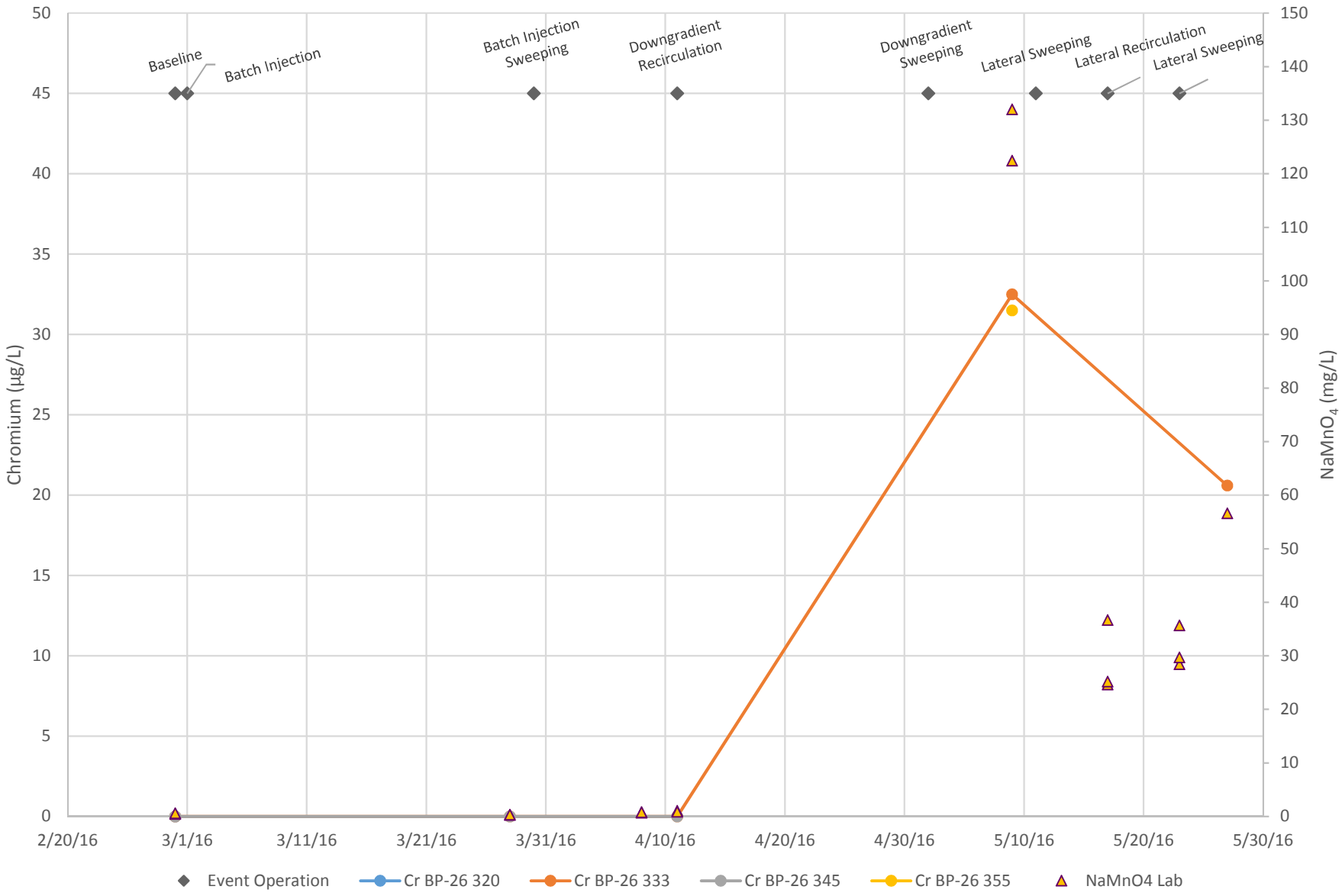


Figure E.8
Chromium and $NaMnO_4$ Concentrations vs Time at BP-27

