Former Joliet Army Ammunition Plant
Will County, Illinois

Final
2014 Semi-annual Groundwater Monitoring Report

Long-Term Monitoring for Multiple Groundwater Sites

Prepared For:
U.S. Army Environmental Command

Firm Fixed Price Contract
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ACRONYMS AND ABBREVIATIONS

ACSIM	Assistant Chief of Staff for Installation Management
Army	United States Army
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeters per second
COC	contaminant of concern
1,1-DCA	1,1-dichloroethane
cis-1,2-DCE	cis-1,2-dichloroethene
2,4-DNT	2,4-dinitrotoluene
2,6-DNT	2,6-dinitrotoluene
2-A-4,6-DNT	2-amino-4,6-dinitrotoluene
4-A-2,6-DNT	4-amino-2,6-dinitrotoluene
DO	dissolved oxygen
DNB	1.3-dinitrobenzene
ft	foot/feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
GMZ	groundwater management zone
GOU	Groundwater Operable Unit
GRU	Groundwater Remedial Unit
IAC	Illinois Administrative Code
IC	institutional control
ID	inside diameter
IEPA	Illinois Environmental Protection Agency
in.	inch
J	estimated concentration
JOAAP	Joliet Army Ammunition Plant
LAP	Load-Assemble-Package Area

LTM	long-term monitoring
LTM Plan	Final Long-term Monitoring Plan for Environmental Remediation Services, TolTest/MWH, March 2010
MDL	method detection limit
MEC	munitions and explosives of concern
MFG	Manufacturing Area
mg/L	milligrams per liter
ml	milliliters
ml/min	per minute
MNA	monitored natural attenuation
MNTP	Midewin National Tallgrass Prairie
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
MWH	MWH Americas, Inc.
NB	nitrobenzene
ND	not detected
NPL	National Priority List
2-NT	2-nitrotoluene
OD	outside diameter
ORP	oxidation-reduction potential
OUs	operable units
PL	Public Law
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
RA	remedial action
Report	Semi-annual Groundwater Monitoring Report
RDX	Research Department Explosive
RG	remediation goal
RI	Remedial Investigation
1998 ROD	Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas, National Priorities List Sites (U.S. Army, October 1998)

SOPs	standard operating procedures
SOU	Soil Operable Unit
SpC	specific conductivity
SVOC	semivolatile organic compound
TAL	target analyte list
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
TNB	1,3,5-trinitrobenzene
TNT	2,4,6-trinitrotoluene
TOC	top of casing
TolTest	TolTest, Inc.
µg/L	micrograms per liter
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds
Work Plan	Final Work Plan Addendum – Site M13 Monitoring Well Installation (MWH, 15 October 2014)

1.0 INTRODUCTION

This Semi-annual Groundwater Monitoring Report (Report) has been prepared by MWH Americas, Inc. (MWH) for environmental remediation services at the former Joliet Army Ammunition Plant (JOAAP) on behalf of the United States Army Environmental Command (USAEC) under Assistant Chief of Staff for Installation Management (ACSIM) Firm-Fixed Price Contract No. W9124J-14-P-0142.

The long-term monitoring (LTM) program of the Groundwater Operable Unit (GOU) and landfill inspection documentation for the Soil Operable Unit (SOU) at the former JOAAP is in response to the *Record of Decision for the Soil and Groundwater Operable Units on the Manufacturing and Load-Assemble-Package Areas* (U.S. Army, 1998), (1998 ROD) for the JOAAP facility. The remedy that was selected for the GOU Sites at JOAAP was monitored natural attenuation (MNA). As a function of the MNA remedy for the Groundwater Remedial Units (GRU), LTM is required. This requirement is intended to satisfy three primary objectives:

1. Monitor contaminant concentration reductions and plume migration;

2. Verify containment of contaminant concentrations greater than the Remediation Goal (RG) within the groundwater management zones (GMZ); and

3. Evaluate the effectiveness of SOU remedial action (RA) and MNA for the GOU remedy.

In addition, SOU RAs included the construction of three landfills at Sites L3, M11, and M13. Landfill inspections are required quarterly to determine if the remedy continues to function as designed.

These objectives are being met through implementation of the LTM program.

The objective of this Report is to provide a data submittal of the groundwater quality sampling results from the 1st and 2nd quarterly sampling events and provide documentation of landfill inspections. However, TolTest, Inc. (TolTest) did not complete the 1st quarterly groundwater sampling at Site M13 or landfill inspections for 2014 (typically completed in January) prior to their bankruptcy. Therefore, this Report only includes the groundwater quality results from the 2nd quarterly sampling and the Post-closure Inspection Report (conducted in October 2014).

Additionally, water table and potentiometric surface maps for the completed sampling event are included.

1.1 FACILITY DESCRIPTION AND BACKGROUND

Joliet Army Ammunition Plant is a former United States Army (Army) munitions production facility located on approximately 36 square miles (23,542 acres) of land in Will County, Illinois (Figure 1-1). The former facility is located approximately 60 miles southwest of Chicago and 14 miles south of Joliet, Illinois. As shown on the Groundwater Study Areas and Landfill Sites Map (Figure 1-2), the JOAAP property is divided into two main functional areas: the Manufacturing Area (MFG), west of Route 53, and the Load-Assemble-Package Area (LAP), east of Route 53. The facility has been described in detail in Section 1.1 of the *Final Long-term Monitoring Plan for Environmental Remediation Services* (LTM Plan [TolTest/MWH, March 2010]).

The MFG Area, covering approximately 14 square miles (9,159 acres), is where the chemical constituents of munitions, propellants, and explosives were produced. The production facilities were generally located in the northern half of the MFG Area. In the southern half of the MFG Area, there was an extensive explosives storage facility. The LAP Area, covering approximately 22 square miles (14,383 acres), is where munitions were loaded, assembled, and packaged for shipping. The LAP Area contained munitions filling and assembly lines, storage areas, and a demilitarization area.

Joliet Army Ammunition Plant was constructed during World War II. The production output varied with the demand for munitions. Although the plant was used extensively during World War II, all production of explosives halted in 1945. At that time, the sulfuric acid and ammonium nitrate plants were leased out, and the remaining production facilities were put in layaway status. The installation was reactivated during the Korean War, and again during the Vietnam War. Production gradually decreased until it was stopped completely in 1977.

Hazardous wastes were generated and released into the environment in several ways. Process waters used in the production and handling of 2,4,6-trinitrotoluene (TNT) and other compounds were discharged into drainage systems. Buildings and equipment were periodically washed to remove explosive residues. Most of these wastewaters leached into the ground or flowed into local surface water and creeks. Later, process water incineration or industrial wastewater treatment produced ash or explosives residue that accumulated over time. Ash from the incineration of production by-products was stored in landfills on-site. Equipment and demolition materials were flashed (burned) to remove residues. Fire training areas, used to keep fire and safety personnel suitably prepared, introduced contaminants to soil and groundwater. Leaks and spills occasionally occurred in the storage and handling of oils and other liquids. Wastes and unusable explosives and munitions were burned or detonated. In addition, munitions were tested, leaving some residuals in soil at the test sites. Vehicle and equipment maintenance, transformer leaks, and the handling of pesticides introduced further contamination to the soil.

Wastes generated during production activities resulted in environmental contamination at various sites around JOAAP. Because of this contamination, the United States

Environmental Protection Agency (USEPA) placed the MFG Area on the National Priority List (NPL) on 21 July 1987 and the LAP Area on the NPL on 31 March 1989.

The contaminated media identified at JOAAP were divided into two operable units (OUs) to aid in the development and evaluation of remedies. The SOU consists of sites where contaminated soils, sediments, and debris were identified. The GOU consists of sites where contaminated groundwater was identified. Surface water was determined to pose no risk to health and the environment and therefore is not addressed further as a contaminated media. However, surface water discharge is a major component of the shallow groundwater system, and localized detections of explosives may occur near contaminated groundwater sites. For this reason, surface water is relevant to the GOU.

Substantial land area at JOAAP is not contaminated. Transfer activities for that land have occurred and some are still underway. After remaining potential hazards to human health and the environment are addressed under the SOU and these properties are found suitable for transfer under Public Law (PL) 104-106 and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Army will prepare documentation for transfer.

The Illinois Land Conservation Act of 1995, PL 104-106, Div. B, Title 2901-2932, 10 February 1996, states that the Army will transfer JOAAP land to various federal, local, and state jurisdictions. Transfer of land is occurring incrementally as it is remediated and is deemed appropriate. As of 2014, the distribution of JOAAP land through these incremental transfers is approximately 17,726 acres to the United States Department of Agriculture (USDA) for establishing the Midewin National Tallgrass Prairie (MNTP); 982 acres to the Department of Veterans Affairs to establish a Veterans Cemetery; 455 acres to Will County, Illinois to establish the Will County Landfill; and 2,885 acres to the State of Illinois to establish two industrial parks.

Where groundwater contamination is present within areas to be transferred, the Army has included institutional controls (IC) in the transfer documents to prevent exposure to contaminants, limit groundwater pumping, and to prevent manipulation of the natural groundwater flow patterns through any means. These controls will help to limit the spread of the remaining contamination in groundwater and will remain in effect with the land until removed by mutual agreement of the Army, USEPA, Illinois Environmental Protection Agency (IEPA), and the current landowner.

1.2 NATURAL ATTENUATION MECHANISMS

The selected remedial action for the GOU is remediation by natural attenuation. A detailed overview of the physical, chemical, and biological criteria, which are most directly linked to natural attenuation mechanisms and the site-specific criteria used to evaluate natural attenuation at JOAAP is provided in the LTM Plan and annual groundwater monitoring reports where natural attenuation is evaluated and reported.

1.3 RECORD OF DECISION REQUIREMENTS

The ROD specified general groundwater monitoring requirements. These requirements were based on information presented in the Remedial Investigation (RI) Report and did not have the additional information provided by the predesign investigation completed in 1998 or subsequent remedial actions completed at JOAAP. As such, the Army applied subsequent site data as well as historic data to arrive at site-specific LTM locations and analytes, which were included in the LTM Plan.

Based on the objectives presented in Section 1.2 of the LTM Plan and as an extension of the ROD, several types of monitoring are required. These include:

- Collection of groundwater samples to evaluate contaminant concentrations;
- Collection of surface water samples where groundwater discharges to surface features to evaluate surface water contaminant concentrations;
- Collection of depth to water measurements to evaluate groundwater flow;
- Documentation and evaluation of source removal or surface disturbing activities;
- Documentation of changes in surface water features, impoundments, or conveyances; and
- Evaluation of evidence concerning illicit water withdrawal affecting contaminant migration.

1.4 LONG-TERM MONITORING PLAN

Monitoring activities are required pursuant to the decision documents developed for the various contaminated sites found at JOAAP. The LTM Plan was written to present LTM activities for the GOU and required SOU maintenance activities. The LTM Plan includes activities associated with long-term maintenance of the remedies selected for JOAAP. The objective of the LTM Plan was to provide a sufficiently detailed description of the monitoring strategy and process and to establish realistic expectations for execution of the LTM program on the part of all stakeholders. With respect to the latter objective, it is the intent of the plan to establish both the actions to be taken in the event of various sampling outcomes and the set of conditions required to reduce and eventually discontinue long-term monitoring efforts where practicable. As such, it includes sample collection and analysis of ground and surface water, surveillance of cap maintenance and access restrictions at landfills, and surveillance of land use restrictions and other ICs implemented on an installation-wide basis.

Section 3.1 of the LTM Plan summarizes the GMZs and monitoring well designations and discusses the decision tree for interpretation of groundwater quality results and the logic for optimizing the LTM program. Section 3.2 of the LTM Plan discusses IC monitoring required as part of the MNA remedy.

The LTM program is presented in Section 4.0 of the LTM Plan which includes a discussion of site-specific LTM programs for the GMZs and landfills, monitoring well installations, abandonments, monitoring schedules, requirements for IC monitoring, and reporting schedules. Tables A1-1 through A1-9 of Appendix A (Field Sampling Plan) of the LTM Plan provide specific information about the monitoring requirements at each site. However, it is expressly presented that the LTM program presented in the LTM Plan will likely change with changing conditions. Therefore, the LTM Plan tables were consolidated into a single table that is continually updated based on groundwater monitoring results and periodic reviews. The 2nd quarterly sampling completed in October 2014 is presented as Table 1-1 in this report and summarizes the monitoring locations and requisite analyses for those sample locations. Additionally, the changes to the LTM program based on results and the conditions set in the LTM Plan are summarized in Section 4 – Recommendations.

The LTM Plan provides a site-specific evaluation of the natural attenuation remedial option that is being applied to all GOU sites. The purpose of the LTM Plan is to:

- describe the process by which data will be collected and analyzed,
- determine if remedies in place at JOAAP are protective of human health and the environment,
- describe the nature of monitoring results that, if observed, would indicate further action be taken because the remedy does not appear to be sufficiently protective,
- prescribe the conditions under which certain monitoring activities may be terminated, and
- provide a detailed description of activities to monitor the GOU natural attenuation RA.

Section 5 of the LTM Plan describes reporting requirements for LTM activities. The LTM Plan reporting schedule requires the submittal of a semi-annual report which is a presentation of the results of the 1st and 2nd quarterly sampling events with minimal analysis and submittal of an annual report that presents the results of the 3rd and 4th quarterly sampling events with detailed evaluation of trends in the groundwater data. The schedule identified in the LTM Plan indicates quarterly sampling events will generally be conducted in January (1st quarter, M13 only), April (2nd quarter), July (3rd quarter, M13 only), and October (4th quarter) of each year. In 2014, the 1st quarterly sampling event at Landfill M13 was not conducted by TolTest. The 2nd quarterly sampling event, typically conducted in April, was conducted in October. The 3rd quarterly (typically July) and 4th

quarterly (typically October) sampling rounds are scheduled to be conducted in November and December 2014, respectively.

The LTM Plan also provides for a CERCLA five-year review of the GOU natural attenuation remedy and SOU remedy, as required by the ROD. Five-year reviews are completed to evaluate the effectiveness of the GOU and SOU remedies and, if necessary, provide recommendations to modify the remedy to make it more effective. Natural attenuation data were collected during the fall 2003 sampling event to facilitate the first five-year review. The First Five-Year Review Report was completed following the fall 2003 sampling event. The Final Second Five-Year Review Reports for the GOU and SOU were submitted in August 2009. The Third Five-Year Review Report was submitted Draft Final to the regulators for review in October 2014. The Third Five-Year Review Report has the GOU and SOU remedy protectiveness evaluated in one consolidated document.

2.0 SITE ACTIVITIES

This section provides a summary of the LTM Plan requirements, the groundwater monitoring activities at each of the GOUs, monitoring well installation at Site M13, and the SOU RA landfill mowing and inspections.

2.1 LANDFILL INSPECTIONS

Post-closure monitoring requirements for Landfills L3, L11, and M13 are mandated by Illinois Administrative Code (IAC) Title 35, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for 15 years at Landfill M13 and 30 years at Landfills L3 and M11. The LTM Plan states that the L3 Landfill cover will be inspected quarterly; the M11 Landfill cover will be inspected quarterly for the first five years and annually for 25 years; and the M13 Landfill cover will be inspected quarterly. The inspections for the 2nd quarter were completed in October 2014 at Landfills L3, M11, and M13.

From 20 through 23 October 2014, the landfill caps and rip rap aprons at landfill Sites L3, M11, and M13 were mowed. Mowing was completed to a height between 4 and 6 inches. Additionally, 2-4D was applied to the vegetation growing in the rip rap. The 2-4D was used to kill the woody and broadleaf vegetation in the rip rap while leaving the other rooting grasses unaffected. Photos of the landfill caps following mowing are included in the Post-closure Landfill Inspection Report.

The Post-closure Inspection Report for the 2nd quarterly inspections completed in October 2014 at Landfills L3, M11, and M13 is included in Appendix A.

2.2 GROUNDWATER MONITORING

This section provides a summary of the field activities undertaken to conduct 2nd quarterly groundwater and surface water monitoring at GOU and SOU sites. Site L2 was not sampled during the 2nd quarterly sampling event as recommended in the 2009 Annual Report based on Section 4.1.2.5 of the LTM Plan. Site L14 was not sampled during the 2nd quarterly sampling event as recommended in the 2010 Semi-annual Report based on Section 4.1.4.5 of the LTM Plan. Landfill M11 was not sampled during the 2nd quarterly sampling event as recommended in the 2011 Annual Report based on Section 4.2.2.5 of the LTM Plan.

The gauging of the monitoring well groundwater elevations was accomplished using an electronic water level indicator. Depth to water was measured from a datum mark on the top of casing (TOC) of each monitoring well. All gauging measurements were taken to an accuracy of +/- 0.01 foot (ft).

In accordance with the standard operating procedure for low-flow sampling, monitoring wells were purged and sampled using low flow sampling techniques at a flow rate of

approximately 100 to 250 milliliters per minute (ml/min). Dedicated ¼-inch (in.) outside diameter (OD) Teflon™ lined polyethylene tubing is installed in each monitoring well. The Teflon™ lined polyethylene tubing was connected with dedicated silicon tubing to a variable speed peristaltic pump. During purging, the pump discharge tube was attached to a Horiba™ (or equivalent) multi-probe water quality meter equipped with a flow-through cell. The water quality meters were equipped with probes for measuring field parameters including temperature, pH, specific conductivity (SpC), oxidation/reduction potential (ORP), and dissolved oxygen (DO). The water quality meters were calibrated daily in accordance with Appendix A (Field Sampling Plan) of the LTM Plan and the manufacturer's instructions.

Measurements of field parameters were taken at two-minute intervals and recorded on Groundwater/Surface Water Sampling Forms. Purging of each monitoring well was considered complete when field parameters stabilized over three successive measurements to within 10%. The last stabilization water quality readings through the flow-thru cell were used to report field parameters which are summarized in Table 2-1. Upon stabilization of the field parameters, the required samples were collected from the discharge tube of the pump into laboratory-supplied containers after disconnecting the flow-thru cell.

Samples were collected in laboratory supplied containers for explosive compounds in 500 milliliter unpreserved amber glass bottles; target analyte list (TAL) metals in 500 milliliter (ml), nitric acid preserved polyethylene bottles; inorganic parameters nitrate and sulfate in 250 ml unpreserved polyethylene bottles; volatile organic compounds (VOCs) in 40 ml, hydrochloric acid preserved glass vials; and semivolatile organic compounds (SVOCs) in one-liter unpreserved amber glass bottles. Samples collected for inorganic parameters TAL metals, nitrate, and sulfate were field filtered using high capacity 0.45 micron in-line cartridge filters. Samples were analyzed by Test America, Denver (Arvada), Colorado in general accordance with Appendix B - Quality Assurance Project Plan (QAPP) of the LTM Plan. Due to the change in laboratories from Chicago (University Park) Illinois the QAPP is being updated with current MWH project personnel, and laboratory standard operating procedures (SOPs) and key personnel from the Denver laboratory.

2.2.1 First Quarterly 2014 Groundwater Monitoring

The 1st quarterly monitoring event for 2014 at Landfill M13 (typically conducted in January) was not conducted by TolTest prior to their bankruptcy.