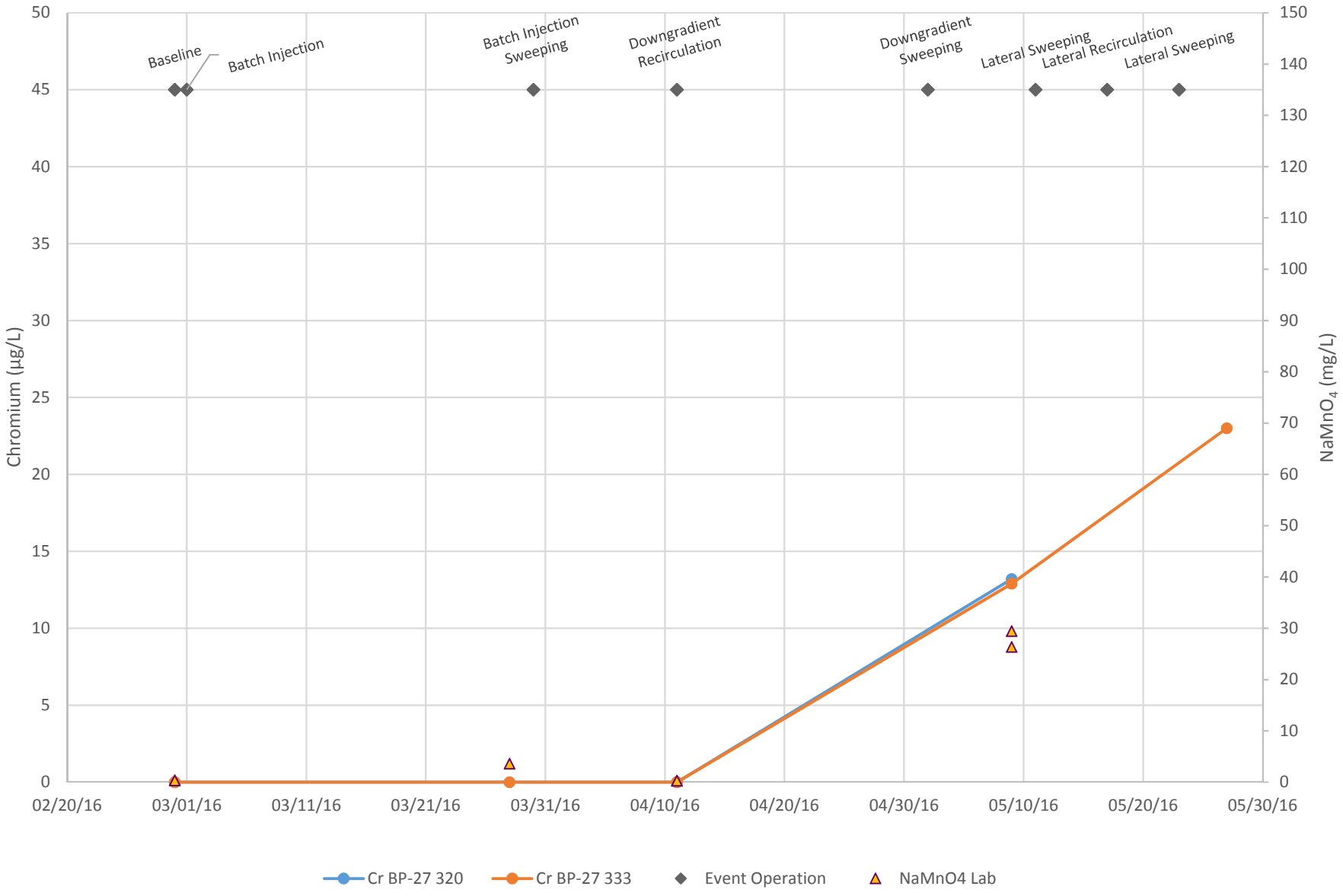
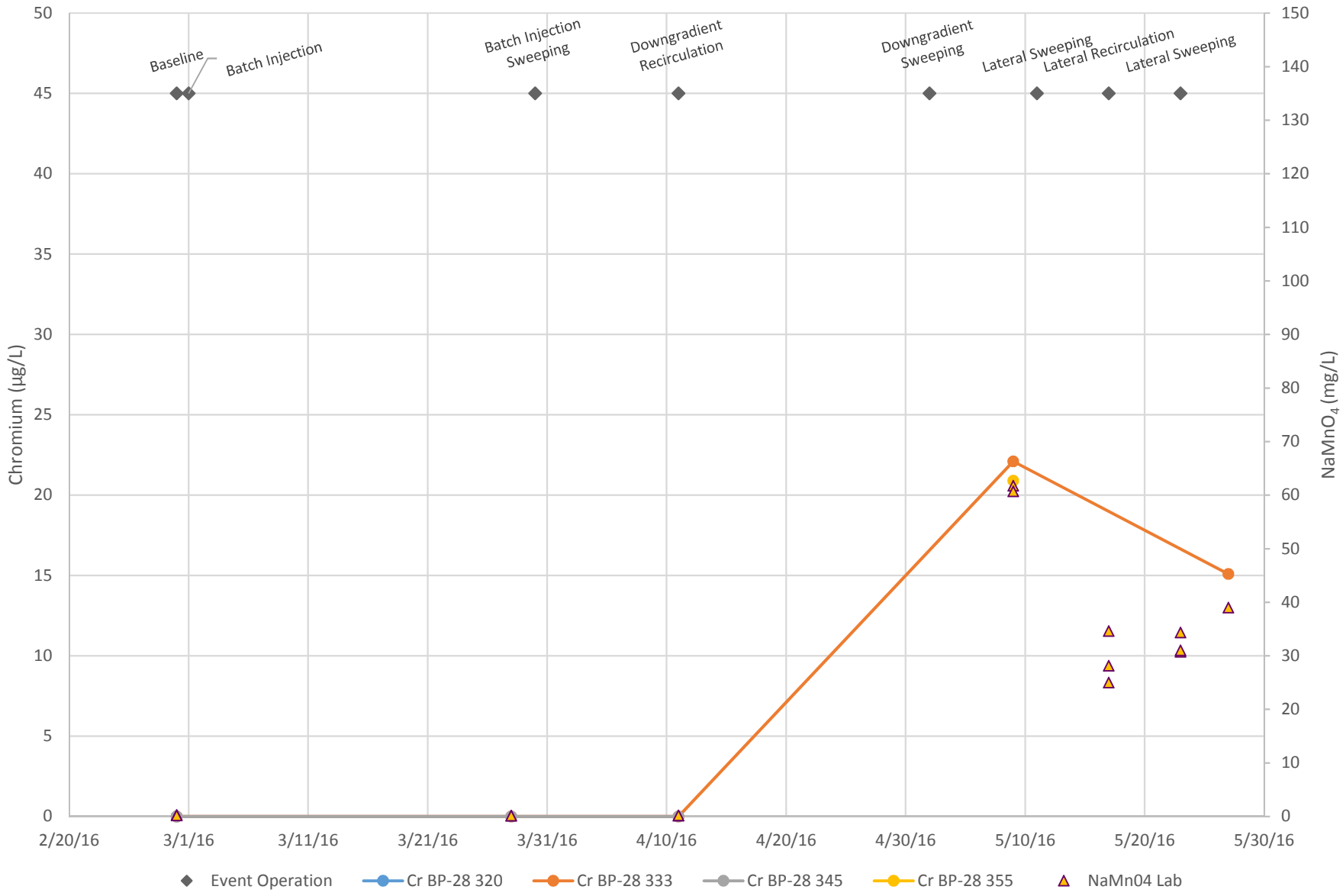


Figure E.9
Chromium and $NaMnO_4$ Concentrations vs Time at BP-28



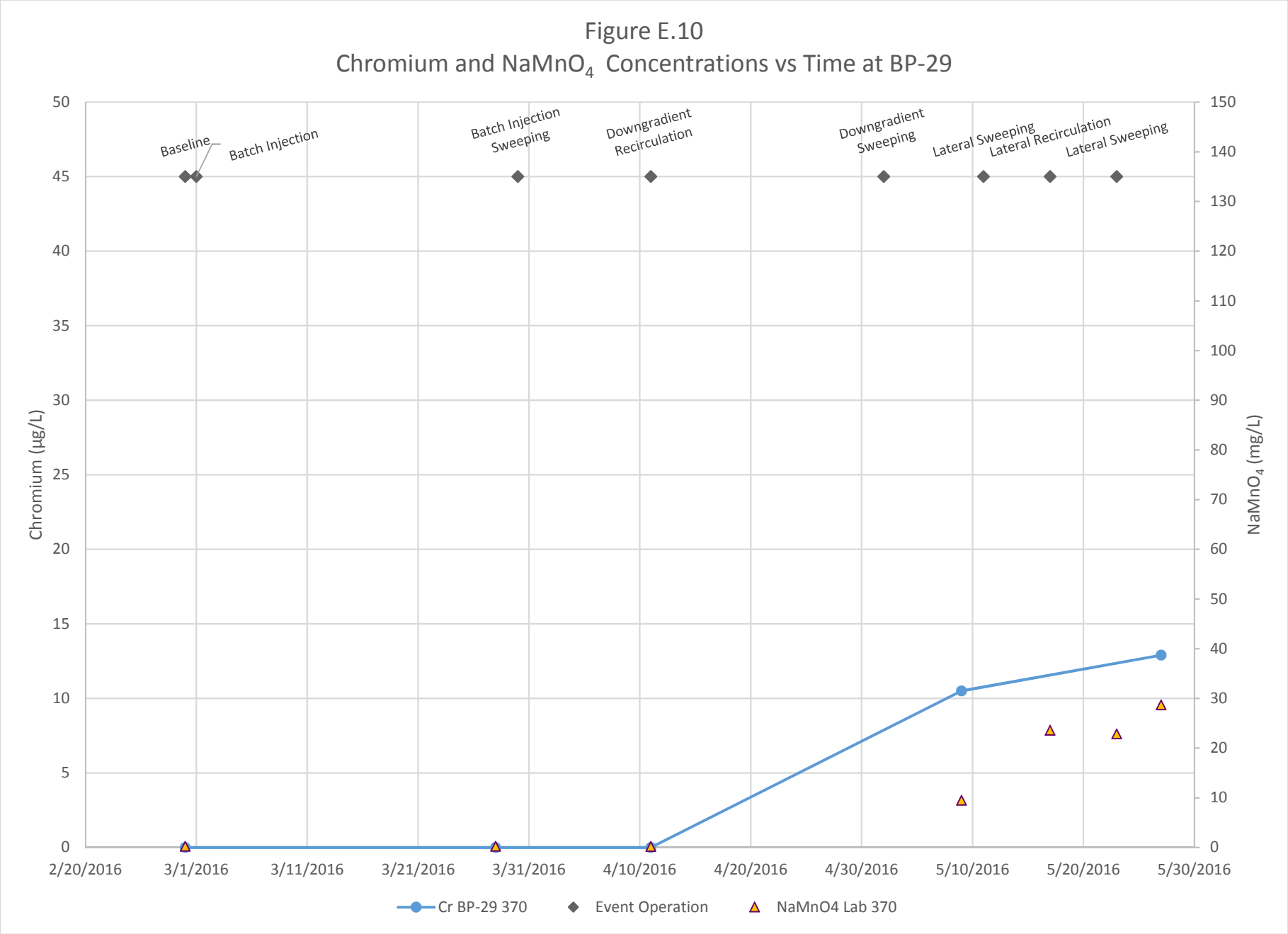
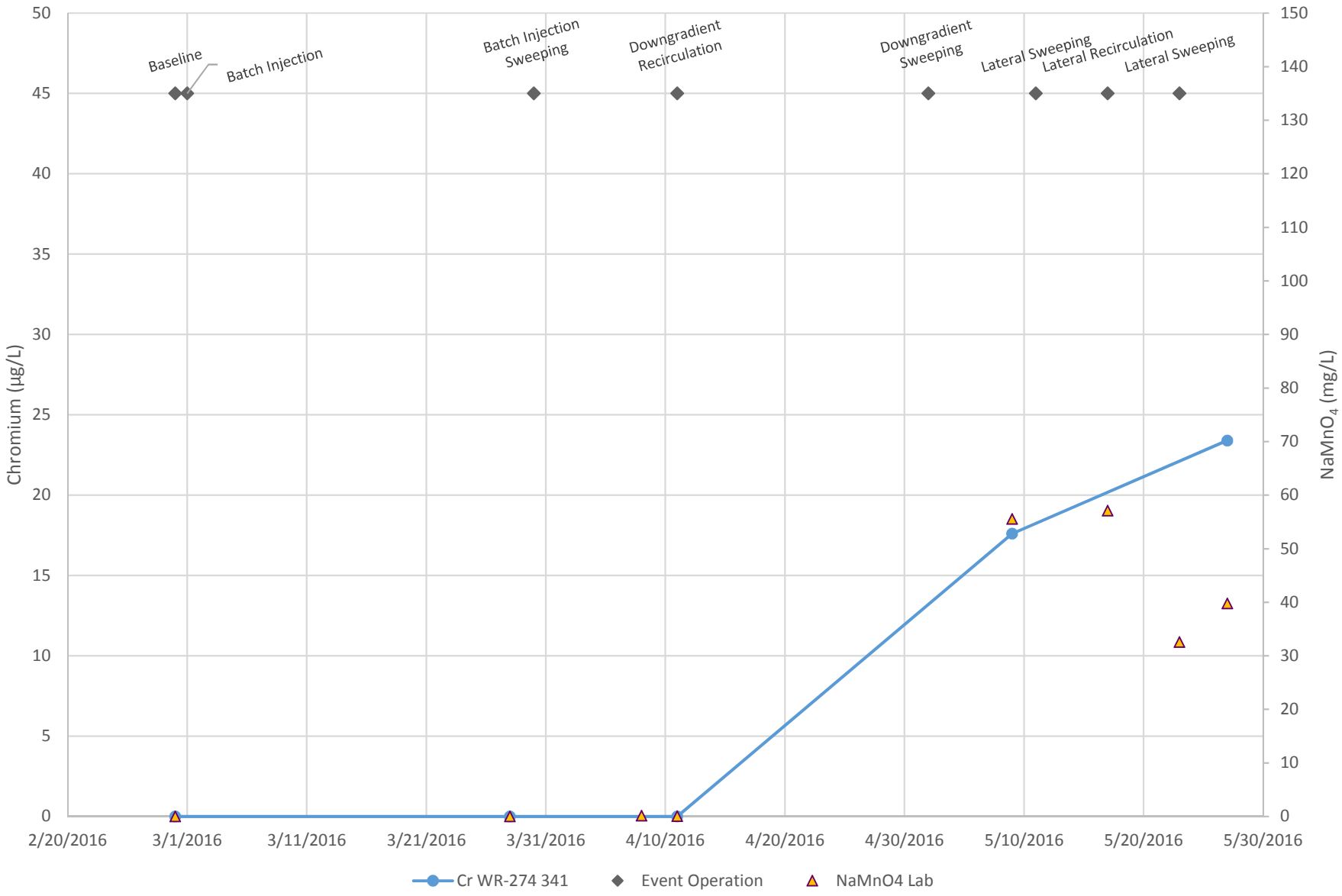