2.2.2 Second Quarterly 2014 Groundwater Monitoring

The 2nd quarterly monitoring event for 2014 (typically conducted in April) was conducted from 20 through 29 October 2014 by MWH. MWH measured water levels at a total of 123 monitoring wells and 4 surface water locations at JOAAP. A total of 31 monitoring wells and 1 surface water location were sampled at the MFG Area and 10 monitoring wells and 5 surface water locations were sampled at the LAP Area as summarized in Table 1-1.

The gauging of the monitoring well water levels was accomplished using techniques discussed in Section 2.1. Surface water elevations are determined by referencing to the known elevations of nearby benchmarks using a level and rod and from marks on existing structures (bridges) for some locations; where at others a direct measurement with a water level indicator was completed. All gauging and surveying measurements were taken to an accuracy of +/- 0.01 ft. All surface water locations contained water during gauging and sampling activities except. Groundwater elevations are summarized in Table 2-2 for the MFG and Table 2-3 for the LAP. Surface water elevations are summarized in Table 2-4. Gauging and surveying activities for individual sites were completed within a 24-hour period.

Groundwater sampling was conducted in accordance with Appendix A (Field Sampling Plan) of the LTM Plan, as described above. Surface water samples were collected by directly immersing the sample container into the surface water body to fill the bottle if filtration for TAL metals was not required. If filtration for TAL metals or sulfate was required, a peristaltic pump with tubing placed directly in the surface water body was used for sample collection.

Blind duplicate samples were collected at a rate of 10% (1 per 10) for each analyte sample total. The majority of the duplicate samples were collected from monitoring wells that had previous analyte detections. Duplicate samples were collected from five monitoring wells in the LAP and MFG areas for the 2nd quarterly sampling. Details concerning field duplicates for 2nd quarterly sampling are as follows:

Duplicate Sample Number	Monitoring Point Sampled	Site	Sample Date	Analyte
MW995	MW231	M1	10/28/2014	Sulfate
MW996	MW631	L3	10/23/2014	Explosives
MW997	MW630	L3	10/23/2014	Explosives and TAL Metals
MW998	MW212R	M6	10/22/2014	Explosives
MW999	MW362	M13	10/21/2014	VOCs, SVOCs, Explosives, TAL Metals, Nitrate, and Sulfate

Matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a rate of 5% (1 per 20) for each analyte sample total.

Level III data validation was completed for groundwater samples by MWH in accordance with the original QAPP. However, based on the change in laboratories the data was validated with 10% of the samples receiving Level IV validation. Based on the results of the validation, data evaluation reports are included in Appendix B1 and a data usability report is included in Appendix B2.

Repair activities completed during the 2nd quarterly sampling activities conducted in October 2014 included the following:

- Weep hole drilled in Site M6 monitoring well MW122 casing
- Weep hole drilled in Site M6 monitoring well MW166R casing
- The clasp on Other Areas monitoring well MW116 was repaired

During sampling, soil grading and stockpiling to build a new asphalt parking lot was observed in the northern part of Site M6.

2.3 SITE M13 MONITORING WELL INSTALLATION/ABANDONMENT

2.3.1 Monitoring Well Installation

During October 2014 monitoring well MW811 was installed at Site M13. The well installation was conducted in accordance with the *Final Work Plan Addendum – Site M13 Monitoring Well Installation* (Work Plan, MWH, 15 October 2014) and the Monitoring Well Installation Work Plan included as Appendix C of the LTM Plan.

The initial drilling was conducted using 6 ¼ in. inside diameter (ID) hollow stem augers at the approximate location shown on Figure 1 of the Work Plan. At a depth of approximately 17 ft below ground surface (bgs) auger refusal occurred due to encountering concrete debris. The boring was abandoned and drilling was conducted approximately 8 ft to the east. At the new location auger refusal occurred again at a depth of approximately 17 ft bgs due to concrete debris. The boring was abandoned and drilling was conducted approximately 21 ft to the south and 28 ft to the east. When auger refusal occurred again at approximately 17 ft bgs due to concrete, brick, and silt fence material, smaller 4 ¼ in. ID augers were used, which were able to advance through the debris. The boring log for the installation is included in Appendix C.

A soil sample was collected during drilling from directly above bedrock within the intended well screened interval and submitted for grain size distribution analysis. The distribution testing identified a silty-clay to clayey silt, which would likely have low hydraulic permeability. During split-spoon sampling the complete profile of the well screened interval was not recovered. The higher permeability water bearing unit was likely not sufficiently dense to displace the collected sandy clay during sampling. The soil collected and analyzed is not believed to represent the aquifer material that would provide water during sample collection based on recovery of the well observed during development and sampling, which would suggest a higher permeability material than that collected and analyzed. The stiffness of the soil collected likely did not allow the coarser (and looser) material to enter the split-spoon sampling device. The grain size distribution curve is included in Appendix C.

Based on the smaller diameter auger used to penetrate the debris, the well installed was 2 in. ID rather than the 4 in. ID specified in the Work Plan. The well construction form is included in Appendix C.

Following installation the well was developed in accordance with the Work Plan and the Monitoring Well Installation Work Plan included as Appendix C of the LTM Plan. The development form is included in Appendix C.

2.3.2 Monitoring Well Abandonment

During October 2014 monitoring well AEHA15 at Site M13 was abandoned. The well abandonment was conducted in accordance with the Work Plan and the Monitoring Well Abandonment Work Plan included as Appendix D of the LTM Plan. The drilling contractor removed the abandoned well materials from the site for disposal as solid waste. The abandonment form is included in Appendix C.

2.4 INSTITUTIONAL CONTROLS MONITORING

The remedies selected for all areas of JOAAP do not allow unrestricted use of the property or underlying groundwater. Restrictions on use of groundwater are limited to the GMZs and annual certification that the restrictions are being maintained for each GMZ is required. Land use restrictions over and above those associated with groundwater use apply wherever waste or contamination has been left in place at levels that pose an unacceptable risk without some form of ICs. Some of those areas include the three landfills (L3, M11, and M13) with associated restrictions with annual certification. For all other areas with institutional controls there is a need for similar annual certification that the deed restrictions remain in place and are effective. Annual certifications are completed separate from this report. However, during groundwater monitoring and landfill inspections conducted quarterly at Landfill M13 and site-wide sampling conducted semi-annually in 2013, there were no observations of intrusive soil activities, construction, or improper use of groundwater which would affect the GOU or SOU remedies.

3.0 RESULTS AND RECOMMENDATIONS

Groundwater management zones are three-dimensional areas containing groundwater being managed to mitigate impairment according to IAC. The GMZs comprise both the glacial drift and shallow bedrock (Silurian Dolomite) aquifer and are bounded at depth by a confining shale unit (Maquoketa Shale). The GMZs were established with acceptance of the ROD. Any future modification of GMZ boundaries will have to be mutually agreed upon by the Army, USEPA, and IEPA. Groundwater monitoring wells and surface water collection points located inside and/or near the borders will be used to monitor contaminant plumes. Site-specific plans for GMZs for GOU sites are discussed in Sections 3.1 through 3.5.

Groundwater and surface water samples collected during the 2nd quarterly sampling event conducted in October 2014 were analyzed for one of more of the following parameters: explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs. Analytical results from the 2nd quarterly sampling event for explosive compounds, TAL metals, indicator parameters (nitrate and sulfate), VOCs, and SVOCs are summarized in Tables 3-1 through 3-5, respectively. Sites L2, L14, and M11 are not sampled during the 2nd quarterly sampling event as described in Section 2.2. This section provides a site-specific presentation of the well gauging and groundwater and surface water quality sampling results. The discussions are arranged by the GMZs into which each of the sites is grouped. This provides an ability to discuss the contaminant detections in relation to each of the GMZ boundaries.

Each site in Section 3 is organized into the following subsections:

General Site Introduction: General site-specific background information is presented.

Groundwater Hydraulics: Site monitoring wells, surface water sampling locations, and water elevation measurements are presented for the water table and potentiometric surface (generally in the bedrock). For groundwater hydraulic purposes, monitoring wells are designated as overburden wells, combination overburden/bedrock wells, or bedrock wells. This designation indicates in which aquifer(s) the well is screened. When possible, discussions include the relationship between groundwater flow direction, hydraulic gradients, and contaminant migration.

Analytical Results: Figures are presented for contaminant detections observed during the 2nd Quarterly sampling event conducted in October 2014. For groundwater quality discussions, monitoring wells and surface water sampling points are designated as in-plume, early warning, or compliance points and at Landfill sites as upgradient or downgradient. These designations are included in the LTM Plan and are based on where the sampling point is located relative to historic groundwater detections, site GMZ, and/or site features.

Analytical data from the 2nd quarterly sampling event are included in the discussion of analytical results. Contaminant concentrations that are greater than site RGs are included in the discussion even if there is not a notable change in the analytical data for that constituent.

Method reporting limits (MRL) are generally less than site RGs. The silver MRL exceeded the surface water RG and the lab has been made aware of this issue. However, silver is not a COC at JOAAP, although included in the TAL Metals analyte list. MRLs are provided for each compound in the Data Evaluation Report presented in Appendix B1. Analytical results, 'not detected' (ND) are for contaminant concentrations less than the MRL. If there were detections between the method detection limit (MDL) and the MRL, the concentration was qualified "J" as an estimated concentration (J).

Recommendations: Recommendations for each site are presented specific to the conditions of the LTM Plan. A thorough summary of recommendations is presented in Section 4. Since there is little evaluation of trends included in the semi-annual reports, the recommendations included herein are general in nature.

3.1 SITE L1

Site L1 is one of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L1 comprises 80 acres on which munitions production facilities were constructed in 1941. It is centrally located in the northern portion of the LAP Area (Figure 1-2 and Figure 3-1). Historically, Site L1 was used for demilitarization and reclamation of various munitions starting with crystallization of ammonium nitrate, but then was converted for shell renovation and 1,3,5-trinitrobenzene (TNB) recovery up until 1945. By April of 1946, it had been reactivated to reclaim TNT.

In the TNT operation, hot water was used to wash the TNT out of shells. The water was discharged to a sump where solid explosives were removed for burning and the overflow (pink water) was routed to a 4.3-acre ridge and furrow evaporation/percolation pond. By 1952, two additional evaporation ponds had been constructed southeast of the ridge and furrow unit on either side of a drainage ditch flowing from it to Prairie Creek. Prairie Creek, the surface water body draining the area, is incised into the bedrock and appears to transmit groundwater that discharges directly or emerges into the streambed by virtue of the head relief available in the open channel.

Explosive residues in soil were observed in the ridge and furrow impoundment, the western most of the two newer ponds, the area south of the washout building, and the soil around the sump. The underlying groundwater contains TNT, TNB, 2,6-dinitrotoluene (2,6-DNT), and Research Department Explosive (RDX) both in the alluvium and in the shallow weathered bedrock, as well as degradation products from those parent compounds, as a result of the infiltration of pink water and possibly continued leaching of explosives in soil. Soil source control measures at the ridge and furrow pond were completed in March 2006.

The contamination is now a legacy groundwater plume continuing to migrate to the southeast towards Prairie Creek, where it is believed to largely discharge into the creek through upwelling. Given these observations, the contaminant footprint is expected to separate from the source area over time and migrate in the alluvium and shallow bedrock until it discharges to Prairie Creek.

The overburden aquifer generally consists of a complex stratification of clay and silt, with some silty gravel observed in the eastern portion of the site near MW174. The overburden is approximately 20 ft thick in the north and less than 5 ft thick in the south and from approximately 15 ft thick in the east and 5 ft thick in the west.

3.1.1 Groundwater Hydraulics

The groundwater monitoring network at Site L1 consists of 16 monitoring wells: 8 overburden wells (MW131, MW171, MW173, MW174, MW175, MW176, MW610, and MW611), 1 combined overburden/bedrock well (MW400), and 7 bedrock wells (MW172, MW177, MW178, MW401, WES1, WES2, and WES3). Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW171, MW172, MW175, MW176, MW177, MW178, MW401, MW610, MW611 and WES2. Surface water (SW555) elevation is measured at a point along Prairie Creek. Monitoring well information and water levels for the 2nd Quarter are summarized in Table 2-3. The groundwater flow direction in the overburden and bedrock aquifers is typically toward the southeast as shown on Figure 3-1 and Figure 3-2, respectively. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site L1.

During the 2nd Quarter the horizontal gradient in the overburden aquifer in northern part of Site L1 was calculated to be 0.0111 feet per foot (ft/ft) and in the southern part of Site L1 was calculated to be 0.0142 ft/ft (Table 3-6). Using the reported average of 9.2E-06 centimeters per second (cm/sec) for hydraulic conductivity and an assumed porosity of 0.30, the calculated flow velocity in the overburden aquifer at Site L1 was approximately 0.0011 feet per day (ft/day) or 0.401 feet per year (ft/yr) (Table 3-7).

Prairie Creek, the surface water body draining the area, is incised into the bedrock and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head relief available in the open channel. Vertical gradients observed between the overburden and bedrock were upward at well nest MW177/MW171 further supporting a gaining stream scenario and downward at well nests MW178/MW176 (at distance from the creek) and MW401/MW610 (on the opposite side of the creek from the site) during the 2nd Quarter (Table 3-8). Monitoring well MW172 was inadvertently not measured.

3.1.2 Analytical Results

Groundwater and surface water sampling completed for Site L1 during the 2nd Quarter are summarized in Table 1-1. The following monitoring wells and the surface water sampling location at L1 are sampled for explosives:

- In-Plume – MW131, MW173, and WES1
- Early Warning – MW174 and WES3
- Compliance – surface water sampling point SW550

Early Warning monitoring well MW172 and compliance monitoring well MW401 were removed from the LTM program beginning in April 2012.

Groundwater and surface water samples collected at Site L1 during the 2nd Quarter were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for the 2nd Quarter sampling event conducted at Site L1 are summarized in Table 3-1 and shown on Figure 3-3. A brief discussion of analytical results by well type follows.

In-Plume Wells (MW131, MW173, and WES1): At overburden well MW131, TNB exceeded the RG at a concentration of 910 µg/L, TNT exceeded the RG at a concentration of 1,100 µg/L, and 2-amino-4,6-dinitrotoluene (2-A-4,6-DNT) was detected. There is no RG for 2-A-4,6-DNT.

At overburden well MW173, high melting-point explosive (HMX) was detected below the RG at a concentration of 1.5 µg/L, RDX exceeded the RG at a concentration of 9.0 µg/L, TNT was detected below the RG at a concentration of 6.2 µg/L, and 2-A-4,6-DNT and 4-amino-2,6-dinitrotoluene (4-A-2,6-DNT) were detected. There are no RGs for 2-A-2,6-DNT and 4-A-2,6-DNT.

At bedrock well WES1, 2-nitrotoluene (2-NT), was detected at a concentration of 0.23 µg/L, TNB exceeded the RG at a concentration of 16 µg/L, TNT exceeded the RG at a concentration of 14 µg/L, and 2-A-4,6-DNT and 4-A-2,6-DNT were detected. There are no RGs for 2-A-2,6-DNT and 4-A-2,6-DNT.

Early Warning Wells (MW174 and WES3): At overburden well MW174, there were no explosive compounds detected.

At bedrock well WES3, 2-A-4,6-DNT and 4-A-2,6-DNT were detected. There are no RGs for 2-A-2,6-DNT and 4-A-2,6-DNT.

Compliance Points (SW550): At surface water sampling location SW550, there were no detections for explosive compounds. According to the LTM Plan SW550 is to be collected at a point along Prairie Creek where the creek leaves the GMZ boundary. However, the GMZ boundary is approximately 1500 ft downstream from where groundwater emanating

from the Site L1 source area would likely be discharging to the surface water. Therefore, the sample has been collected at the location shown on Figure 3-1 to provide an indication if the groundwater discharging to Prairie Creek exceeds the surface water RG. If concentrations are detected in excess of the RG at this current sampling location the sampling location will be moved downstream to the GMZ boundary to determine if surface water is leaving the GMZ in excess of the RG.

3.1.3 Recommendations

There are no recommended changes to the LTM program at Site L1.

3.2 SITE L3/ LANDFILL L3

Site L3 is the third of six GMZs created to manage risk arising from groundwater contamination and to monitor performance of the selected remedy. Site L3 comprises approximately 50 acres used as a demolition area directly southwest of Site L2. Landfill L3 (described below) occupies 3.32 acres of the Site L3 area (Figure 1-2 and Figure 3-4). Site L3 is bounded on the west by Prairie Creek, the south by an unnamed tributary of Prairie Creek, and the east by Star Grove Cemetery. Predominant use of the area was for open burning of combustibles and munitions crates, including some materials with low level explosive contamination. An air curtain destructor was constructed at the site to reduce emissions, but was never put into use. There was also a one-acre fire training area at the site, which consisted of a small depression surrounded by an earthen berm.

Specific burning units included “U” and “L” shaped burn pads and a burn cage on a concrete slab. Geophysical surveys noted a number of metallic anomalies buried around the burn pads. The soil was also found to contain lead and RDX contamination at levels requiring remediation. Berms along Prairie Creek were found to contain lead, chlordane, 2,6-DNT, and phosphate exceeding their respective RGs. It has been posited that the contamination in these berms arises from filling activity in the area when the berms were constructed. Unexploded ordnance may also be present in this area. The remedy selected for the area along Prairie Creek was consolidation and capping into what is now called Landfill L3.

Landfill L3 is located on the western edge of the Site L3 GMZ on the east bank of Prairie Creek (Figure 3-4). The area of Landfill L3 was originally contaminated through import of contaminated fill. However, other waste and contaminated soil have been moved to the Site L3 Landfill as a part of the L3 RA in order to consolidate residual contamination into a smaller footprint. Soil source control measures were completed in 2008.

Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would

be expected to migrate to Prairie Creek and discharge as the groundwater flows upward into the surface water body.

Monitoring at Landfill L3 is mandated by IAC Title 35, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 30 years.

The overburden aquifer primarily consists of silt and clay with some silty clay and sand. The overburden thickness is irregular and generally varies between approximately 5 ft and greater than 30 ft across Site L3 with limited saturated overburden in the southern part of the site.

3.2.1 Groundwater Hydraulics

The groundwater monitoring network at Site L3/Landfill L3 consists of 11 monitoring wells: 4 overburden wells (MW1, MW137, MW3, and MW410), 2 combined overburden/bedrock wells (MW136 and MW411), and 5 bedrock wells (MW412, MW630, MW631, MW632, and MW633). Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW1, MW3, MW136, MW137, MW411, and MW632. Monitoring well information and water levels for the 2nd Quarter are summarized in Table 2-3. The surface water elevation in the northern portion of the site is dictated by the dam located on Prairie Creek just north of Central Road (Figure 3-4). The groundwater flow direction in the overburden aquifer is generally toward the west/southwest as shown on Figure 3-4 and the groundwater flow direction in the bedrock aquifer is generally toward the west as shown on Figure 3-5. The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site L3/Landfill L3.

During the 2nd Quarter the horizontal gradient in the overburden at Site L3 was calculated to be 0.0305 ft/ft (Table 3-6). Using the reported average of 1.6E-03 cm/sec for hydraulic conductivity and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site L3 was approximately 0.461 ft/day or 168 ft/yr (Table 3-7).