Figure E.10
Chromium and NaMnO4 Concentrations vs Time at BP-29
Baseline
Batch Injection
Batch Injection Sweeping
Downgradient Recirculation
Downgradient Sweeping
Lateral Sweeping
Lateral Recirculation
Lateral Sweeping
Chromium (µg/L)
NaMnO4 (mg/L)
50
45
40
35
30
25
20
15
10
5
0
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
2/20/2016
3/1/2016
3/11/2016
3/21/2016
3/31/2016
4/10/2016
4/20/2016
4/30/2016
5/10/2016
5/20/2016
5/30/2016
Cr BP-29 370
Event Operation
NaMnO4 Lab 370

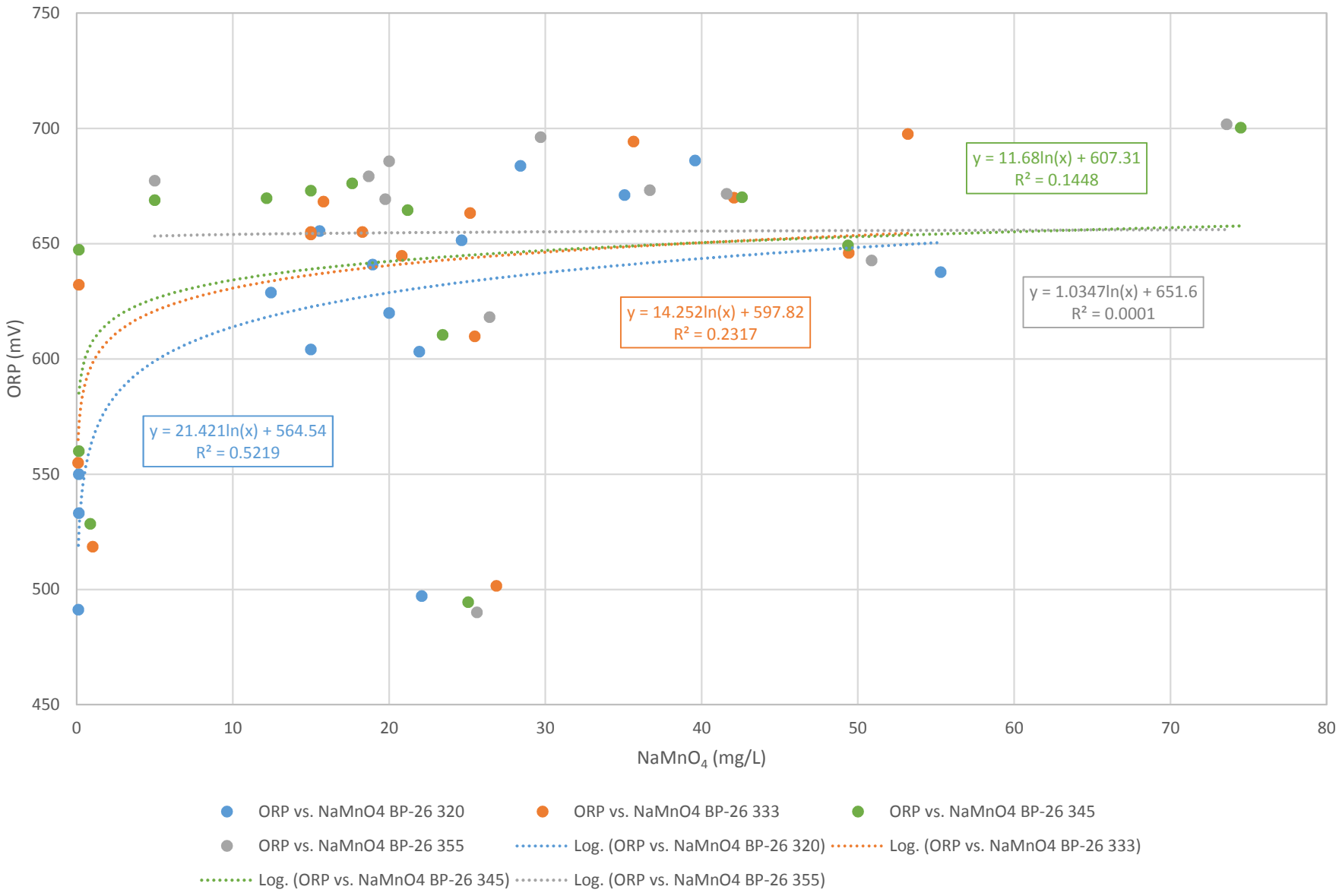
Figure E.11
Chromium and $NaMnO_4$ Concentrations vs Time at WR-274



APPENDIX F

PLOTS OF DOWNHOLE ORP DATA

Figure F.1
ORP vs $NaMnO_4$ Concentration in Well BP-26



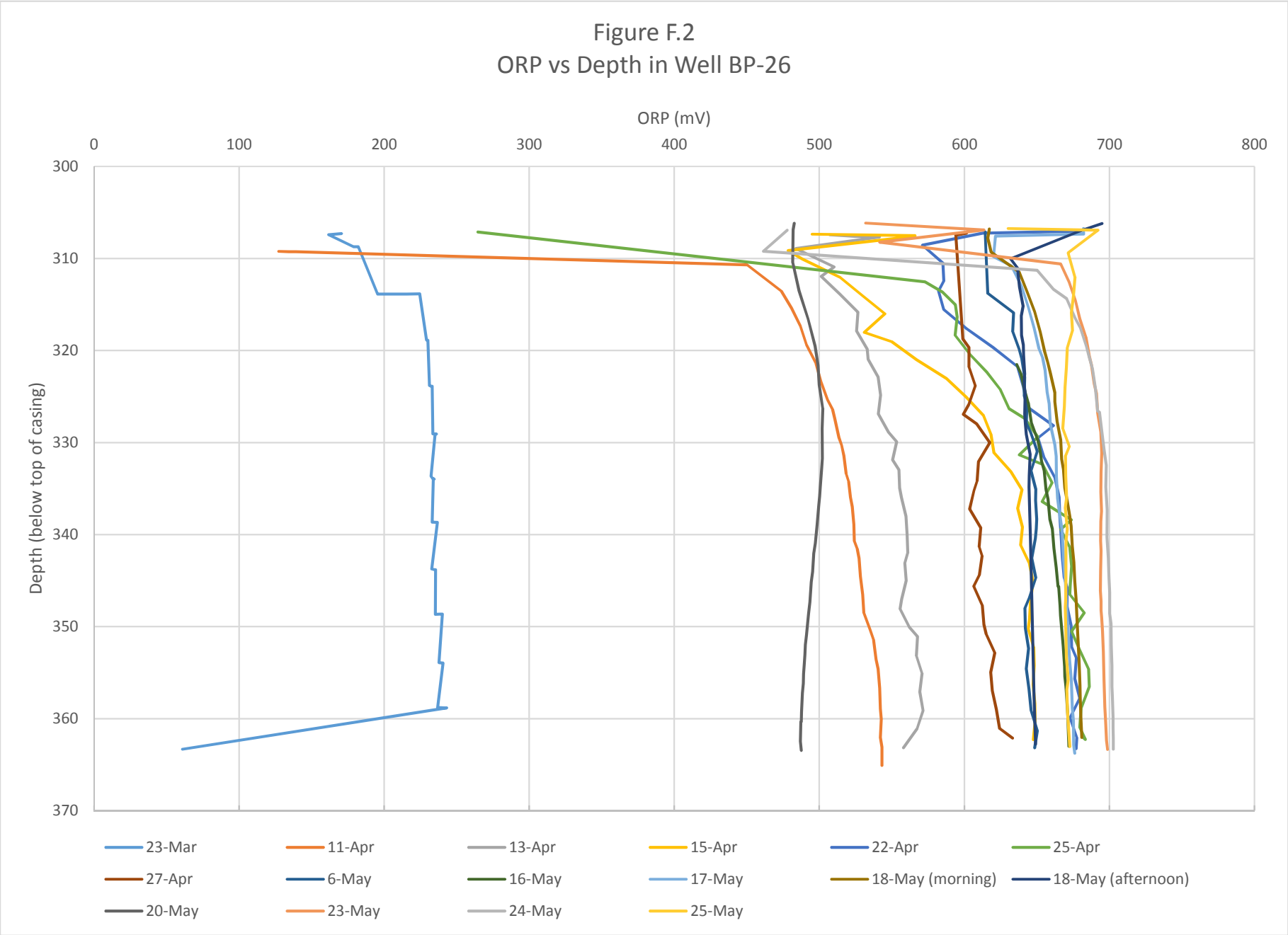


Figure F.2
ORP vs Depth in Well BP-26
ORP (mV)
0
100
200
300
400
500
600
700
800
Depth (below top of casing)
300
310
320
330
340
350
360
370
23-Mar
11-Apr
13-Apr
15-Apr
22-Apr
25-Apr
27-Apr
6-May
16-May
17-May
18-May (morning)
18-May (afternoon)
20-May
23-May
24-May
25-May

APPENDIX G

PCE CONCENTRATION DECAY ANALYSIS

Figure G.1
First Order Decay in BP-26 at 333 ft bgs During Downgradient Recirculation