Prairie Creek, the surface water body draining the area, is incised into the bedrock in the southern and central parts of the site and appears to transmit groundwater that discharges directly or upwells into the streambed by virtue of the head relief available in the open channel. The groundwater elevation in the bedrock at monitoring well MW632 was greater than the elevation of Prairie Creek, indicating a gaining stream scenario. Upward vertical gradients were observed in the bedrock at well nest MW631/MW630 at Site L3 (Table 3-8), further supporting a gaining stream scenario.

3.2.2 Analytical Results

Groundwater and surface water sampling points for Site L3/Landfill L3 during the 2nd Quarter are summarized in Table 1-1. The following monitoring wells and surface water sampling points at L3 are sampled for explosives and TAL metals:

- Upgradient – SW004 is only sampled during the 2nd Quarter when SW555 at Site L2 is not sampled
- In-Plume – MW410 (explosives only)
- In-Plume/Downgradient –MW412
- Early Warning/Downgradient – MW630, MW631, and MW633
- Compliance/Downgradient – surface water sampling point SW777 for the overburden aquifer where the creek leaves the GMZ boundary
- Downgradient - Surface water sampling points SW557, upstream of the landfill drainage swale discharge, and SW558, at the constructed drainage swale along the southwest side of the landfill.

Upgradient monitoring well MW03 and compliance monitoring well MW632 were removed from the LTM program beginning in spring 2012.

Groundwater and surface water samples collected at Site L3/Landfill L3 during the 2nd Quarter were analyzed for explosive compounds and TAL metals (except MW410) in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for the 2nd Quarter sampling event conducted at Site L3/Landfill L3 are summarized in Table 3-1 and shown on Figure 3-6. Metals detections for the 2nd Quarter sampling event conducted at Site L3/Landfill L3 are summarized in Table 3-2. For Landfill L3, the monitoring well locations are classified as upgradient or downgradient. Therefore, a single monitoring well can represent two separate classifications at Site L3/Landfill L3. A brief discussion of analytical results by well type follows:

Upgradient Point (SW004): At surface water sampling location SW004, there were no explosive compounds detected or TAL metals exceedances.

In-Plume Wells (MW410 and MW412 {downgradient}): At overburden well MW410, there were no explosive compounds detected.

At bedrock well MW412, HMX was detected below the RG at a concentration of 29 µg/L, RDX exceeded the RG at a concentration of 85 µg/L, and 2-A-4,6-DNT and 4-A-2,6-DNT were detected. There are no RGs for 2-A-2,6-DNT and 4-A-2,6-DNT.

There were no TAL metals exceedances.

Early Warning (downgradient) Wells (MW630, MW631 and MW633): At bedrock well MW630, HMX was detected below the RG at a concentration of 2.4 µg/L and RDX exceeded the RG at a concentration of 3.5 µg/L.

There were no TAL metals exceedances.

At bedrock well MW631, there were no explosive compounds detected or TAL metals exceedances.

At bedrock well MW633, HMX was detected below the RG at a concentration of 1.3 µg/L and RDX exceeded the RG at a concentration of 3.8 µg/L.

There were no TAL metals exceedances.

Compliance (downgradient) Point (SW777): At surface water sampling location SW777, there were no explosive compounds detected or TAL metals exceedances.

Additional Downgradient Points (SW557 and SW558): At surface water sampling location SW557 there were no explosive compounds detected or TAL metals exceedances.

At surface water sampling location SW558, there were no explosive compounds detected or TAL metals exceedances.

3.2.3 Recommendations

There are no recommended changes to the LTM program at Site L3/Landfill L3.

3.3 SITE M1

Site M1, the southern ash pile, is part of the MFG facility (Figure 1-2 and Figure 3-7), but contains unique contaminants not present at actionable levels in any other GMZ. As such, it is singled out as the fifth of the six GMZs. Site M1 comprises 68 acres in the southwestern part of the MFG facility where, from 1965 to 1974, ash residues from the incineration of “red water” (TNT production waste water) were landfilled and piled on unlined soil. At various times (1985, 1993, and 1996) after closure, polyvinyl chloride (PVC) liner and clay were used to repair erosion damage to the cover.

Groundwater beneath and downgradient of the pile was observed to contain elevated levels of sulfate, 2,6-DNT, and antimony. The latter two exceeded their respective RGs on a single sample event only, but the sulfate has exceeded its RG continuously in groundwater and occasionally in surface water. In February 2003, the United States Army Corps of Engineers (USACE) submitted E*xplanation of Significance Difference Site M1 – Southern Ash Pile* (USACE, 2003), which expanded the northern boundary of the GMZ for Site M1 to encompass concentrations of sulfate in excess of the RG that had migrated beyond the original boundary.

The elevated sulfate is believed to originate in leachate from the Site M1 ash pile that infiltrated through the soil and entered the shallow groundwater. Dissolved sulfate then migrated to the northwest. Sulfate-containing groundwater flows into Prairie Creek, which is located northwest of the former ash pile. Concentrations of sulfate have been measured as high as 46,000 milligrams per liter (mg/L), or over 100 times the RG of 400 mg/L. As recently as 2000, surface water samples were collected that exceeded the RG of 500 mg/L. The ash piles were removed in 2006-2007 eliminating the primary source of sulfate. Consequently, dissolved sulfate in groundwater is now a legacy plume migrating to the northwest.

The overburden aquifer primarily consists of silt and clay, with scarce amounts of sand and silty gravel at the bedrock contact. Sand is abundant in the higher, unsaturated, parts of the site. Over most of Site M1, the overburden thickness is fairly consistent between 15 and 20 ft thick. At the northern end of the site, near MW642/MW641, the overburden consists entirely of silty gravel and the depth to bedrock is greater than 40 ft. The presence of Prairie Creek in the western part of M1 suggests that Prairie Creek is the discharge point for shallow groundwater.

3.3.1 Groundwater Hydraulics

The groundwater monitoring network within this site consists of 18 monitoring wells: 7 overburden wells (MW104, MW231, MW351, MW641, MW643, MW645, and MW648), 5 combined overburden/bedrock wells (MW105, MW106, MW107, MW347, and MW649), and 6 bedrock wells (MW201, MW640, MW642, MW644, MW646, and MW647). Water levels are measured at the groundwater/surface water locations that are sampled (listed below), and at monitoring wells MW104, MW105, MW106, MW201, MW347, MW351, and MW647. Monitoring well information and water levels for the 2nd Quarter are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer and bedrock aquifers is generally to the northwest, as shown on Figure 3-7 and Figure 3-8, respectively. The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically. Based on groundwater flow data, Prairie Creek is the likely discharge point for all shallow groundwater in the vicinity of Site M1.

During the 2nd Quarter the horizontal gradient in the overburden aquifer in northern part of Site M1 was calculated to be 0.0385 ft/ft (Table 3-6). Using an average hydraulic conductivity value of 6.6E-05 cm/sec and an assumed porosity of 0.3, the flow velocity in the overburden aquifer at Site M1 was approximately 0.0240 ft/day or 9 ft/yr (Table 3-7). However, that would indicate that the plume should be on the order of 528 ft from the ash pile after 40 years of travel time (1965 to 2005). In fact, by 2005, the elevated sulfate levels were observed out to MW645, a distance of 2,060 ft, which suggests a groundwater velocity of approximately 50 ft/yr.

Prairie Creek, the surface water body draining the area, in the northwestern part of the site appears to transmit groundwater that discharges directly or upwells into the streambed by

virtue of the head relief available in the open channel. Between the overburden and bedrock, vertical gradients observed were upward at well nest MW640/MW351 and downward at well nest MW642/MW641, located at distance from Prairie Creek, and an upward vertical gradient was observed at well nests MW644/MW643 and MW646/MW645 next to Prairie Creek (Table 3-8), further supporting a gaining stream scenario.

3.3.2 Analytical Results

Groundwater sampling points for Site M1 during the 2nd Quarter are summarized in Table 1-1. The following monitoring wells and the surface water sampling point at M1 are sampled for sulfate:

- In-Plume – MW107, MW231, MW640, MW641, and MW642
- Early Warning –MW643 and MW644
- Compliance – MW646 for the bedrock aquifer and MW645, MW648, and MW649 and surface water sampling point SW709 where the creek leaves the GMZ boundary for the overburden aquifer.

Groundwater and surface water samples collected at Site M1 during the 2nd Quarter were analyzed for sulfate in accordance with Appendix B (QAPP) of the LTM Plan. Sulfate detections for the 2nd Quarter sampling event conducted at Site M1 are summarized in Table 3-3 and shown on Figure 3-9. A brief discussion of analytical results by well type follows:

In-Plume Wells (MW107, MW231, MW640, MW641, and MW642): At combination well MW107, sulfate exceeded the RG at a concentration of 16,000 mg/L.

At overburden well MW231, sulfate exceeded the RG at a concentration of 35,000 mg/L.

At bedrock well MW640, sulfate exceeded the RG at a concentration of 6,300 mg/L.

At overburden well MW641, sulfate exceeded the RG at a concentration of 690 mg/L.

At overburden well MW642, sulfate exceeded the RG at a concentration of 420 mg/L.

Early Warning Wells (MW643 and MW644): At overburden well MW643, sulfate was detected below the RG at a concentration of 75 mg/L.

At bedrock well MW644, sulfate was detected below the RG at a concentration of 180 mg/L.

Compliance Points (MW645, MW646, MW648, MW649, and SW709): At overburden well MW645, sulfate was detected below the RG at a concentration of 110 mg/L.

At bedrock well MW646, sulfate was detected below the RG at a concentration of 120 mg/L.

At overburden well MW648, sulfate was detected below the RG in April and October at concentrations of 13 mg/L and 14 mg/L, respectively.

At overburden well MW649, sulfate was detected below the RG at a concentration of 32 mg/L.

At surface water sampling point SW709, sulfate was detected below the RG at a concentration of 68 mg/L.

3.3.3 Recommendations

There are no recommended changes to the LTM program at Site M1.

3.4 MFG GMZ

The MFG Area is the sixth GMZ, lies in the northwestern part of JOAAP, and was created by the consolidation of several discrete sites including M3, M4, M5, M6, M7, M8 Other Areas, and M13. The MFG Area GMZ is illustrated on Figure 1-2 and Figure 3-10. Each of these areas hosted unique operations that led to the release of different contaminants now present in site groundwater. Groundwater contaminants of concern (COCs) consist of explosive compounds. In the MFG, only Sites M6, M8, and M13 continue to have groundwater contamination with COCs in excess of RGs. Each site comprising the MFG GMZ will be independently closed before the MFG GMZ can be eliminated.

Numerous monitoring wells are also measured as water level control points at sites M3, M4, M5, M8, and Other Areas. Results from the monitoring wells at these other MFG sites are discussed in Section 3.4.1 – M6.

3.4.1 Site M6

Site M6, the TNT Ditch Complex, covers 271 acres to the northwest of Site M5 in the central part of the MFG Area (Figure 1-2 and Figure 3-10) and was largely used for TNT and DNT production during World War II, and then again in the Korean and Vietnam Wars. In between the wars, the facilities were used for research and development of different explosives like nitroxylenes. Production of TNT was terminated in 1977.

Production of TNT was conducted in 12 parallel lines, each containing a full sequence of production steps from the “mono-house” to the “bi-house” and then the “tri-house” buildings. Waste water (“red water”) from each “tri-house” and the wash houses was discharged from wooden tanks to clay-lined ditches feeding into the TNT Ditch. In 1965, the original drainage system was replaced by wooden flumes completed in the TNT Ditch

and the red water was diverted to Site M7 for treatment. Dintrotoluene production waste water was discharged from wooden tanks into open troughs and ditches that flowed to the storm water sewer system and the TNT Ditch, ultimately flowing untreated into Grant Creek. In addition to normal processing water, the TNT Ditch received drench water used to kill a production run when reactions ran out of control and posed an explosive threat. Between 1972 and 1974, there were more than 30 recorded instances of drenching with the associated discharge of "bi-oil" and concentrated nitric and sulfuric acid.

The full range of nitroaromatic compounds have been found in soil at Site M6, with concentrations of TNT, 2,4-dinitrotoluene (2,4-DNT), lead, arsenic, and beryllium exceeding their respective RGs. Seven explosive compounds have been historically observed in the underlying groundwater at concentrations that exceed their respective RGs: TNT, 2,4-DNT, 2,6-DNT, 2-NT, TNB, NB, and RDX.

The overburden aquifer primarily consists of silt and clay, with variable amounts of sand and silty gravel. The overburden thickness ranges from 5 to 30 ft across the site. Based on available information, screens for overburden wells at Site M6 are set in silt and/or clay layers with the exception of monitoring wells MW650 and MW652; which have screens set in a silty gravel layer.

3.4.1.1 Groundwater Hydraulics

The groundwater monitoring network within Site M6 consists of 39 monitoring wells: 12 overburden wells (MW160, MW164, MW165, MW166R, MW210R, MW212R, MW307, MW309, MW650, MW652, MW662, and MW664), 3 combined overburden/bedrock wells (MW117, MW125R, and MW162R), and 24 bedrock wells (MW122, MW123R, MW208, MW209, MW213R, MW215R, MW308, MW310R, MW311, MW312, MW313, MW314, MW315, MW316, MW317, MW318, MW319, MW320R, MW651, MW653, MW654, MW655, MW663, and MW665). Water levels are measured at the groundwater locations that are sampled (listed below), and at numerous monitoring wells at M6 and sites including M3, M4, M8, and "Other Areas".

The groundwater monitoring network within Site M3 consists of 10 monitoring wells: 1 combined overburden/bedrock well (MW154), and 9 bedrock wells (MW111, MW112, MW113, MW203, MW232, MW233, MW348, MW352, and MW353).

The groundwater monitoring network within Site M4 consists of 3 monitoring wells: 1 combined overburden/bedrock well (MW157) and 2 bedrock wells (MW115 and MW158).

The groundwater monitoring network within Site M5 consists of 6 monitoring wells: 2 overburden wells (MW207R and MW354R), 3 combined overburden/bedrock wells (MW114R, MW127R, and MW355R), and 1 bedrock well (MW356R).

The groundwater monitoring network within Site M8 consists of 9 monitoring wells: 7 overburden wells (MW121, MW147R, MW323R, MW324R, MW325R, MW328, and MW330) and 2 combined overburden/bedrock wells (MW148RR and MW327R).

The groundwater monitoring network within Other Areas consists of 3 monitoring wells: 1 combined overburden/bedrock well (MW119) and 2 bedrock wells (MW116 and MW118).

Monitoring well information and water levels are summarized in Table 2-2. The groundwater flow direction in the overburden and bedrock aquifers is generally toward the west as shown on Figure 3-10 and Figure 3-11. The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

During the 2nd Quarter the horizontal gradient in the overburden aquifer in Site M6 was calculated to be 0.0186 ft/ft in the northern part and 0.0239 ft/ft in the southern part (Table 3-6). Using an average hydraulic conductivity value of 8.6E-04 cm/sec and an assumed porosity of 0.30, the calculated flow velocity at Site M6 was approximately 0.1726 ft/day or 63 ft/yr (Table 3-7). However, at Site M6, COCs have not been detected at wells 600 ft directly downgradient (MW212R to MW123R and MW162R). Given the 60 years that have passed since releases began at Site M6, this suggests the transport time for RDX and TNT is less than 600/60 = 10 ft/yr. A rate of 10 ft/yr is comparable to transport rates calculated for other areas of JOAAP.

For well nests located in the wetland on the west side of Site M6, vertical gradients observed in the bedrock at well nests MW318/MW319, MW316/MW317, and MW654/MW313 were upward. At combination well and bedrock at well nest MW162R/MW123R vertical gradients were downward. Since monitoring well MW162R is a combination well the vertical gradient may not indicate the hydraulic relationship between the overburden and bedrock. For well nests located on the escarpment, vertical gradient observed between the overburden and bedrock at well nests MW212R/MW215R and MW210R/MW213R, MW650/MW651, MW652/MW653, MW309/MW310R, and MW307/MW308 were downward and at well nest MW166R/MW320R were upward, and vertical gradients in the bedrock at well nests MW311/MW312 and MW314/MW315 were upward (Table 3-8).

3.4.1.2 Analytical Results

Groundwater sampling points for Site M6 during the 2nd Quarter are summarized in Table 1-1. The following monitoring wells at M6 and other sites included in the MFG GMZ are sampled for explosives:

- In-Plume – MW212R, MW652, and MW330 (M8)
- Early Warning – MW123R, MW162R, MW313, MW318, MW319, and MW654
- Compliance – MW117 and MW118 and MW119 (Other Areas).

In-plume monitoring well MW148RR and compliance monitoring wells MW112, MW113, MW115, and MW116 were removed from the LTM program beginning in spring 2012.

Groundwater samples collected at Site M6 during the 2nd Quarter were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Monitoring well MW330 was sampled for sulfate. Explosive compound detections for the 2nd Quarter sampling event conducted at Site M6 are summarized in Table 3-1 and shown on Figure 3-12. Sulfate detections for the 2nd Quarter sampling events conducted at Site M6 are summarized in Table 3-3. A brief discussion of analytical results by well type follows:

In-Plume Wells (MW212R, MW652, and MW330): At overburden well MW212R, 1,3-dinitrobenzene (DNB) was detected below the RG at a concentration of 1.5 µg/L, 2,4-DNT exceeded the RG at a concentration of 620 µg/L, 2,6-DNT exceeded the RG at a concentration of 300 µg/L, NB was detected below the RG at a concentration of 1.6 µg/L, 2-NT was detected below the RG at a concentration of 1,800 µg/L, TNT exceeded the RG at a concentration of 60 µg/L, and 3-NT, 4-NT, 2-A-4,6-DNT, and 4-A-2,6-DNT were detected. There are no RGs for 3-NT, 4-NT, 2-A-4,6-DNT, and 4-A-2,6-DNT.

At overburden well MW652, DNB exceeded the RG at a concentration of 14 µg/L, 2,4-DNT exceeded the RG at a concentration of 5,100 µg/L, 2,6-DNT exceeded the RG at a concentration of 3,000 µg/L, NB was detected below the RG at a concentration of 27 µg/L, 2-NT exceeded the RG at a concentration of 17,000 µg/L, TNT exceeded the RG at a concentration of 1,200 µg/L, and 3-NT, 4-NT, 2-A-4,6-DNT, and 4-A-2,6-DNT were detected. There are no RGs for 3-NT, 4-NT, 2-A-4,6-DNT, and 4-A-2,6-DNT.

At overburden well MW330, sulfate exceeded the RG at a concentration of 570 µg/L.

Early Warning Wells (MW123R, MW162R, MW313, MW318, MW319, and MW654): At bedrock well MW123R, there were no explosive compounds detected.

At overburden well MW162R, there were no explosive compounds detected.

At bedrock well MW313, 2-NT was detected below the RG at a concentration of 0.88 µg/L and 4-NT was detected. There is no RG for 4-NT.

At bedrock well MW318, DNB was detected below the RG at a concentration of 1.8 µg/L and RDX was detected below the RG at a concentration of 0.64 µg/L.