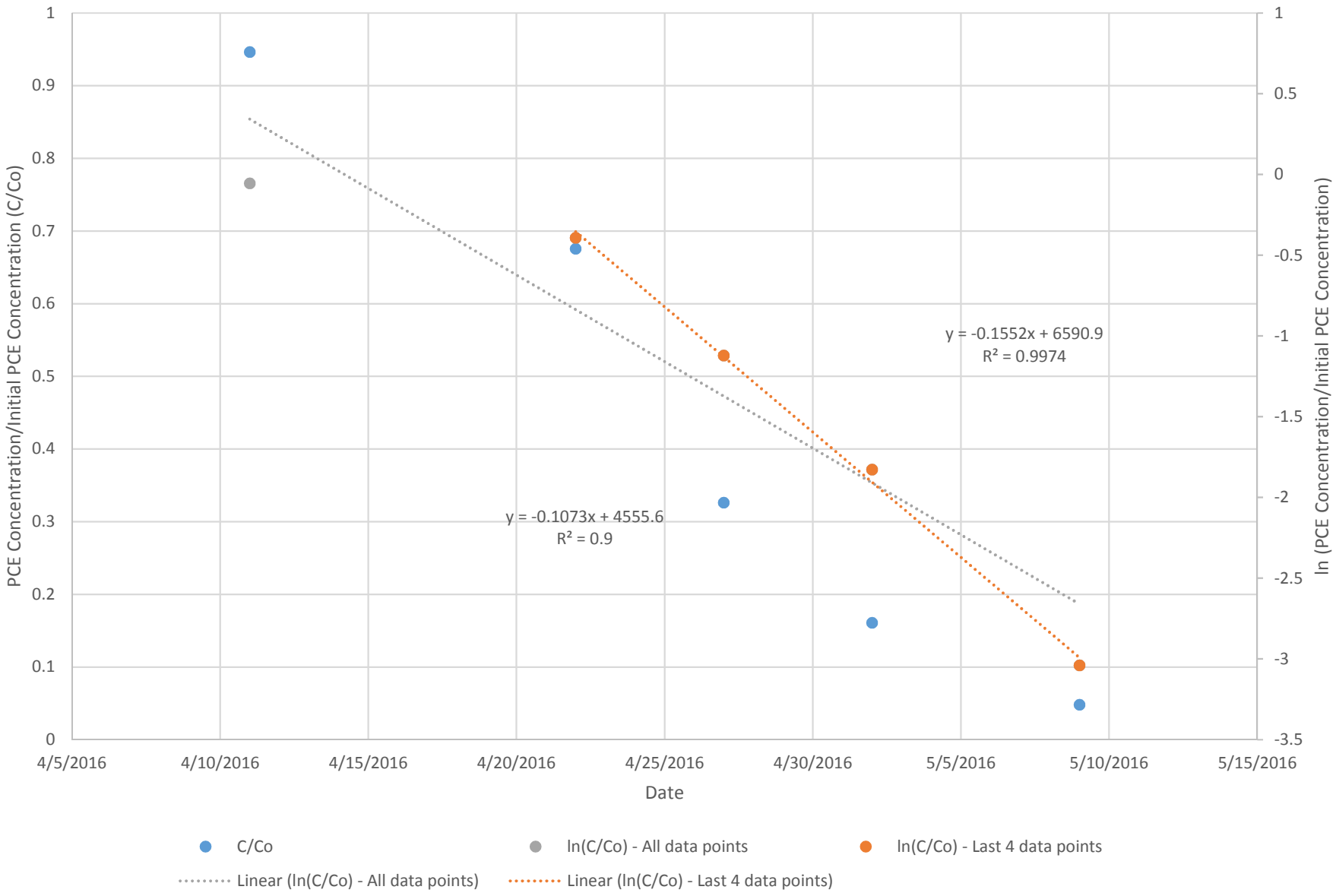
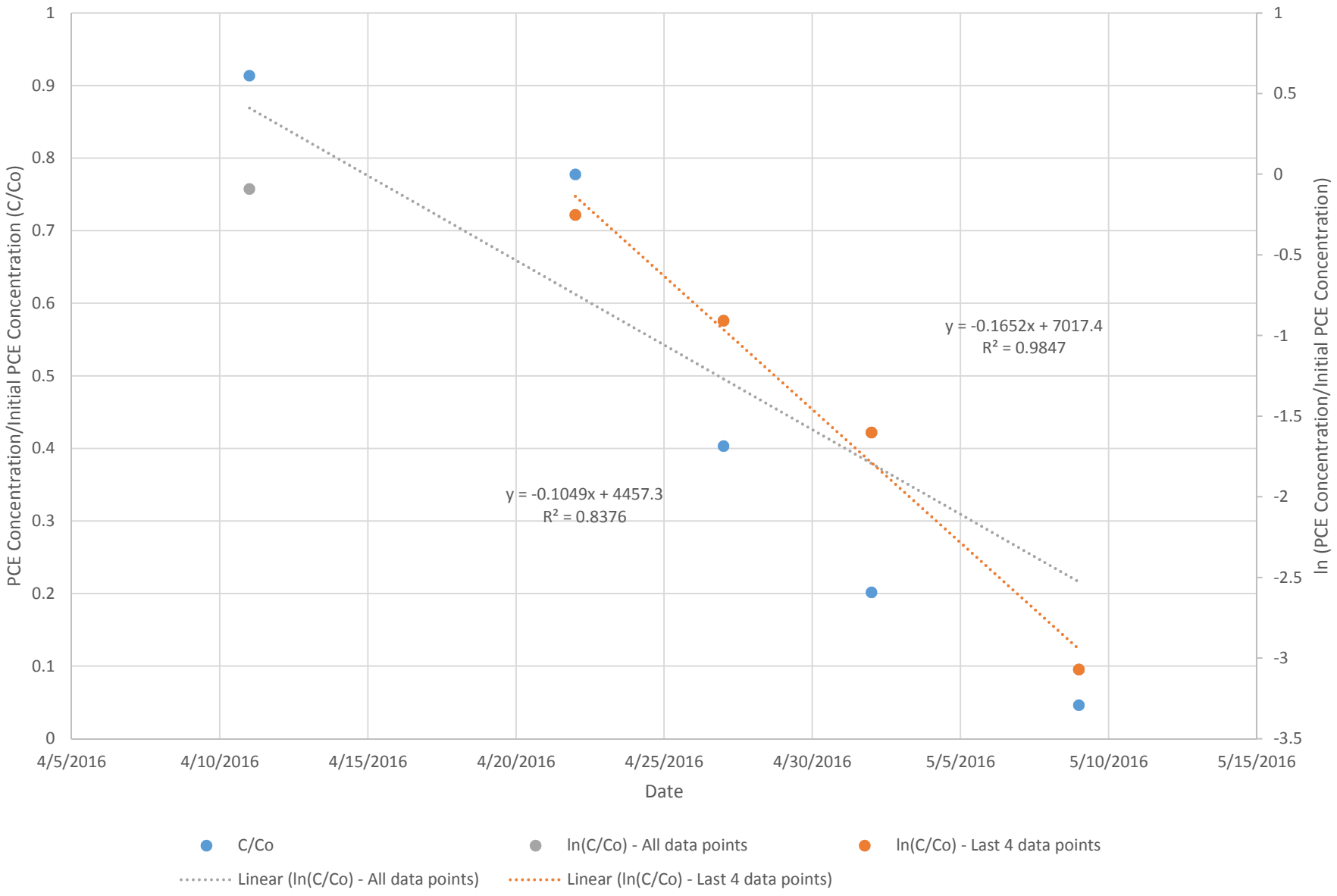


Figure G.2
First Order Decay in BP-26 at 345 ft bgs During Downgradient Recirculation



APPENDIX H

UA CONTAMINANT MASS DISCHARGE ANALYSIS

Permanganate Injection Pilot Test at the Broadway-Pantano WQARF Site: UA Sampling Results

Mark L Brusseau

University of Arizona

August 2016

Summary:

Dr. Mark Brusseau from the University of Arizona developed a collaborative effort with ADEQ and AMEC Foster Wheeler to collect groundwater samples during a planned in-situ chemical oxidation (ISCO) pilot test to be conducted at the Broadway-Pantano WQARF Site. The purpose of this effort was to supplement and complement the planned project sampling schedule, with the additional data to support a performance assessment of the ISCO test. The analysis is focused on the initial permanganate injection/extraction sub-test, conducted with a longitudinal injection-extraction flow scheme [injection well = IW-1; extraction well = WR-274A].