At bedrock well MW319, NB was detected below the RG at a concentration of 0.64 µg/L and 2-A-4,6-DNT was detected. There is no RG for 2-A-4,6-DNT.

At bedrock well MW654, there were no explosive compounds detected.

Compliance Wells (MW117 and, MW118 and MW119 (other areas): At combination well MW117, there were no explosive compounds detected.

At bedrock well MW118, there were no explosive compounds detected.

At bedrock well MW119, there were no explosive compounds detected.

3.4.1.3 Recommendations

There are no recommended changes to the LTM program at the Site M6.

3.4.2 Site M7

Site M7, the Red Water Area, comprises 49 acres in the central part of the MFG Area between Site M6 and Site M7 on the west bank of the TNT Ditch (Figure 1-2 and Figure 3-10). Facilities in Site M7 included storage tanks, pump stations, evaporators, and incinerators used to destroy the red water from Site M6 after construction in 1965. Overflows of untreated red water were stored in the Red Water Lagoon, a 3.3 acre impoundment that was remediated in 1985.

Contaminants of concern in soil included TNT, 2,4- and 2,6-DNT, TNB, and RDX. Source areas in soil included the drainage areas in the northwest part of Site M7. Soil RA activities were completed in 2001 at Site M7. Contaminants of concern in groundwater include TNT, 2,4-DNT, 2,6-DNT, and RDX.

The overburden aquifer primarily consists of silt and clay, with some sand and gravel in the upper, unsaturated, part of the aquifer. The overburden thickness ranges from less than 5 to more than 10 ft across Site M7. Based on available information, samples from overburden wells are obtained from discontinuous sand and gravel layers.

3.4.2.1 Groundwater Hydraulics

The groundwater monitoring network at Site M7 consists of 7 monitoring wells: 4 overburden wells (MW156, MW216, MW660, and MW661), 1 combined overburden/bedrock well (MW159), and 2 bedrock wells (MW124R, and MW217). Water levels are measured at the groundwater location that is sampled (listed below), and at monitoring wells MW156, MW216, MW660, and MW661. Monitoring well information and water levels are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer in the immediate vicinity of Site M7 is generally toward the west/southwest as shown on Figure 3-10. The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Site M7 is generally toward the west/northwest as shown on Figure 3-11. The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

During the 2nd Quarter the average horizontal gradient at Site M7 was calculated to be

0.0099 ft/ft (Table 3-6). Using an average hydraulic conductivity value of 6.7E-04 cm/sec and an assumed porosity of 0.30, the flow velocity at Site M7 was calculated to be approximately 0.0627 ft/day or 23 ft/yr (Table 3-7).

In the overburden, downward vertical gradients were observed at well nest MW661/MW660 and at combination/bedrock well nest MW157/MW158 at Site M4. Since monitoring well MW157 is a combination well the vertical gradient may not indicate the hydraulic relationship between the overburden and bedrock. Between the overburden and bedrock, upward vertical gradients were observed at well nest MW217/MW216. (Table 3-8).

3.4.2.2 Analytical Results

Monitoring well MW124R was sampled during the 2nd Quarter as an early warning bedrock well as part of the MFG monitoring network (Table 1-1). The groundwater samples collected at Site M7 during the 2nd Quarter were analyzed for explosive compounds in accordance with Appendix B (QAPP) of the LTM Plan. Explosive compound detections for the 2nd Quarter sampling event conducted at Site M7 are summarized in Table 3-1 and shown on Figure 3-12. A brief discussion of analytical results by well type follows.

Early Warning Well (MW124R): At bedrock well MW124R, there were no explosive compounds detected.

3.4.2.3 Recommendations

There are no recommended changes to the LTM program at Site M7.

3.4.3 Landfill M13

Site M13 comprises approximately 106 acres of the central part of the MFG area known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area (Figure 1-2 and Figure 3-13).

Landfill M13 is located in the northern part of Site M13 and comprises approximately 10.5 acres. Site features at Landfill M13 are illustrated on Figure 3-13. Disposal activities were confined to four discrete areas of the site, none of which extended beyond 12 acres in size. Historical records indicate landfilling took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. Other waste management activities at Site M13 involved explosives. Explosive compounds observed in the groundwater at Site M13 include: TNT, TNB, 2,4-DNT, and 2,6-DNT.

Soil in the vicinity of the Northern Gravel Pit had been found to contain beryllium, lead, and benzo(a)pyrene as COCs. On a single occasion in 1991, antimony and cadmium were

reported to be present in groundwater samples at concentrations in excess of their respective RGs, but they have not exceeded the RGs since. It is difficult to determine if the original findings could have resulted from turbid samples since low flow sampling and micro purging techniques are now employed to obtain more representative samples.

The current conceptual site model is that metal and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit.

The Northern Gravel Pit was consolidated and capped (Landfill M13) in 2007 to 2008. The three other pits received waste materials that do not appear to pose a threat to human health and the environment.

With the implementation of the RA on the TNT Ditch and the capping of the Northern Gravel Pit, it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

Monitoring at Landfill M13 is mandated by IAC Title 35, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for a period of 15 years.

The overburden aquifer primarily consists of silt and clay, with abundant sand and gravel in the upper, unsaturated, portion of the aquifer. The overburden thickness is approximately 25 ft and is fairly consistent across Site M13. Samples from overburden wells are obtained from silt and/or clay layers.

3.4.3.1 Groundwater Hydraulics

The groundwater monitoring network at Landfill M13 consists of 13 monitoring wells: 6 overburden wells (AEHA14R, MW126R, MW363, MW806, MW809, and MW811), 2 combined overburden/bedrock wells (MW350 and MW362), and 5 bedrock wells (MW321, MW322, MW364, MW807, and MW809). Monitoring well MW811 was installed and monitoring well AEHA15 was abandoned in October 2014. Water levels are measured at the groundwater locations that are sampled (listed below), and at monitoring wells AEHA14R, MW321, MW322, MW363, and MW364. Monitoring well information and water levels for the 2nd Quarter are summarized in Table 2-2. The groundwater flow direction in the overburden aquifer in the immediate vicinity of Landfill M13 is to the south/southeast as shown on Figure 3-13 which includes the surrounding groundwater flow from Figure 3-10. The groundwater flow direction in the bedrock aquifer in the immediate vicinity of Landfill M13 was generally toward the southwest as shown on Figure 3-14 which includes the surrounding groundwater flow from Figure 3-11. The overburden and bedrock aquifer flow directions are consistent with flow directions observed historically.

The horizontal gradient at Site M13 was calculated to be 0.0032 ft/ft in (Table 3-6). Using an average hydraulic conductivity value of 8.0E-02 cm/sec and an assumed porosity of 0.30, the calculated flow velocity at Site M13 was approximately 2.4 ft/day or 883 ft/yr in (Table 3-7).

Vertical gradients observed in the overburden were upward at downgradient well nest MW362/MW126R. Between the overburden and bedrock, downward vertical gradients were observed at upgradient well nest MW807/MW806 and downgradient well nests MW809/MW808 and MW364/MW363. In the bedrock, downward vertical gradients were observed at downgradient well nest MW322/MW321 (Table 3-8).

3.4.3.2 Analytical Results

Groundwater sampling points for Landfill M13 within the MFG GMZ for the 2nd Quarter sampling event are summarized in Table 1-1. The following monitoring wells at Landfill M13 are sampled for VOCs, SVOCs, TAL metals, explosives, nitrate, and sulfate:

- Upgradient – MW806 and MW807
- Downgradient – MW126R, MW362, MW808, MW809, and MW811

Groundwater samples collected at Landfill M13 during the 2nd Quarter were analyzed for explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs in accordance with Appendix B (QAPP) of the LTM Plan. Detections of explosive compounds, TAL metals, indicator parameters (sulfate and nitrate), VOCs, and SVOCs for the sampling events conducted at Landfill M13 during the 2nd Quarter are summarized in Tables 3-1, 3-2, 3-3, 3-4, and 3-5, respectively. Explosive compound detections are shown on Figure 3-15. For Landfill M13 the monitoring well locations are classified as upgradient or downgradient locations. A brief discussion of analytical results by well type follows:

Upgradient Wells (MW806 and MW807): At overburden well MW806, there were no explosive compounds detected, no RG exceedances for TAL metals, detections but no RG exceedances for nitrate and sulfate, no detections of VOCs, and no detections of SVOCs.

At bedrock well MW807, there were no explosive compounds detected, no RG exceedances for TAL metals, no detection for nitrate, a detection but no RG exceedance for sulfate, 1,1-dichloroethane (1,1-DCA) was detected below the RG at a concentration of 1.5 µg/L, cis-1,2-dichloroethene (cis-1,2-DCE) was detected below the RG at a concentration of 1.1 µg/L, and trichloroethene (TCE) was detected below the RG at a concentration of 0.19 µg/L, and no detections of SVOCs.

Downgradient Wells (MW126R, MW362, MW808, MW809, and MW811): At overburden well MW126R, there were no explosive compounds detected, no RG exceedances for TAL metals, no detection for nitrate, a detection but no RG exceedance for sulfate, acetone was detected (there is no RG), and no detections of SVOCs.

At bedrock well MW362, 2,4-DNT exceeded the RG at a concentration of 5.7 µg/L, 2,6-DNT was detected at the RG (0.42 µg/L), and 2-A-4,6-DNT and 4-A-2,6-DNT were detected (there are no RGs for 2-A-2,6-DNT and 4-A-2,6-DNT), no RG exceedances for TAL metals, no detection for nitrate, a detection but no RG exceedance for sulfate, acetone was detected (there is no RG), 1,1-DCA was detected below the RG at a concentration of 0.46 µg/L, PCE was detected below the RG at a concentration of 0.27 µg/L, and in the SVOC sample 2,4-DNT exceeded the RG at a concentration of 3.4 µg/L.

At overburden well MW808, there were no explosive compounds detected, no RG exceedances for TAL metals, detections but no RG exceedances for nitrate and sulfate, acetone was detected (there is no RG), and no detections of SVOCs.

At bedrock well MW809, the were no explosive compounds detected, no RG exceedances for TAL metals, detections but no RG exceedances for nitrate and sulfate, acetone was detected (there is no RG), and no detections of SVOCs.

At overburden well MW811, the were no explosive compounds detected, no RG exceedances for TAL metals, no detection for nitrate, a detection but no RG exceedance for sulfate, no detections of VOCs, and no detections of SVOCs.

3.4.3.3 Recommendations

There are no recommended changes to the LTM program at Site M13.

4.0 SUMMARY OF RECOMMENDATIONS

The following section present a summary of recommendations made in this report that are relevant to the LTM program. A summary of the recommendations to the LTM program, the reasoning for the recommendation, and the status of those recommendations are included in Table 4-1.

The following is a summary of recommendations:

- The LTM program, as outlined in Table 3-9, should be implemented for the 3rd (scheduled for November) and 4th (scheduled for December) Quarterly 2014 sampling events.
- At Landfill L3 - Repair rip rap along Prairie creek. The Army is currently preparing the contract documentation necessary for implementation of the repairs of the rip rap along Prairie creek at Landfill L3. Field work is currently scheduled for August 2015. During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height. Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes.
- At Landfill M11 - The October 2013 landfill inspection at M11 would have completed the first five years of quarterly inspections (October 2008 through October 2013). According to Sections 4.2.2.2 and 4.2.2.3.2 of the LTM Plan, Landfill M11 is required to have quarterly inspections completed for the first five years, and annually thereafter. As stated in the Draft Final 2013 Annual Groundwater Monitoring Report (MWH, January 2015) currently in review, *"Quarterly inspections of the landfill cap at Site M11 were required for the first five years, then annually thereafter. However, due to the missing inspections report from October 2013, when the landfill was mowed for the first time, quarterly inspections will continue through 2014."* Some woody growth was observed in the rip rap on the south side of the landfill. The rip rap needs to be cleared of woody growth. During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height. During the next mowing event scheduled for December 2014, small trees will be removed from the rip rap. Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes.
- At Landfill M13 - During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height. During the next mowing event scheduled for December 2014, small trees will be removed from the rip rap. Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes. Although the landfill cap was mowed, the overgrowth within the Landfill M13 fenced area and surrounding the perimeter rip rap is limiting access to the landfill. Additionally, having such a dense overgrowth

of seed sources in close proximity to the landfill, there will continue to be a high occurrence of invading species. Therefore, additional mowing should be conducted surrounding the landfill, including the drainage ditch located on the south side of the landfill.

- Following mowing outside of the landfill footprint, the drainage ditch on the south side of Landfill M13 will be inspected to determine if there is blockage causing the retention of surface water.

5.0 REFERENCES

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TABLES

Table 1-1

Sample Parameters - 2nd Quarter 2014
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Parameter
L1	***In-plume***	
	MW131	E
	MW173	E
	WES1	E
	Early Warning	
	WES3	E
	MW174	E
	Compliance	
	SW550	E
L3/ Landfill L3	***Upgradient***	
	SW0004	E, M
	In-plume/Downgradient	
	MW410	E
	MW412	E, M
	Early Warning/Downgradient	
	MW630	E, M
	MW631	E, M
	MW633	E, M
	Compliance/Downgradient	
	SW777	E, M
	Downgradient	
	SW557	E, M
	SW558	E, M
M1	***In-plume***	
	MW107	S
	MW231	S
	MW640	S
	MW641	S
	MW642	S
	Early Warning	
	MW643	S
	MW644	S
	Compliance	
	MW645	S
	MW646	S
	MW648	S
	MW649	S
	SW709	S
MFG	***In-plume***	
	MW212R	E
	MW330	S
	MW652	E
	Early Warning	
	MW123R	E
	MW124R	E
	MW162R	E
	MW313	E
	MW318	E
	MW319	E
	MW654	E
	Compliance	
	MW117	E
	MW118	E
	MW119	E
Landfill M13(1)	***Upgradient***	
	MW806	E, I, M, SVOC & V
	MW807	E, I, M, SVOC & V
	Downgradient	
	MW126R	E, I, M, SVOC & V
	MW362	E, I, M, SVOC & V
	MW808	E, I, M, SVOC & V
	MW809	E, I, M, SVOC & V
	MW811	E, I, M, SVOC & V

General Notes:
V - Volatile Organic Compounds
SVOC - Semivolatile Organic Compounds
E - Explosives
M - Metals
I - Indicator parameters (Nitrate-N and Sulfate)
S - Sulfate
MFG - Manufacturing Area

Footnotes:
(1) Landfill M11 not sampled during 1st Quarter 2014.

RJR/rjr/
J:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Final\Tables\Table 1-1 2nd Quarter 2014 Sample Parameters

Table 2-1

Summary of Final Field Parameters
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Sample Date	pH (SU)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (°C)	Redox (mV)
L1	**In-plume**							
	MW131	10/28/2014	6.91	999	0.0	6.34	10.9	137
	MW173	10/27/2014	7.24	690	0.0	1.84	13.2	-72
	WES1	10/28/2014	8.36	1020	0.0	2.63	10.2	137
	Early Warning							
	WES3	10/27/2014	7.83	938	0.0	2.58	11.2	138
	MW174	10/28/2014	7.15	767	0.0	3.29	12.4	103
	Compliance							
	SW550	10/28/2014	7.88	717	6.0	11.11	13.3	102
L3	**Upgradient**							
	SW004	10/23/2014	9.59	972	13.2	12.14	8.5	14
	In-plume							
	MW410	10/23/2014	8.50	1090	1.3	0.63	11.6	-117
	In-plume/Downgradient							
	MW412	10/23/2014	7.24	705	0.0	5.28	12.5	99
	Early Warning/Downgradient							
	MW630	10/23/2014	7.35	690	0.3	2.89	13.4	-44
	MW631	10/23/2014	8.57	788	0.0	2.46	11.9	-73
	MW633	10/23/2014	8.66	802	16.1	7.23	13.3	45
	Compliance/Downgradient							
	SW777	10/23/2014	8.38	707	2.8	12.27	11.2	68
	Downgradient							
	SW557	10/23/2014	9.25	924	7.1	13.12	9.5	42
	SW558	10/23/2014	9.03	838	1.1	12.96	9.6	73
M1	**In-plume**							
	MW107	10/28/2014	10.66	4060	0.0	2.43	12.2	22
	MW231	10/28/2014	10.65	4060	0.0	2.63	12.2	22
	MW640	10/28/2014	6.80	8830	0.0	1.63	12.0	-71
	MW641	10/29/2014	7.21	1950	1.9	1.41	14.4	-90
	MW642	10/29/2014	7.26	1400	0.5	2.28	12.3	-116
	Early Warning							
	MW643	10/28/2014	7.10	763	0.9	2.87	13.5	-90
	MW644	10/28/2014	7.34	943	0.0	1.78	12.8	29
	Compliance							
	MW645	10/27/2014	8.14	1300	0.0	8.67	14.5	108
	MW646	10/27/2014	7.40	821	0.0	2.09	13.4	10
	MW648	10/28/2014	8.53	755	0.0	2.13	14.3	-107
	MW649	10/28/2014	8.28	866	0.0	1.89	13.8	78
	SW709	10/28/2014	8.34	695	0.0	13.07	14.6	41
MFG	**In-plume**							
	MW212R	10/22/2014	7.33	674	1.4	1.79	12.8	-64
	MW330	10/20/2014	7.72	2090	6.5	5.91	13.2	190
	MW652	10/22/2014	7.05	974	0.0	1.49	12.4	-57
	Early Warning							
	MW123R	10/21/2014	8.11	1470	20.3	1.48	12.8	-124
	MW124R	10/21/2014	8.17	900	49.4	1.46	13.2	-93
	MW162R	10/21/2014	7.15	794	0.1	4.89	14.8	78
	MW313	10/22/2014	7.31	1430	0.0	1.54	11.5	-250
	MW318	10/21/2014	7.01	1070	0.0	1.72	12.6	-178
	MW319	10/21/2014	8.43	1680	131.0	17.24	13.0	-157
	MW654	10/22/2014	8.26	1940	6.9	3.17	12.6	-249
	Compliance							
	MW117	10/27/2014	7.39	1220	2.5	2.50	14.1	-58
	MW118	10/27/2014	7.46	601	0.0	2.54	13.9	74
	MW119	10/27/2014	8.38	2430	3.4	2.84	14.0	57
Landfill M13	**Upgradient**							
	MW806	10/21/2014	8.54	931	1.8	1.80	12.2	-119
	MW807	10/21/2014	7.04	4	0.5	1.64	12.3	-124
	Downgradient							
	MW126R	10/21/2014	8.26	908	0.0	2.10	14.0	-24
	MW362	10/21/2014	7.06	2900	0.0	1.70	12.5	104
	MW808	10/20/2014	6.47	1730	1.8	2.60	12.1	122
	MW809	10/20/2014	7.54	623	0.0	2.34	12.2	68
	MW811	10/29/2014	(1)	(1)	(1)	(1)	(1)	(1)

Notes:
ID = Identification
SU = Standard Units
mS/cm = Microsiemens Per Centimeter
NTU = Nephelometric Turbidity Unit
mg/L = Milligrams Per Liter
°C = Degrees Centigrade
mV = Millivolt
R = Replacement Well
Redox = Reduction/Oxidation Potential

Footnotes
(1) Parameters not measured. Well was sampled using a bailer due to turbidity.

TABLE 2-2

Monitoring Well Information Table - Manufacturing Area
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Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water October 2014 (TOC)	Water Elevation October 2014 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW104	M1	15019989.4	1318790.5	549.10	546.20	7.0	27.0	30.0	6.55	542.55	27.0	519.2	1981	OVB	20.0	4.0
MW105		15020111.7	1320854.1	555.00	552.50	7.0	27.0	29.9	6.50	548.50	24.0	528.5	1981	COMBO	20.0	4.0
MW106		15020948.8	1318761.3	542.00	539.70	10.0	30.0	32.0	4.39	537.61	21.0	518.7	1981	COMBO	20.0	4.0
MW107		15021094.2	1320422.3	552.40	549.10	5.5	25.5	27.4	6.84	545.56	17.0	532.1	1981	COMBO	20.0	4.0
MW201		15020020.6	1318931.6	546.15	544.01	46.5	66.5	70.5	3.42	542.73	24.0	520.0	1988	BRK	20.0	4.0
MW231		15020828.1	1319861.0	550.33	548.47	6.0	16.0	15.7	4.32	546.01	16.0	532.5	1988	OVB	10.0	4.0
MW347		15020481.0	1319595.0	551.73	549.84	14.4	24.4	27.0	4.77	546.96	18.5	531.3	1991	COMBO	10.0	4.0
MW351		15021257.8	1319798.9	548.38	545.68	9.5	19.5	22.7	5.00	543.38	22.5	523.2	1991	OVB	10.0	4.0
MW640		15021244.2	1319804.0	548.12	545.40	29.0	39.0	40.0	4.20	543.92	23.0	522.4	1999	BRK	10.0	4.0
MW641		15021873.5	1319350.2	544.50	541.98	7.0	17.0	17.2	2.40	542.10	29.0	516.1	1999	OVB	10.0	4.0
MW642		15021874.4	1319339.9	544.47	541.95	29.0	39.0	40.0	2.95	541.52	29.0	516.1	1999	BRK(1)	10.0	4.0
MW643		15022117.7	1318719.9	540.03	537.55	4.3	7.2	7.8	6.03	534.00	7.3	530.3	2001	OVB	2.9	4.0
MW644		15022128.9	1318718.6	540.23	537.55	10.8	20.4	21.0	6.21	534.02	7.3	530.3	2001	BRK	9.6	4.0
MW645		15022269.1	1318648.7	541.47	538.90	7.5	11.5	12.0	8.62	532.85	10.5	528.4	2001	OVB	4.0	4.0
MW646		15022257.3	1318650.5	541.48	539.09	12.3	21.9	22.5	8.47	533.01	10.5	528.6	2001	BRK	9.6	4.0
MW647		15022572.9	1318013.0	538.40	535.96	7.3	16.9	17.5	5.84	532.56	6.0	530.0	2001	BRK(2)	9.6	4.0
MW648		15022428.3	1319438.1	546.77	544.17	7.3	16.8	17.4	6.04	540.73	13.5	530.7	2001	OVB	9.6	4.0
MW649		15021299.5	1318723.2	543.10	540.49	7.0	16.6	17.2	7.29	535.81	7.5	533.0	2001	COMBO(3)	9.6	4.0
MW111	M3	15028903.0	1318551.6	531.80	529.40	10.5	54.0	54.0	**NM**	**NM**	10.0	519.4	1981	BRK	43.5	4.0
MW112		15030353.7	1318557.9	534.10	531.70	7.2	27.2	29.0	3.72	530.38	8.0	523.7	1981	BRK	20.0	4.0
MW113		15030379.5	1319676.1	536.32	533.70	7.2	27.2	28.0	4.84	531.48	5.0	528.7	1981	BRK	20.0	4.0
MW154		15027749.6	1318572.5	533.06	529.15	5.5	9.1	9.1	**NM**	**NM**	8.0	521.2	1982	COMBO(4)	3.6	4.0
MW203		15029235.4	1318551.2	534.23	532.02	10.5	25.5	25.5	2.03	532.20	5.5	526.5	1988	BRK	15.0	4.0
MW232		15030123.9	1318974.4	535.79	533.38	20.0	35.0	37.0	**NM**	**NM**	7.0	526.4	1988	BRK	15.0	4.0
MW233		15029737.9	1319024.9	535.58	532.96	10.0	25.0	25.5	**NM**	**NM**	2.5	530.5	1988	BRK	15.0	4.0
MW348		15029911.3	1318978.0	535.71	532.61	16.5	31.5	35.0	**NM**	**NM**	3.0	529.6	1991	BRK	15.0	4.0
MW352		15029602.8	1318617.3	534.89	532.33	19.0	34.0	34.5	**NM**	**NM**	6.0	526.3	1991	BRK	15.0	4.0
MW353		15030120.6	1318562.3	534.64	531.86	17.0	32.0	34.0	**NM**	**NM**	2.0	529.9	1991	BRK	15.0	4.0
MW115	M4	15032589.5	1318485.3	533.40	530.80	7.2	27.2	28.0	6.72	526.68	2.0	528.8	1981	BRK	20.0	4.0
MW157		15032947.3	1319827.0	535.02	531.37	3.7	10.2	10.5	3.34	531.68	6.5	524.9	1982	COMBO	6.5	2.0
MW158		15032970.9	1319820.0	534.40	531.58	9.0	29.5	31.9	3.02	531.38	5.0	526.6	1982	BRK	20.5	3.0
MW114R	M5	15031315.3	1323651.6	556.80	554.9	6.5	21.5	22.0	10.58	546.22	15.0	539.9	2001	COMBO	15.0	4.0
MW127R		15032537.2	1326273.8	596.04	592.9	30.0	45.0	46.0	42.17	553.87	40.0	552.9	2001	COMBO	15.0	4.0
MW207R		15032188.9	1323779.7	560.21	557.5	7.0	17.0	18.0	11.71	548.50	15.5(5)	542.0(5)	2001	OVB	10.0	4.0
MW354R		15031780.2	1323424.2	559.61	557.6	7.0	17.0	18.0	14.02	545.59	19.0	538.6	2001	OVB(6)	10.0	4.0
MW355R		15030827.1	1323676.8	558.12	555.7	10.0	20.0	22.0	11.88	546.24	15.0	540.7	2001	COMBO	10.0	4.0
MW356R		15031372.5	1322054.0	558.08	556.1	24.5	34.5	35.0	17.80	540.28	20.0	536.1	2001	BRK	10.0	4.0
MW117	M6	15036450.2	1318407.7	529.10	526.90	7.7	27.7	27.7	4.10	525.00	12.0	514.9	1981	COMBO	20.0	4.0
MW122		15038443.3	1321305.0	540.10	537.40	7.0	27.0	27.5	4.47	535.63	6.5	530.9	1981	BRK	20.0	4.0
MW123R		15035314.9	1320626.1	537.22	534.9	15.0	30.0	32.0	5.16	532.06	10.0	524.9	2001	BRK	15.0	4.0
MW125R		15037201.5	1322981.6	567.69	565.1	12.0	32.0	33.0	13.97	553.72	26.0	539.1	2001	COMBO	20.0	4.0
MW160		15034274.9	1321203.9	542.29	538.20	3.3	6.3	10.4	6.66	535.63	6.0	532.2	1982	OVB	3.0	2.0
MW162R		15035325.7	1320625.8	540.19	537.7	4.5	9.5	10.0	5.28	534.91	3.7(5)	534.0(5)	2001	COMBO(7)	5.0	4.0
MW164		15037035.7	1321868.5	545.21	541.69	3.0	6.0	9.7	6.47	538.74	6.0	535.7	1982	OVB	3.0	4.0
MW165		15037644.2	1321700.3	544.01	540.31	2.8	5.3	9.0	5.72	538.29	5.0	535.3	1982	OVB	2.5	4.0
MW166R		15039129.4	1322675.0	558.21	555.6	10.0	20.0	21.0	13.25	544.96	**UNKNOWN**	**UNKNOWN**	2001	OVB	10.0	4.0
MW208		15035028.4	1320126.9	538.38	535.10	12.0	27.0	30.1	4.55	533.83	4.0	531.1	1988	BRK	15.0	4.0
MW209		15037473.3	1320271.3	537.75	534.89	19.5	34.5	34.5	3.95	533.80	11.1	523.8	1988	BRK	15.0	4.0
MW210R		15035465.0	1322154.0	565.83	564.30	10.7	20.0	20.0	10.78	555.05	**NE**	**NE**	1998	OVB	10.0	4.0
MW212R		15035415.0	1321862.0	567.74	565.30	9.5	19.5	21.0	14.64	553.10	**NE**	**NE**	1998	OVB	10.0	4.0
MW213R		15035462.0	1322159.0	566.49	564.30	38.0	53.0	54.0	19.23	547.26	30.5	533.8	1998	BRK	15.0	4.0

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Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water October 2014 (TOC)	Water Elevation October 2014 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW215R	M6	15035410.0	1321863.0	567.27	565.30	38.5	53.5	54.5	21.00	546.27	30.0	535.3	1998	BRK	15.0	4.0
MW307		15033821.0	1321855.8	563.56	561.45	17.0	27.0	31.7	19.60	543.96	**NE**	**NE**	1991	OVB	10.0	4.0
MW308		15033810.7	1321837.6	563.84	561.38	50.5	65.5	71.8	21.97	541.87	35.0	526.4	1991	BRK	15.0	4.0
MW309		15034826.8	1321825.3	565.59	563.43	12.7	27.7	30.6	11.28	554.31	30.0	533.4	1991	OVB	15.0	4.0
MW310R		15034823.0	1321824.0	565.17	563.00	44.5	59.5	60.0	21.88	543.29	31.0	532.0	1998	BRK	15.0	4.0
MW311		15038100.4	1322342.5	548.85	546.36	14.0	24.0	26.4	0.39	548.46	7.0	539.4	1991	BRK	10.0	4.0
MW312		15038100.6	1322332.5	548.59	545.96	40.0	55.0	58.1	0.16	548.43	7.0	539.0	1991	BRK	15.0	4.0
MW313		15037051.7	1321934.0	551.07	549.20	25.0	40.0	40.9	12.00	539.07	12.0	537.2	1991	BRK	15.0	4.0
MW314		15034383.6	1321451.5	542.32	539.53	9.7	14.7	17.8	6.86	535.46	7.2	532.3	1991	BRK	5.0	4.0
MW315		15034394.6	1321451.7	541.60	538.91	29.7	44.7	47.9	6.10	535.50	6.5	532.4	1991	BRK	15.0	4.0
MW316		15036232.3	1321257.1	542.89	540.49	13.0	18.0	20.9	9.21	533.68	7.5	533.0	1991	BRK	5.0	4.0
MW317		15036222.4	1321257.7	542.96	540.71	34.0	49.0	49.0	6.71	536.25	8.0	532.7	1991	BRK	15.0	4.0
MW318		15037189.7	1321488.6	547.67	545.23	11.8	21.8	24.2	10.08	537.59	11.5	533.7	1991	BRK	10.0	4.0
MW319		15037202.6	1321489.8	548.10	545.49	40.0	55.0	57.0	10.31	537.79	12.0	533.5	1991	BRK	15.0	4.0
MW320R		15039129.7	1322656.0	557.09	554.6	30.5	45.5	46.0	11.92	545.17	8.0(5)	546.6(5)	2001	BRK(8)	15.0	4.0
MW650		15037950.2	1322588.0	566.45	563.83	12.0	22.0	22.5	10.73	555.72	23.0(5)	560.8(5)	1999	OVB	10.0	4.0
MW651		15037939.2	1322583.7	566.88	563.83	36.0	46.0	47.0	17.98	548.90	23.0	560.8	1999	BRK	10.0	4.0
MW652		15037004.9	1322243.1	565.03	561.93	11.0	21.0	22.0	11.41	553.62	25.0(5)	536.9(5)	1999	OVB	10.0	4.0
MW653		15036994.6	1322239.1	564.60	561.93	36.0	46.0	47.0	17.51	547.09	25.0	536.9	1999	BRK	10.0	4.0
MW654		15037070.8	1321976.9	551.15	548.49	13.0	23.0	24.0	12.46	538.69	10.5	539.0	1999	BRK	10.0	4.0
MW655		15034232.3	1320633.2	540.19	537.71	**UNKNOWN**	**UNKNOWN**	**UNKNOWN**	6.54	533.65	5.0	532.7	1999	BRK(9)	**UNKNOWN**	4.0
MW662		15039862.6	1321841.5	547.56	**UNKNOWN**	6.0	16.0	18.0	8.08	539.48	20.0	**UNKNOWN**	2001	OVB	10.0	4.0
MW663		15039854.9	1321841.4	547.86	**UNKNOWN**	30.0	40.0	41.0	8.38	539.48	20.0	**UNKNOWN**	2001	BRK	10.0	4.0
MW664		15040136.6	1322326.4	547.43	**UNKNOWN**	5.0	10.0	10.5	7.93	539.50	10.0	**UNKNOWN**	2001	OVB	5.0	4.0
MW665		15040145.7	1322327.5	546.98	**UNKNOWN**	28.0	38.0	40.0	4.22	542.76	10.0	UNKNOWN	2001	BRK	10.0	4.0
MW124R	M7	15033133.0	1320756.0	537.25	534.70	6.0	16.0	16.0	2.30	534.95	5.0	529.7	1998	BRK	10.0	4.0
MW156		15032408.6	1321713.5	541.35	537.45	1.7	5.2	5.4	5.98	535.37	5.3	532.2	1982	OVB	3.5	4.0
MW159		15033457.9	1320537.1	537.80	533.54	4.4	9.4	12.8	5.65	532.15	5.7	527.8	1982	COMBO	5.0	4.0
MW216		15033525.6	1320650.6	538.03	536.51	5.0	10.0	36.7	6.27	531.76	11.0	525.5	1988	OVB	5.0	4.0
MW217		15033449.7	1320652.6	538.97	536.90	19.5	34.5	12.0	5.97	533.00	13.4	523.5	1988	BRK	15.0	4.0
MW660		15032597.2	1320677.4	539.73	537.08	7.0	12.0	12.6	5.89	533.84	**UNKNOWN**	**UNKNOWN**	1999	OVB(10)	5.0	4.0
MW661		15032587.2	1320679.2	539.57	537.09	20.0	30.0	30.0	6.92	532.65	**UNKNOWN**	**UNKNOWN**	1999	OVB(10)	10.0	4.0
MW121	M8	15040140.8	1323725.5	575.75	572.50	10.0	30.0	14.2	18.73	557.02	**NE**	**NE**	1981	OVB	20.0	4.0
MW147R		15037926.9	1323318.0	567.82	564.0	6.5	21.5	22.0	10.91	556.91	**NE**	**NE**	2001	OVB	15.0	4.0
MW148RR		15038954.5	1323542.2	561.59	560.7	8.0	23.0	23.5	15.62	545.97	18.0	542.7	2001	COMBO	15.0	4.0
MW323R		15036514.7	1323739.7	566.00	563.5	8.0	18.0	18.5	10.59	555.41	**NE**	**NE**	2001	OVB	10.0	4.0
MW324R		15038125.4	1323502.9	566.23	562.7	9.5	19.5	20.0	14.03	552.20	**NE**	**NE**	2001	OVB	10.0	4.0
MW325R		15036105.4	1322633.3	569.62	566.9	7.0	17.0	18.0	**NM**	**NM**	**NE**	**NE**	2001	OVB	10.0	4.0
MW327R		15035974.9	1324366.5	565.27	562.57	13.5	18.5	19.0	**NM**	**NM**	17.0	545.6	2001	COMBO	5.0	4.0
MW328		15040352.8	1323793.0	582.93	580.72	18.0	28.0	19.7	24.52	558.41	**NE**	**NE**	1991	OVB	10.0	4.0
MW330		15040218.4	1323970.2	580.33	578.20	15.0	25.0	17.0	22.18	558.15	**NE**	**NE**	1991	OVB	10.0	4.0
MW116	Other Areas	15034538.6	1318460.3	535.20	532.60	7.0	27.0	27.0	3.75	531.45	5.0	527.6	1981	BRK	20.0	4.0
MW118		15039343.5	1318362.2	534.00	531.20	8.0	23.0	23.0	3.36	530.64	2.5	528.7	1981	BRK	15.0	4.0
MW119		15040962.1	1320127.9	538.90	535.50	3.3	23.3	25.5	6.34	532.56	6.0	529.5	1981	COMBO(11)	20.0	4.0
MW108	M11	15025248.1	1320261.2	543.60	540.80	7.0	27.0	27.0	**NM**	**NM**	9.0	531.8	1981	COMBO(12)	20.0	4.0
MW333		15026529.4	1319776.9	536.41	533.63	17.9	32.9	34.5	**NM**	**NM**	5.0	528.6	1991	BRK	15.0	4.0
MW334		15025998.4	1319521.8	536.22	533.40	19.0	34.0	35.0	**NM**	**NM**	5.0	528.4	1991	BRK	15.0	4.0
MW335		15025671.9	1319364.8	538.36	535.66	9.4	19.4	19.5	**NM**	**NM**	6.0	529.7	1991	BRK	10.0	4.0
MW336		15025322.1	1319223.4	537.28	534.79	12.0	22.0	23.5	**NM**	**NM**	7.5	527.3	1991	BRK	10.0	4.0
MW337		15024992.0	1319103.4	536.96	534.32	21.1	36.1	35.0	**NM**	**NM**	6.5	527.8	1991	BRK	15.0	4.0

TABLE 2-2

Monitoring Well Information Table - Manufacturing Area
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water October 2014 (TOC)	Water Elevation October 2014 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Formation Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW338	M11	15024414.1	1318777.5	537.73	534.70	13.5	28.5	30.5	**NM**	**NM**	3.0	531.7	1991	BRK	15.0	4.0
MW339		15023897.9	1318660.6	541.27	538.41	9.7	19.7	20.0	**NM**	**NM**	9.0	529.4	1991	BRK	10.0	4.0
MW340		15023157.7	1318683.2	542.47	539.83	7.0	17.0	22.0	**NM**	**NM**	10.0	529.8	1991	COMBO	10.0	4.0
MW802		15025690.0	1320235.7	543.42	541.62	5.0	15.0	15.0	**NM**	**NM**	9.5	532.1	2008	COMBO	10.0	4.0
MW803		15025697.7	1320237.5	543.66	541.56	26.5	36.5	36.5	**NM**	**NM**	9.5	532.1	2008	BRK	10.0	4.0
MW804		15025916.1	1319219.3	536.48	533.78	5.0	15.0	15.0	**NM**	**NM**	3.5	530.3	2008	BRK(13)	10.0	4.0
MW805		15025913.6	1319229.6	536.27	533.62	25.0	35.0	35.0	**NM**	**NM**	3.5	530.1	2008	BRK	10.0	4.0
AEHA14R	M13	15034927.3	1322519.9	569.73	567.03	16.5	26.5	27.0	16.27	553.46	**UNKNOWN**	**UNKNOWN**	2001	OVB	10.0	4.0
AEHA15		15034695.4	1322493.9	570.38	567.32	**UNKNOWN**	**UNKNOWN**	36.5	**NM**	**NM**	**UNKNOWN**	**UNKNOWN**	**UNKNOWN**	OVB(10)	**UNKNOWN**	2.0
MW126R		15034092.6	1323332.3	562.41	563.00	11.0	21.0	22.0	15.33	547.08	NE	NE	2004	OVB	10.0	4.0
MW321		15033167.5	1321626.5	545.55	542.93	13.5	23.5	26.6	8.00	537.55	9.5	533.4	1991	BRK	10.0	4.0
MW322		15033161.0	1321640.2	544.54	542.26	34.5	49.5	51.5	10.87	533.67	9.0	533.3	1991	BRK	15.0	4.0
MW350		15032810.1	1321811.0	554.34	552.34	12.5	22.5	24.8	15.97	538.37	19.0	533.3	1991	COMBO	10.0	4.0
MW362		15034100.6	1323339.4	562.46	562.78	28.0	33.0	34.0	12.87	549.59	29.5	533.3	2004	COMBO(14)	5.0	4.0
MW363		15032768.3	1322536.0	570.03	567.66	21.0	31.0	32.0	28.01	542.02	31.5	536.2	2004	OVB	10.0	4.0
MW364		15032775.4	1322527.2	569.82	567.69	37.0	42.0	42.5	27.89	541.93	31.5	536.2	2004	BRK	5.0	4.0
MW806		15034807.2	1323337.9	565.53	**UNKNOWN**	15.0	25.0	25.0	13.24	552.29	29.0	**UNKNOWN**	2008	OVB	10.0	4.0
MW807		15034817.4	1323338.1	565.79	**UNKNOWN**	35.0	45.0	45.0	15.25	550.54	29.0	**UNKNOWN**	2008	BRK	10.0	4.0
MW808		15034539.9	1322493.1	569.23	**UNKNOWN**	15.0	25.0	25.0	16.74	552.49	30.0	**UNKNOWN**	2008	OVB	10.0	4.0
MW809		15034530.2	1322492.9	569.18	**UNKNOWN**	35.0	45.0	45.0	19.34	549.84	30.0	**UNKNOWN**	2008	BRK	10.0	4.0
MW811		15034212.0	1323111.7	568.24	565.60	20.0	30.0	30.2	**NM**	**NM**	30.2	535.4	2014	OVB	10.0	2.0

Notes:

Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)

UNKOWN = indicate data not presented on borelogs or provided in RI/FS documentation.