With the assistance of AMEC-FW and ADEQ personnel, the UA collected 6 sets of samples. The samples were analyzed at a commercial laboratory (Turner) using standard methods. The results of the analyses have been disseminated to AMEC-FW and ADEQ. The data are plotted in Figure 1, along with the results reported by AMEC-FW for their sampling. It is noted that the concentrations obtained for the two sets of samples are consistent.

The basis for the performance assessment is to compare contaminant mass discharge (or concentrations for systems for which there is minimal change in fluid discharge rates) measured before and after injection of the ISCO reagent. The three relevant stages of the ISCO test and the associated CMD analysis are noted in Figure 1. It is noted that the UA samples are the only ones that were collected in the post-ISCO injection stage, prior to the change in flow scheme. These data, in conjunction with the data collected prior to the permanganate injection provide the means to conduct the performance assessment. Concentration reductions of approximately 68% are obtained by comparing the final post-ISCO PCE and TCE concentrations (for samples collected during stage 3) to the mean concentrations for stage 1.

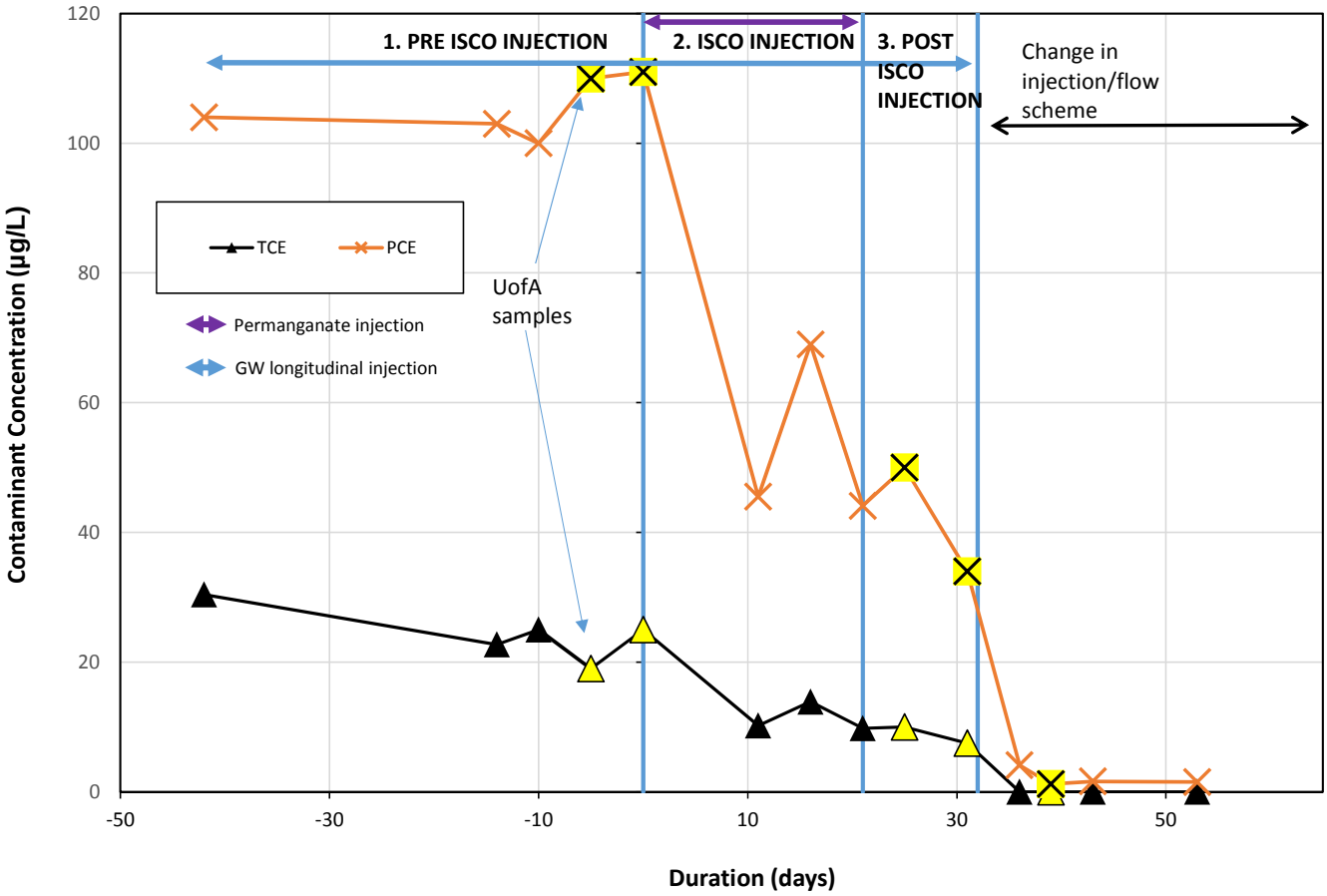


Figure 1. Data for ISCO pilot test. Data points represent concentrations of constituents in groundwater samples collected from well WR-274A. UA samples are highlighted in yellow.