NM = Water level not measured.

NE = not encountered

BRK = Bedrock

OVB = Overburden

COMBO = Combination Overburden and Bedrock Well

MSL = Feet relative to mean seal level

BGS = Feet below ground surface

ID = identification

TOC = Top of Casing

Footnotes:

(1) Well designation changed from overburden to bedrock based on top of the well screen at 29.0 ft bgs and top of bedrock at 29.0 ft bgs.
(2) Well designation changed from overburden to bedrock based on top of the well screen at 7.3 ft bgs and top of bedrock at 6.0 ft bgs.
(3) Well designation changed from overburden to combination due to top of the well screen at 7.0 ft bgs and top of bedrock at 7.5 ft bgs.
(4) Well designation changed from bedrock to combination based on bottom of the well screen at 9.1 ft bgs and top of bedrock at 8.0 ft bgs.
(5) Bedrock elevation from depth to bedrock from boring log for original monitoring well or the depth to bedrock from nested monitoring well.
(6) Well designation changed from combination to overburden based on bottom of the well screen at 17.0 ft bgs and top of bedrock at 19.0 ft bgs.
(7) Well designation changed from overburden to bedrock based on top of the well screen at 3.7 ft bgs and top of bedrock at 4.5 ft bgs.
(8) Well designation changed from overburden to bedrock based on top of the well screen at 30.5 ft bgs and top of bedrock at 8.0 ft bgs.
(9) Designation assumed based on shallow depth to bedrock, screen length unknown.
(10) Designation assumed, depth to bedrock unknown.
(11) Well designation changed from bedrock to combination based on top of the well screen at 3.3 ft bgs and top of bedrock at 6.0 ft bgs.
(12) Well designation changed from bedrock to combination based on top of the well screen at 7.0 ft bgs and top of bedrock at 9.0 ft bgs.
(13) Well designation changed from combination to bedrock based on top of the well screen at 5.0 ft bgs and top of bedrock at 3.5 ft bgs.
(14) Well designation changed from bedrock to combination based on top of the well screen at 28.0 ft bgs and top of bedrock at 29.5 ft bgs.

TABLE 2-3

Monitoring Well Information Table - LAP Area
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water October 2014 (TOC)	Water Elevation October 2014 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Well Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW131	L1	15029483.20	1344039.100	625.01	622.29	2.5	22.5	24.0	14.71	610.30	**NE**	**NE**	1981	OVB	20.0	4.0
MW171		15028774.67	1343406.032	618.24	615.03	2.9	7.9	11.1	10.72	607.52	8.0	607.0	1982	OVB(1)	5.0	4.0
MW172		15028836.84	1344094.147	615.87	613.19	14.5	34.5	37.5	**NM**	**NM**	11.0	602.2	1982	BRK	20.0	4.0
MW173		15028827.26	1344123.204	615.56	612.56	2.8	11.8	15.2	8.55	607.01	12.0	600.6	1982	OVB	9.0	3.6
MW174		15028974.94	1344649.467	615.32	612.40	3.5	14.5	18.1	8.38	606.94	15.0	597.4	1982	OVB	11.0	3.6
MW175		15029420.69	1343046.596	634.45	630.96	3.7	19.7	23.2	17.24	617.21	20.0	611.0	1982	OVB	16.0	3.6
MW176		15030320.57	1343491.565	646.77	643.49	4.8	20.8	23.6	21.73	625.04	20.8	622.7	1982	OVB	16.0	3.6
MW177		15028773.31	1343380.183	616.29	613.84	11.8	31.0	33.4	8.07	608.22	6.5	607.3	1983	BRK	19.2	3.0
MW178		15030330.01	1343512.024	643.83	640.39	27.3	46.5	50.1	24.84	618.99	20.0	620.4	1983	BRK	19.2	3.0
MW400		15030872.22	1344840.211	655.17	652.56	16.2	26.2	28.6	**NM**	**NM**	21.0	631.6	1991	COMBO	10.0	4.0
MW401		15028228.22	1344007.476	611.96	610.20	28.5	43.5	46.1	6.48	605.48	16.0	594.2	1991	BRK	15.0	4.0
WES1		15029404.21	1343978.508	623.13	621.43	20.0	40.0	40.0	13.43	609.70	20.0	601.4	1997	BRK	20.0	4.0
WES2		15029874.92	1343699.213	637.69	635.98	22.0	42.0	42.0	23.31	614.38	22.0	614.0	1997	BRK	20.0	4.0
WES3		15028686.71	1344093.581	611.69	610.33	20.0	40.0	40.0	4.92	606.77	20.0	590.3	1997	BRK	20.0	4.0
MW610		15028213.06	1344005.102	612.63	609.62	4.0	14.0	14.0	7.10	605.53	16(1)	594.2(2)	1999	OVB	10.0	4.0
MW611		15027976.15	1344327.569	620.45	617.83	10.0	20.0	21.0	8.96	611.49	**NE**	**NE**	1999	OVB	10.0	4.0
MW132	L2	15026868.16	1339653.570	612.30	609.84	7.5	27.5	29.4	**NM**	**NM**	18.0	591.8	1981	COMBO	20.0	4.0
MW133		15026726.48	1338362.506	605.88	603.51	7.2	27.2	28.7	**NM**	**NM**	19.5	584.0	1981	COMBO	20.0	4.0
MW134		15025646.63	1338233.841	613.30	609.70	6.7	26.7	27.1	**NM**	**NM**	**NE**	**NE**	1981	OVB	20.0	4.0
MW135		15025761.10	1339631.781	637.35	634.18	6.0	26.0	27.0	**NM**	**NM**	**NE**	**NE**	1981	OVB	20.0	4.0
MW404		15026798.76	1338548.502	605.88	604.09	7.7	17.7	20.5	**NM**	**NM**	12.0	592.1	1991	COMBO	10.0	4.0
MW405		15027072.91	1338771.791	607.21	605.16	10.8	20.8	23.5	**NM**	**NM**	16.0	589.2	1991	COMBO	10.0	4.0
MW406		15026560.78	1339282.341	623.13	620.72	23.8	33.8	35.7	**NM**	**NM**	29.0	591.7	1991	COMBO	10.0	4.0
MW407		15026676.15	1339269.053	620.05	618.30	20.5	30.5	33.9	**NM**	**NM**	25.5	592.8	1991	COMBO	10.0	4.0
MW501		15025985.85	1338411.03	617.05	614.72	12.7	22.7	**NA**	**NM**	**NM**	25.0	589.7	1991	OVB	10.0	4.0
MW620		15027048.61	1338602.438	605.07	602.41	7.0	17.0	18.0	**NM**	**NM**	**UNKNOWN**	**UNKNOWN**	1999	OVB	10.0	4.0
MW621		15027058.70	1338599.038	604.96	602.41	22.0	32.0	32.8	**NM**	**NM**	20.0	582.4	1999	BRK	10.0	4.0
MW810		15027142.71	1338476.770	604.58	601.91	7.0	17.3	18.0	**NM**	**NM**	**NE**	**NE**	2009	OVB	10.0	4.0
MW1	L3	15025237.01	1338193.456	630.63	628.68	16.5	26.5	27.8	16.89	613.74	**NE**	**NE**	1986	OVB	10.0	2.0
MW136		15024523.06	1337305.702	602.70	600.8	7.2	27.2	**NA**	7.69	595.01	11.0	589.8	1981	COMBO	20.0	4.0
MW137		15024661.00	1338608.636	632.90	631.40	7.0	27.0	28.7	19.26	613.64	**NE**	**NE**	1981	OVB	20.0	4.0
MW3		15025504.29	1337801.715	610.34	608.50	9.0	19.0	20.9	4.33	606.01	19.0	589.5	1986	OVB	10.0	2.0
MW410		15025282.41	1337409.613	604.38	**NA**	8.0	18.0	20.3	14.40	589.98	**NE**	**NE**	1993	OVB	10.0	4.0
MW411		15024977.88	1337383.946	616.71	**NA**	13.0	23.0	25.1	19.57	597.14	18.0	594.5	1991	COMBO	10.0	4.0
MW412		15024596.02	1337101.399	599.14	597.41	7.4	17.4	19.2	6.45	592.69	3.0	594.4	1991	BRK	10.0	4.0

TABLE 2-3

Monitoring Well Information Table - LAP Area
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Area/Well ID	Site	Northing (Feet)	Easting (Feet)	TOC Elevation (MSL)	Ground Elevation (MSL)	Depth to Top of Screen (BGS)	Depth to Bottom of Screen (BGS)	Total Borehole Depth (BGS)	Depth to Water October 2014 (TOC)	Water Elevation October 2014 (MSL)	Depth to Bedrock From Log (BGS)	Bedrock Elevation from Log (MSL)	Year Installed	Well Designation	Screen Length (Feet)	Casing & Screen Diameter (Inches)
MW630	L3	15024770.15	1337013.674	595.06	592.23	7.0	12.0	12.7	6.68	588.38	4.0	588.2	1999	BRK	5.0	4.0
MW631		15024764.63	1337010.736	595.09	592.23	16.0	26.0	27.0	4.64	590.45	4.0	588.2	1999	BRK	10.0	4.0
MW632		15024828.58	1336912.350	606.25	603.75	12.0	27.2	27.5	16.06	590.19	9.5	594.3	2009	BRK	15.0	4.0
MW633		15024474.50	1336978.448	600.37	597.90	7.0	17.0	18.0	8.60	591.77	5.0	592.9	1999	BRK	10.0	4.0
H-7	L14	15019448.58	1332662.795	584.62	581.45	4.0	14.0	15.5	**NM**	**NM**	12.0	569.5	1982	OVB	10.0	2.0
H-8		15019409.64	1333457.292	591.40	588.14	7.0	22.0	22.9	**NM**	**NM**	20.0	568.1	1982	OVB	15.0	2.0
MW140		15018819.68	1332901.750	584.59	581.68	7.0	27.0	30.3	**NM**	**NM**	22.0	559.7	1981	COMBO	20.0	4.0
MW508		15019632.37	1333106.169	587.44	585.34	10.0	20.0	22.9	**NM**	**NM**	**NE**	**NE**	1993	OVB	10.0	4.0
MW511		15019645.92	1333029.631	587.45	584.98	4.0	14.0	17.0	**NM**	**NM**	16.0	569.0	1997	OVB	10.0	4.0
MW512		15019541.13	1333111.131	588.04	585.98	5.0	15.0	18.2	**NM**	**NM**	16.0	570.0	1997	OVB	10.0	4.0
MW600		15019920.13	1332928.643	587.22	584.75	6.0	11.0	11.0	**NM**	**NM**	11.0	573.8	1998	OVB	5.0	2.0
MW601		15019196.31	1333121.302	586.72	584.29	9.0	19.0	20.0	**NM**	**NM**	19.6	564.7	1998	OVB	10.0	2.0
MW602		15019432.73	1332663.469	583.83	581.22	21.0	31.0	31.0	**NM**	**NM**	12.0	569.2	1999	BRK	10.0	4.0
MW603		15019323.75	1332379.579	580.77	578.27	6.0	16.0	16.0	**NM**	**NM**	13.0	565.3	1999	COMBO(3)	10.0	4.0
MW604		15019335.87	1332379.437	581.12	578.27	20.0	30.0	31.0	**NM**	**NM**	13.0	565.3	1999	BRK	10.0	4.0

General Notes

Coordinates are Universal Transverse Mercator (UTM), Zone 16 East, North American Datum 1983 (NAD83)

NE = Not Encountered.

UNKOWN = indicate data not presented on borelogs or provided in RI/FS documentation.

NM = Water level not measured.

BRK = Bedrock

OVB = Overburden

COMBO = Combination Overburden/Bedrock Well

MSL = Feet Relative to Mean Seal Level

BGS = Feet Below Ground Surface

ID = Identification

TOC = Top of Casing

Footnotes:
(1) Site L1 monitoring well MW171 designation changed from bedrock to overburden based on bottom of the well screen at 7.9 ft bgs and top of bedrock at 8.0 ft bgs.
(2) Based on the depth to bedrock from nested monitoring well.
(3) Site L14 monitoring well MW603 designation changed from overburden to combination based on bottom of the well screen at 16.0 ft bgs and top of bedrock at 13.0 ft bgs.

TABLE 2-4

Surface Water Elevations
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Surface Water Location	Surface Water Elevation	
		Date	ft (MSL)
L1	SW550	10/28/2014	603.88
L2	SW555	**NM**	**NM**
L3	SW557	**NM**	**NM**
	SW558	**NM**	**NM**
	SW777	10/23/2014	588.31
	SW004	10/23/2014	590.27
M1	SW709	10/28/2014	532.88

Notes:
ft = feet
MSL = Mean Sea Level
NM = Not Measured

Table 3-1

Summary of Analytical Results - Explosives
2014 Semi-Annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

		Compound	**1,3-DNB**		**2,4-DNT**		**2,6-DNT**		**2-A-4,6-DNT**		**4-A-2,6-DNT**		**HMX**		**NB**		**2-NT**		**3-NT**		**4-NT**		**RDX**		**Tetryl**		**1,3,5-TNB**		**2,4,6-TNT**	
		Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
		Project Action Limit[1]	10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
		Surface Water RG	4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L1	***In-Plume***																													
	MW131	10/28/2014	<0.38		<0.38		<0.19		58	/ J	<0.19		<0.38		<0.38		160	/ J	<0.38		<0.95		<0.19		2.2	/ J	**910**	/ J	**1100**	/ J
	MW173	10/27/2014	<0.39		<0.39		<0.19		4.3		5.9		1.5	/ J	<0.39		<0.39		<0.39		<0.96		**9**		<0.23	U / UJ	<0.96		6.2	
	WES1	10/28/2014	<0.37		<0.37		<0.19		5.9	/ J	6.9	/ J	<0.37		<0.37		0.23	F / J	<0.37		<0.93		<0.19		<0.22	U / UJ	**16**	/ J	**14**	/ J
	Early Warning																													
	MW174	10/28/2014	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<0.99		<0.2		<0.24	U / UJ	<0.99		<0.4	
	WES3	10/27/2014	<0.37		<0.37		<0.18		0.77		1		<0.37		<0.37		<0.37		<0.37		<0.92		<0.18		<0.22	U / UJ	<0.92		0.95	
	Compliance																													
	SW550	10/28/2014	<0.37		<0.37		<0.19		<0.19		<0.19		<0.37		<0.37		<0.37		<0.37		<0.94		<0.19		<0.22	U / UJ	<0.94		<0.37	
L3	***Upgradient***																													
	SW004	10/23/2014	<0.38		<0.38		<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.38		<0.95		<0.19		<0.23	U / UJ	<0.95		<0.38	
	In-Plume																													
	MW410	10/23/2014	<0.39		<0.39		<0.19		<0.19		<0.19		<0.39		<0.39		<0.39		<0.39		<0.97		<0.19		<0.23	U / UJ	<0.97		<0.39	
	In-Plume/Downgradient																													
	MW412	10/23/2014	<0.4		<0.4		<0.2		0.91		1.4		29		<0.4		<0.4		<0.4		<0.99		**85**		<0.24	U / UJ	<0.99		<0.4	
	Early Warning/Downgradient																													
	MW630	10/23/2014	<0.38		<0.38		<0.19		<0.19		<0.19		2.4		<0.38		<0.38	U / UJ	<0.38		<0.95		**3.5**		<0.23	U / UJ	<0.95		<0.38	
	MW630(DUP)	10/23/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		2.2		<0.4		<0.4		<0.4		<1		**3.4**		<0.24	U / UJ	<1		<0.4	
	MW631	10/23/2014	<0.38		<0.38		<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.38		<0.95		<0.19		<0.23	U / UJ	<0.95		<0.38	
	MW631(DUP)	10/23/2014	<0.38		<0.38		<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.38		<0.95		<0.19		<0.23	U / UJ	<0.95		<0.38	
	MW633	10/23/2014	<0.37		<0.37		<0.18		<0.18		<0.18		1.3		<0.37		<0.37		<0.37		<0.92		**3.8**		<0.22	U / UJ	<0.92		<0.37	
	Compliance/Downgradient																													
	SW777	10/23/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	Downgradient																													
	SW557	10/23/2014	<0.38		<0.38		<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.38		<0.94		<0.19		<0.23	U / UJ	<0.94		<0.38	
	SW558	10/23/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<0.99		<0.2		<0.24	U / UJ	<0.99		<0.4	
MFG	***In-Plume***																													
	MW212R	10/22/2014	1.5	/ J	**620**	/ J	**300**	/ J	37	/ J	24	/ J	<0.39		1.6	/ J	1800	/ J	490	/ J	1700	/ J	<0.2		<0.24	U / UJ	<0.98		**60**	/ J
	MW212R(DUP)	10/22/2014	1.7	/ J	**590**	/ J	**300**	/ J	24	/ J	19	/ J	<0.4		3.3	/ J	1700	/ J	390	/ J	1600	/ J	<0.2		<0.24	U / UJ	<1		**85**	/ J
	MW652	10/22/2014	**14**	/ J	**5100**	/ J	**3000**	/ J	150	/ J	170	/ J	<4		27	/ J	**17000**	/ J	2700	/ J	16000	/ J	<2		<2.4	U / UJ	<10		**1200**	/ J
	Early Warning																													
	MW123R	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	MW162R	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	MW313	10/22/2014	<0.39		<0.39		<0.2		<0.2		<0.2		<0.39		<0.39		0.88		<0.39		0.53	F /	<0.2		<0.24	U / UJ	<0.98		<0.39	
	MW318	10/21/2014	1.8	/ J	<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		0.64	/ J	<0.24	U / UJ	<1		<0.4	
	MW319	10/21/2014	<0.4	U / UJ	<0.4		<0.2		0.74	/ J	<0.2		<0.4		0.64	/ J	<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1	U / UJ	<0.4	
	MW654	10/22/2014	<0.39		<0.39		<0.19		<0.19		<0.19		<0.39		<0.39		<0.39		<0.39		<0.97		<0.19		<0.23	U / UJ	<0.97		<0.39	
	MW124R	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<0.99		<0.2		<0.24	U / UJ	<0.99		<0.4	

Table 3-1

Summary of Analytical Results - Explosives
2014 Semi-Annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

		Compound	**1,3-DNB**		**2,4-DNT**		**2,6-DNT**		**2-A-4,6-DNT**		**4-A-2,6-DNT**		**HMX**		**NB**		**2-NT**		**3-NT**		**4-NT**		**RDX**		**Tetryl**		**1,3,5-TNB**		**2,4,6-TNT**	
		Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
		Project Action Limit[(1)]	10		0.42		0.42		NS		NS		5100		51		5100		NS		NS		2.6		200		5.1		9.5	
		Surface Water RG	4		330		150		NS		NS		260		8000		62		NS		NS		500		700		15		75	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
MFG	***Compliance***																													
	MW117	10/27/2014	<0.39		<0.39		<0.2		<0.2		<0.2		<0.39		<0.39		<0.39		<0.39		<0.98		<0.2		<0.24	U / UJ	<0.98		<0.39	
	MW118	10/27/2014	<0.38		<0.38		<0.19		<0.19		<0.19		<0.38		<0.38		<0.38		<0.38		<0.94		<0.19		<0.23	U / UJ	<0.94		<0.38	
	MW119	10/27/2014	<0.39		<0.39		<0.19		<0.19		<0.19		<0.39		<0.39		<0.39		<0.39		<0.96		<0.19		<0.23	U / UJ	<0.96		<0.39	
M13	***Upgradient***																													
	MW806	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	MW807	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	Downgradient																													
	MW126R	10/21/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<0.99		<0.2		<0.24	U / UJ	<0.99		<0.4	
	MW362	10/21/2014	<0.39		**5.7**	/ J	0.42	/ J	1.1	/ J	0.93	/ J	<0.39		<0.39		<0.39		<0.39		<0.98		<0.2		<0.24	U / UJ	<0.98		<0.39	
	MW362(DUP)	10/21/2014	<0.4		**5.6**	/ J	**0.43**	/ J	1.1	/ J	0.83	/ J	<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	MW808	10/20/2014	<0.41		<0.41		<0.2		<0.2	U / UJ	<0.2		<0.41		<0.41		<0.41		<0.41		<1		<0.2		<0.24	U / UJ	<1		<0.41	
	MW809	10/20/2014	<0.4		<0.4		<0.2		<0.2	U / UJ	<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	
	MW811	10/29/2014	<0.4		<0.4		<0.2		<0.2		<0.2		<0.4		<0.4		<0.4		<0.4		<1		<0.2		<0.24	U / UJ	<1		<0.4	

Footnotes:
(1) Project Action Limits (Remedial Goal{RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:
Sites L2, L14, and M11 are not sampled during 2nd Quarter.
µg/L = microgram per liter
Bolded result indicates Project Action Limit (RG) exceedance
NS = No standard
< = Result shows laboratory Method Reporting Limit for non-detected results
LF/VF = Lab Flag/Validation Flag
J = Estimated concentration
U = Not detected
UJ = Not detected, estimated detection limit
JJ = data is estmated due to more then one criteria
F = Concentration below the reported detection limit
DUP = Duplicate

1,3-DNB = 1,3-Dinitrobenzene
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
2-A-4,6-DNT = 2-amino-4,6-Dinitrotoluene
4-A-2,6-DNT = 4-amino-2,6-Dinitrotoluene
HMX = High melting explosive
NB = Nitrobenzene
2-NT = 2-Nitrotoluene
3-NT = 3 Nitrotoluene
4-NT = 4-Nitrotoluene
RDX = Research Department Explosive
1,3,5-TNB = 1,3,5-Trinitrobenzene
2,4,6-TNT = 2,4,6-Trinitrotoluene

Table 3-2

Summary of Analytical Results - Target Analyte List Metals
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

		Analyte	**Aluminum**		**Antimony**		**Arsenic**		**Barium**		**Cadmium**		**Calcium**		**Chromium**		**Cobalt**		**Copper**		**Iron**		**Lead**		**Magnesium**		**Manganese**		**Mercury**		**Nickel**		**Potassium**		**Silver**[2]		**Sodium**		**Vanadium**		**Zinc**	
		Units	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
		Project Action Limit[1]	100		0.024		0.2		NS		0.05		NS		1.0		NS		NS		5.0		0.1		NS		10		NS		NS		NS		0.511		NS		NS		10	
		Surface Water RG	NS		0.61		0.16		5		0.0023		NS		0.44		NS		0.026		1.0		0.064		NS		1.0		0.103		1.0		NS		0.005		NS		NS		1.0	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
L3	***Upgradient***																																									
	SW004	10/23/2014	<0.3		<0.02		<0.025		0.044		0.00058	F /	90		<0.015		<0.015		<0.015		0.036	F /	<0.015		39		0.035		<0.0002		<0.04		1.5	F /	<0.015		16		<0.015		<0.15	
	In-Plume/Downgradient																																									
	MW412	10/23/2014	<0.3		<0.02		<0.025		0.046		0.00062	F /	89		<0.015		<0.015		<0.015		<0.1		<0.015		46		<0.01		<0.0002		<0.04		1.2	F /	<0.015		6.7		<0.015		<0.15	
	Early Warning/Downgradient																																									
	MW630	10/23/2014	<0.3		<0.02		<0.025		0.013		0.00047	F /	78		<0.015		<0.015		<0.015		0.17	/ J	<0.015	U / UJ	40		0.067		<0.0002		<0.04		5.1	/ J	<0.015	U / UJ	25	/ J	<0.015		<0.15	
	MW630(DUP)	10/23/2014	<0.3		<0.02		<0.025		0.013		<0.005		77		<0.015		<0.015		<0.015		0.15		<0.015		39		0.066		<0.0002		<0.04		5		<0.015		24		<0.015		<0.15	
	MW631	10/23/2014	<0.3		<0.02		0.0045	F /	0.018		<0.005		63		<0.015		<0.015		<0.015		0.13		<0.015		33		0.032		<0.0002		<0.04		5.3		<0.015		28		<0.015		<0.15	
	MW633	10/23/2014	<0.3		<0.02		<0.025		0.051		<0.005		85		<0.015		<0.015		<0.015		<0.1		<0.015		36		<0.01		<0.0002		<0.04		1.3	F /	<0.015		4.7	F /	<0.015		0.0089	F /
	Compliance/Downgradient																																									
	SW777	10/23/2014	<0.3		<0.02		0.0062	F /	0.043		0.00048	F /	87		<0.015		<0.015		<0.015		<0.1		<0.015		38		0.026		<0.0002		<0.04		1.5	F /	<0.015		15		<0.015		<0.15	
	Downgradient																																									
	SW557	10/23/2014	<0.3		<0.02		<0.025		0.044		0.00057	F /	89		<0.015		<0.015		<0.015		<0.1		<0.015		39		0.027		<0.0002		<0.04		1.5	F /	<0.015		15		<0.015		<0.15	
	SW558	10/23/2014	<0.3		<0.02		<0.025		0.045		<0.005		89		<0.015		<0.015		<0.015		0.035	F /	<0.015		38		0.0025	F /	<0.0002		<0.04		1.3	F /	<0.015		4.9	F /	<0.015		<0.15	
M13	***Upgradient***																																									
	MW806	10/21/2014	<0.3		<0.02		0.0059	F / B	0.1		<0.005		83		<0.015		<0.015		0.0016	F /	0.36		<0.015		48		0.045		<0.0002		0.0015	F /	2.1	F /	<0.015		28		<0.015		<0.15	
	MW807	10/21/2014	<0.3		<0.02		<0.025		0.12		<0.005		230		<0.015		0.0012	F /	0.0034	F /	0.75		<0.015		110		0.16		<0.0002		0.004	F /	9.5		<0.015		650		0.0017	F /	<0.15	
	Downgradient																																									
	MW126R	10/21/2014	<0.3		<0.02		<0.025		0.06		<0.005		74		<0.015		<0.015		0.0019	F /	0.14		<0.015		47		0.035		<0.0002		0.0015	F /	2.6	F /	<0.015		27		0.0012	F /	<0.15	
	MW362	10/21/2014	<0.3		<0.02		<0.025		0.053		<0.005		190		<0.015		0.0012	F /	0.0031	F /	<0.1		<0.015		110		0.18		<0.0002		0.0067	F /	7.7		<0.015		330		0.0017	F /	<0.15	
	MW362(DUP)	10/21/2014	<0.3		<0.02		<0.025		0.051		<0.005		190	/ J	<0.015		<0.015		0.0033	F /	0.023	F /	<0.015		110		0.18		<0.0002		0.0067	F /	7.3		<0.015		320		0.0012	F /	<0.15	
	MW808	10/20/2014	<0.3		<0.02		0.0049	F / B	0.059		0.00066	F /	200		<0.015		<0.015		0.0038	F /	<0.1		<0.015		75		1.5		<0.0002		0.04		17		<0.015		120		0.0014	F /	<0.15	
	MW809	10/20/2014	<0.3		<0.02		<0.025		0.034		<0.005		45		0.0008	F /	<0.015		0.0018	F /	<0.1		<0.015		34		0.0011	F /	<0.0002		0.0017	F /	3.2		<0.015		23		0.0011	F /	<0.15	
	MW811	10/29/2014	0.44	/ J	0.0033	F /	<0.025		0.077		0.00086	F /	150	/ J	0.0023	F /	0.0018	F /	0.0058	F /	1		<0.015		86		0.11		<0.0002		0.01	F /	12		<0.015		260	/ J	0.0031	F / B	0.011	F /

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

(2) Reporting limit exceeded the surface water RG.

General Notes:

Site M11 not sampled during 2nd Quarter.
An abbreviated list of analytes is used for reporting based on historically detected and reported compounds.
mg/L = milligrams per liter
Bolded result indicates Project Action Limit (RG) exceedance
NS = No Standard
< = Result shows laboratory Method Reporting Limit for non-detected results
LF/VF = Lab Flag/Validation Flag
F = Concentration below the reported detection limit
J = Estimated concentration
UJ = Not detected, estimated detection limit
B = Blank contamination
DUP = Duplicate

Table 3-3

Summary of Analytical Results - Indicator Parameters
2014 Semi-Annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

		Compound	**Nitrate**		**Sulfate**	
		Units	mg/L		mg/L	
		Project Action Limit[1]	10		400	
		Surface Water RG	NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**
M1	***In-Plume***					
	MW107	10/29/2014	NA		**16,000**	
	MW231	10/28/2014	NA		**35,000**	
	MW231(DUP)	10/28/2014	NA		**30,000**	
	MW640	10/28/2014	NA		**6,300**	
	MW641	10/29/2014	NA		**690**	
	MW642	10/29/2014	NA		**420**	
	Early Warning					
	MW643	10/28/2014	NA		75	
	MW644	10/28/2014	NA		180	
	Compliance					
	MW645	10/27/2014	NA		110	
	MW646	10/27/2014	NA		120	
	MW648	10/28/2014	NA		32	
	MW649	10/28/2014	NA		150	
	SW709	10/28/2014	NA		68	
M8	***In-Plume***					
	MW330	10/20/2014	NA		**570**	
M13	***Upgradient***					
	MW806	10/21/2014	0.16	F /	68	
	MW807	10/21/2014	<0.5		250	
	Downgradient					
	MW126R	10/21/2014	<0.5		55	
	MW362	10/21/2014	<0.5		270	
	MW362(DUP)	10/21/2014	0.048	F /	260	
	MW808	10/20/2014	0.29	F / J	210	
	MW809	10/20/2014	0.078	F / J	14	/ J
	MW811	10/29/2014	<5		260	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the *Long Term Monitoring Plan* (Toltest 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Site M11 not sampled during 2nd Quarter.
mg/L = milligrams per liter
NS = No standard
NA = not analyzed
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory Method Reporting Limit for non-detected results
LF/VF = Lab Flag/Validation Flag
F = Concentration below the reported detection limit
J = Estimated concentration
DUP = duplicate

Table 3-4

Summary of Analytical Results - Volatile Organic Compounds
2014 Semi-Annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

		Compound	**Acetone**		**Benzene**		**Carbon disulfide**		**Chlorobenzene**		**Chloromethane**		**1,1-DCA**		**1,2-DCA**		**cis-1,2-DCE**		**Ethyl Benzene**		**MethCl**		**MEK**		**Naphthalene**		**PCE**		**Toluene**		**1,1,1-TCA**		**TCE**		**VC**		**Xylenes (total)**	
		Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
		Project Action Limit(1)	NS		25		NS		500		NS		3500		25		NS		1,000		NS		NS		NS		25		2,500		1,000		25		25		10,000	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Upgradient***																																					
	MW806	10/21/2014	<10		<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<2	
	MW807	10/21/2014	<10		<1		<2		<1		<2		1.5		<1		1.1		<1		<5		<6		<1		<1		<1		<1		0.19	F /	<1.5		<2	
	Downgradient																																					
	MW126R	10/21/2014	4.1	F / B	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<2	
	MW362	10/21/2014	3.7	F / B	<1		<2		<1		<2		0.46	F /	<1		<1		<1		<5		<6		<1		0.27	F /	<1		<1		<1		<1.5		<2	
	MW362(DUP)	10/21/2014	6.5	F / B	<1		<2		<1		<2		0.48	F /	<1		0.16	F /	<1		<5		<6		<1		0.28	F /	<1		0.17	F /	<1		<1.5		<2	
	Downgradient																																					
	MW808	10/20/2014	3.6	F / B	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<2	
	MW809	10/20/2014	3.7	F / B	<1		<2		<1		<2		<1		<1		<1		<1		<5		<6		<1		<1		<1		<1		<1		<1.5		<2	
	MW811	10/29/2014	<10		<1		<2		<1	U / UJ	<2		<1		<1		<1		<1		<5		<6		<1	U / UJ	<1		0.22	F / J	<1		<1		<1.5		<2	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

Site M11 not sampled in spring
An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.
µg/L = Micrograms Per Liter
Bolded result indicates Project Action Limit (RG) exceedance
DUP = Duplicate
NS = No Standard
< = Result shows laboratory method reporting limit for non-detected results
LF/VF = Lab Flag/Validation Flag
B = Blank contamination
U = Not detected
UJ = Not detected, estimated detection limit
F = Concentration below the reported detection limit

1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
cis-1,2-DCE = cis-1,2-Dichloroethene
MEK = Methyl Ethyl Ketone (2-butanone)
MethCl = Methylene Chloride
PCE = Tetrachloroethene
TCE = Trichloroethene
VC = Vinyl chloride

Table 3-5

Summary of Analytical Results - Semivolatile Organic Compounds
2014 Semi-Annual Groundwater Monitoring Report
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		Compound	**2,4-DNT**		**2,6-DNT**		**Naphthalene**		**NB**		**2-Methylnaphthalene**		**Phenol**	
		Units	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Project Action Limit[(1)]		0.42		0.42		NS		51		NS		NS	
Site	**Well**	**Date**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**	**Result**	**LF/VF**
M13	***Upgradient***													
	MW806	10/21/2014	<19		<19		<9.5		<19		<9.5		<9.5	
	MW807	10/21/2014	<23		<23		<12		<23		<12		<12	
	Downgradient													
	MW126R	10/21/2014	<19		<19		<9.5		<19		<9.5		<9.5	
	MW362	10/21/2014	**3.4**	F /	<19		<9.5		<19		<9.5		<9.5	
	MW362(DUP)	10/21/2014	**2.9**	F /	<19		<9.7		<19		<9.7		<9.7	
	Downgradient													
	MW808	10/20/2014	<19		<19		<9.6		<19		<9.6		<9.6	
	MW809	10/20/2014	<19		<19		<9.5		<19		<9.5		<9.5	
	MW811	10/29/2014	<19		<19		<9.6		<19		<9.6		<9.6	

Footnotes:

(1) Project Action Limits (Remedial Goal {RG}) obtained from Worksheet #15 of Appendix B (QAPP) of the Long Term Monitoring Plan (Toltest/MWH, 2010). IEPA Class II groundwater standards for industrial uses are presented where Class I and Class II standards (potable and industrial uses, respectively) were both available.

General Notes:

See Table 3-1 for 2,4-DNT and 2,6-DNT results where the SVOC reporting limit exceeded the RG.
Site M11 not sampled during 2nd Quarter.
An abbreviated list of compounds analyzed is used for reporting based on historically detected and reported compounds.
µg/L = Micrograms Per Liter
NS = No Standard
Bolded result indicates Project Action Limit (RG) exceedance
< = Result shows laboratory method reporting limit for non-detected results
LF/VF = Lab Flag/Validation Flag
F = Concentration below the reported detection limit
DUP = Duplicate
2,4-DNT = 2,4-Dinitrotoluene
2,6-DNT = 2,6-Dinitrotoluene
NB = Nitrobenzene

Table 3-6

Groundwater Horizontal Gradients
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

	2nd Quarter - October 2014				
Site	**Well Number** **Groundwater Elevation (ft MSL)**	**Well Number** **Groundwater Elevation (ft MSL)**	**Head Difference (ft)**	**Horizontal Separation (ft)**	**Horizontal Gradient**
LAP AREA					
L1	MW176	MW173			L1 (North)
	625.04	607.01	18.03	1620	0.0111
	MW611	MW610			L1 (South)
	611.49	605.53	5.96	420	0.0142
L2[(1)]	MW135	MW404			
	NM	**NM**	**NM**	1500	**NM**
L3/ Landfill L3	MW1	MW410			
	613.74	589.98	23.76	780	0.0305
L14[(2)]	MW508	MW603			
	NM	**NM**	**NM**	780	**NM**
MANUFACTURING AREA					
M1	MW107	MW643			
	545.56	534.00	11.56	300	0.0385
MFG - M6	MW650	MW165			M6 (North)
	555.72	538.29	17.43	937.5	0.0186
	MW309	MW160			M6 (South)
	554.31	535.63	18.68	780	0.0239
MFG - M7	MW307	MW216			
	543.96	531.76	12.20	1237.5	0.0099
MFG - M8	MW127R	MW323R			
	553.87	555.41	1.54	3960	0.0004
MFG - M13	AEHA14R	MW126R			
	553.46	547.08	6.38	2025	0.0032
Landfill M11[(3)]	MW802	MW804			
	NM	**NM**	**NM**	1030	**NM**

General Notes:
Sites L2, L14, and M11 are not sampled in during 2nd Quarter.
ft = feet
MSL = mean sea level

Table 3-7

Groundwater Flow Velocities
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
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Site	Average K (cm/sec)	2nd Quarter - October 2014 Horizontal Gradient	Effective Porosity	2nd Quarter - October 2014		
				Velocity (cm/sec)	Velocity (ft/day)	Velocity (ft/year)
L1[1]	9.2E-06	0.0127	0.3	0.0000004	0.0011	0.401
L2[2]	1.6E-03	**NM**	0.3	**NM**	**NM**	**NM**
L3/Landfill L3[3]	1.6E-03	0.0305	0.3	0.0002	0.4610	168.259
L14[2]	1.6E-03	**NM**	0.3	**NM**	**NM**	**NM**
M1	6.6E-05	0.0385	0.3	0.00001	0.0240	8.761
MFG (M6)[4]	8.6E-04	0.0213	0.3	0.0001	0.1726	63.011
MFG (M7)	6.7E-04	0.0099	0.3	0.00002	0.0627	22.870
MFG (Landfill M13)	8.0E-02	0.0032	0.3	0.0009	2.4183	882.672
Average for MFG Sites M6, M7, and M13	2.7E-02	0.0115	0.3	0.0010	2.9395	1072.904
Landfill M11[2, 5]	6.7E-04	**NM**	0.3	**NM**	**NM**	**NM**

General Notes:

Hydraulic conductivity values are averages for the overburden aquifer.

Horizontal gradients are calculated using water table elevation data.

K = Hydraulic Conductivity

NM = Water level not measurerd

MFG = Manufacturing Area Sites.

cm/sec = centimeters per second

ft = feet

Footnotes:

(1) Average of north and south gradients at L1 used .

(2) Sites L2, L14, and M11 are not sampled during the 2nd Quarter.

(3) No hydraulic conductivity data were available for Site L3 or Site L14. Values used are from nearby Site L2.

(4) Average of north and south gradients at M6 used.

(5) No hydraulic conductivity data were available for Site M11 Landfill. Value used is from nearby Site M7.

Table 3-8

Vertical Gradient Calculations
2014 Semi-annual Groundwater Monitoring Report
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Site ID	Well ID	Ground Elevation (ft MSL)	Depth (ft) to top of screen (from ground)	Depth (ft) to bottom of screen (from ground)	Screen Length (feet)	Elevation of Screen Midpoint (ft MSL)	Groundwater Elevation 10/14 (ft MSL)	Vertical Gradient 10/14 (ft/ft)
LOAD-ASSEMBLE-PACKAGE AREA								
L1	MW178	640.39	27.3	46.5	19.2	603.49	618.99	-0.2807
	MW176	643.49	4.8	20.8	16.0	630.69	625.04	
	MW172	613.19	14.5	34.5	20.0	588.69	**NM**	**NA**
	MW173	612.56	2.8	11.8	9.0	605.26	607.01	
	MW177	613.84	11.8	31.0	19.2	592.44	608.22	0.0464
	MW171	615.03	2.9	7.9	5.0	609.63	607.52	
	MW401	610.2	28.5	43.5	15.0	574.20	605.48	-0.0016
	MW610	609.62	4.0	14.0	10.0	600.62	605.53	
L3/	MW631	592.23	16.0	26.0	10.0	571.23	590.45	0.1207
Landfill L3	MW630	592.23	7.0	12.0	5.0	582.73	588.38	
MANUFACTURING AREA								
M1	MW640	545.4	29.0	39.0	10.0	511.40	543.92	0.0169
	MW351	545.68	9.5	19.5	10.0	531.18	543.38	
	MW642	545.08	29.0	39.0	10.0	511.08	541.52	-0.0187
	MW641	545.08	7.0	17.0	10.0	533.08	542.10	
	MW644	540.23	10.8	20.4	9.6	524.63	534.02	0.0021
	MW643	540.03	4.3	7.2	2.9	534.28	534.00	
	MW646	541.48	12.3	21.9	9.6	524.38	533.01	0.0189
	MW645	541.47	7.5	11.5	4.0	531.97	532.85	
M4	MW158	531.58	9.0	29.5	20.5	512.33	531.38	-0.0155
	MW157	531.37	3.7	10.2	6.5	524.42	531.68	
M6	MW320R	554.6	30.5	45.5	15.0	516.60	545.17	0.0074
	MW166R	555.6	10.0	20.0	10.0	540.60	544.96	
	MW312[(1)]	545.96	40.0	55.0	15.0	498.46	548.43	-0.0010
	MW311	546.36	14.0	24.0	10.0	527.36	548.46	
	MW651	563.83	36.0	46.0	10.0	522.83	548.90	-0.2074
	MW650	563.83	12.0	22.0	10.0	546.83	555.72	
	MW319	545.49	40.0	55.0	15.0	497.99	537.79	0.0051
	MW318	545.23	11.8	21.8	10.0	528.43	537.59	
	MW313	549.20	25.0	40.0	15.0	516.70	539.07	0.0173
	MW654	548.49	13.0	23.0	10.0	530.49	538.69	
	MW653	561.93	36.0	46.0	10.0	520.93	547.09	-0.1998
	MW652	561.93	11.0	21.0	10.0	545.93	553.62	
	MW317[(1)]	540.71	34.0	49.0	15.0	499.21	536.25	0.0997
	MW316	540.49	13.0	18.0	5.0	524.99	533.68	

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J:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Final\Tables\Table 3-8 Vert Grads

Table 3-8

Vertical Gradient Calculations
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammuntion Plant
Will County, Illinois

Site ID	Well ID	Ground Elevation (ft MSL)	Depth (ft) to top of screen (from ground)	Depth (ft) to bottom of screen (from ground)	Screen Length (feet)	Elevation of Screen Midpoint (ft MSL)	Groundwater Elevation 10/14 (ft MSL)	Vertical Gradient 10/14 (ft/ft)
M6	MW123R	534.90	15.0	30.0	15.0	512.40	532.06	-0.1266
	MW162R	537.70	4.5	9.5	5.0	530.70	534.91	
	MW215R	565.30	38.5	53.5	15.0	519.30	546.27	-0.2021
	MW212R	565.30	9.5	19.5	10.0	550.80	553.10	
	MW213R	564.30	38.0	53.0	15.0	518.80	547.26	-0.2149
	MW210R	564.30	10.7	20.0	9.3	548.95	555.05	
	MW310R	563.00	44.5	59.5	15.0	511.00	543.29	-0.2544
	MW309	563.43	12.7	27.7	15.0	543.23	554.31	
	MW315(1)	538.91	29.7	44.7	15.0	501.71	535.50	0.0016
	MW314	539.53	9.7	14.7	5.0	527.33	535.46	
	MW308	561.38	50.5	65.5	15.0	503.38	541.87	-0.0515
	MW307	561.45	17.0	27.0	10.0	539.45	543.96	
M7	MW217	536.90	19.5	34.5	15.0	509.90	533.00	0.0567
	MW216	536.51	5.0	10.0	5.0	529.01	531.76	
	MW661	537.09	20.0	30.0	10.0	512.09	532.65	-0.0547
	MW660	537.08	7.0	12.0	5.0	527.58	533.84	
Landfill M13	MW807	563.79	35.0	45.0	10.0	523.79	550.54	-0.0614
	MW806	563.73	15.0	25.0	10.0	543.73	552.29	
	MW809	567.28	35.0	45.0	10.0	527.28	549.84	-0.1051
	MW808	567.33	15.0	25.0	10.0	547.33	552.49	
	MW362	562.78	28.0	33.0	5.0	532.28	549.59	0.1696
	MW126R	563.00	11.0	21.0	10.0	547.00	547.08	
	MW322(1)	542.26	34.5	49.5	15.0	500.26	533.67	-0.1605
	MW321	542.93	13.5	23.5	10.0	524.43	537.55	
	MW364	567.69	37.0	42.0	5.0	528.19	541.93	-0.0065
	MW363	567.66	21.0	31.0	10.0	541.66	542.02	

Notes:

$$\text{Vertical Gradient} = \frac{\text{Water Level in Deep Well - Water Level in Shallow Well}}{\text{ABS (Water Table Elevation - Screen Midpoint of Deep Well)}}$$

Negative vertical gradients indicate downward flow, positive indicates upward flow.
ft = feet
ft/ft = feet per foot
MSL = mean sea level
NA - well dry. Therfore, vertical gradient could not be calculated.
NM = not measured
ID = identification

Footnotes:

(1) For well nests with no water table well, only 2 bedrock piezometers with top of screen for the shallow well below water elevation:

$$\text{Vertical Gradient} = \frac{\text{Water Level in Deep Well - Water Level in Shallow Well}}{\text{ABS (Screen Midpoint in Shallow Well - Screen Midpoint of Deep Well)}}$$

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Table 3-9

Proposed Sampling Plan - 3rd and 4th Quarters 2014
2014 Semi-annual Groundwater Monitoring Report
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Site	Well ID	Parameter
L1[(1)]	***In-plume***	
	MW131	E
	MW173	E
	WES1	E
	Early Warning	
	WES3	E
	MW174	E
	Compliance	
	SW550	E
L2[(1)]	***In-plume***	
	MW404	E
	Early Warning	
	MW620	E
	Compliance	
	MW621	E
	SW555	E
L3[(1)]/ Landfill L3	***In-plume/Downgradient***	
	MW410	E
	MW412	E, M
	Early Warning/Downgradient	
	MW630	E, M
	MW631	E, M
	MW633	E, M
	Compliance/Downgradient	
	SW777	E, M
	Downgradient	
	SW557	E, M
	SW558	E, M
L14[(1)]	***In-plume***	
	MW511	E
	MW512	E
	Early Warning	
	H7	E
M1[(1)]	***In-plume***	
	MW107	S
	MW231	S
	MW640	S
	MW641	S
	MW642	S
	Early Warning	
	MW643	S
	MW644	S
	Compliance	
	MW645	S
	MW646	S
	MW648	S
	MW649	S
	SW709	S

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J:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Final\Tables\Table 3-9 Proposed Sample Plan - 3rd and 4th Quarters 2014

Table 3-9

Proposed Sampling Plan - 3rd and 4th Quarters 2014
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Site	Well ID	Parameter
MFG[1]	***In-plume***	
	MW212R	E
	MW330	S
	MW652	E
	Early Warning	
	MW123R	E
	MW124R	E
	MW162R	E
	MW313	E
	MW318	E
	MW319	E
	MW654	E
	Compliance	
	MW117	E
	MW118	E
	MW119	E
Landfill M11[1]	***Upgradient***	
	MW802	E, I, M, SVOC & V
	MW803	E, I, M, SVOC & V
	Downgradient	
	MW333	E, I, M, SVOC & V
	MW334	E, I, M, SVOC & V
	MW335	E, I, M, SVOC & V
	MW336	E, I, M, SVOC & V
	MW804	E, I, M, SVOC & V
	MW805	E, I, M, SVOC & V
Landfill M13[2]	***Upgradient***	
	MW806	E, I, M, SVOC & V
	MW807	E, I, M, SVOC & V
	Downgradient	
	MW126R	E, I, M, SVOC & V
	MW362	E, I, M, SVOC & V
	MW808	E, I, M, SVOC & V
	MW809	E, I, M, SVOC & V
	MW811	E, I, M, SVOC & V

General Notes:

V - Volatile Organic Compounds
SVOC - Semivolatile Organic Compounds
E - Explosives
M - Metals
I - Indicator parameters (Nitrate-N and Sulfate)
S - Sulfate
MFG - Manufacturing Area

Footnotes:

(1) 4th Quarter only.
(2) 3rd and 4th Quarters in compliance with Illinois Administrative Code.

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J:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Final\Tables\Table 3-9 Proposed Sample Plan - 3rd and 4th Quarters 2014

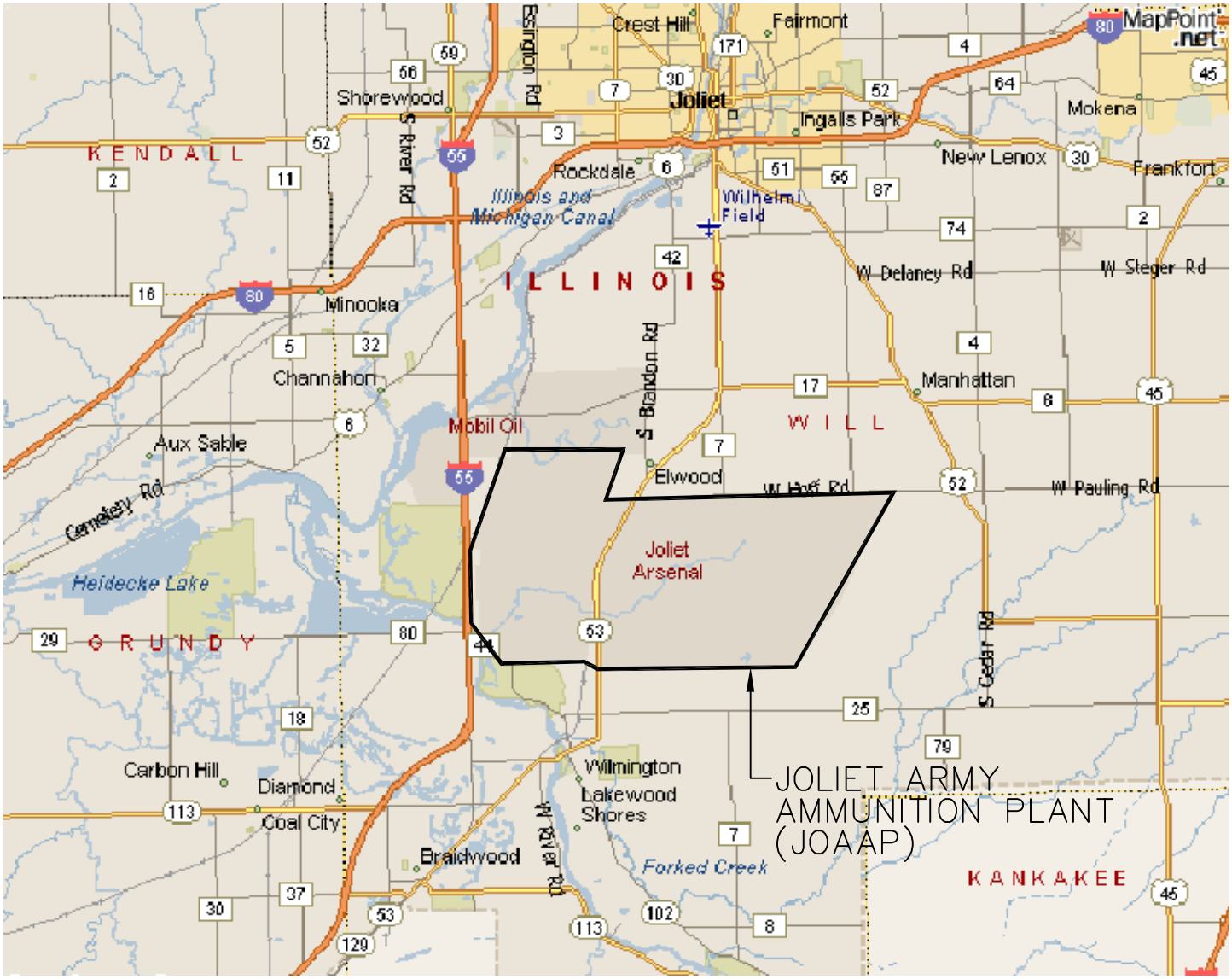
TABLE 4-1

Summary of Recommendations
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Report	Recommendation	Reasoning	Status Initiated/Pending
2009 Semi-annual			
	No recommendations regarding the monitoring program		
2009 Annual			
	Fall Sampling only at L2	Section 4.1.2.5 of LTM Plan, round with highest concentration	Initiated, Site L2 will not be sampled spring 2012
	Remove TAL metals analysis from Site L3 well MW410	No metals exceedances since sampling re-initiated in spring 2008	Initiated, metals at well MW410 were not sampled beginning fall 2011
	Remove Site M5 well MW207R from monitoring program	Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds	Initiated, well MW207R was not sampled beginning fall 2011
	Remove Site M3 wells MW233 and MW352 from monitoring program	Section 4.1.6.5 of LTM Plan, no RG exceedances for 4 rounds	Initiated, wells MW233 and MW352 were not sampled beginning fall 2011
	Prepare closure report for Site M3	Section 4.1.6.6 of LTM Plan, no RG exceedances for 4 rounds	Closure Report will be prepared in 2013
2010 Semi-annual			
	Remove Site L2 well MW501 from monitoring program	Section 4.1.2.5 of LTM Plan, no RG exceedances for 4 rounds	Initiated, well MW501 was not sampled fall beginning 2011
	Fall Sampling only at L14	Section 4.1.4.5 of LTM Plan, round with highest concentration	Initiated, Site L14 will not be sampled spring 2012
	Prepare closure report for Site M5	Section 4.1.7.4 of LTM Plan, no RG exceedances for 4 rounds	Closure Report will be prepared in 2013
	Remove cadmium analysis from Site M6 well MW123R	Section 4.1.7.4 of LTM Plan, no cadmium detections	Initiated, cadmium at well MW123R was not analyzed beginning fall 2010
2010 Annual			
	Remove Site L1 compliance well MW401 from monitoring program	No explosives detections. Site has upgradient early warning wells with no detections	Initiated, well MW401 will not be sampled beginning spring 2012
	Remove Site L1 early warning well MW172 from monitoring program	Well MW172 redundant with well MW173, upward vertical gradients	Initiated, well MW172 will not be sampled beginning spring 2012
	Change designation of Site L1 well MW173 to in-plume	Migration of contaminants	Initiated in 2011 Annual Report
	Remove Site L2 compliance well MW810 from monitoring program	No explosives detections. Site had upgradient early warning wells with no detections	Initiated, L2 is no longer sampled in spring and well MW810 will not be sampled in fall 2012
	Remove Site L3 compliance well MW632 from monitoring program	No explosives detections. Hydraulics suggest well not within migration flowpath	Initiated, well MW632 will not be sampled beginning spring 2012
	Change designation of Site M1 wells MW640, MW641, and MW642 to in-plume	Migration of contaminants	Initiated in 2011 Annual Report
	Remove Site M8 in-plume well MW148RR from monitoring program	In-plume well with no sulfate exceedances since spring 2009	Initiated, well MW148RR will not be sampled beginning spring 2012
	Remove Site M13 wells AEHA14R and AEHA15 from monitoring program and abandon	Problematic wells	Initiated, wells AEHA14R and AEHA15 will not be sampled beginning spring 2012
2011 Semi-annual			
	No new recommendations		
2011 Annual			
	At Site L3/Landfill L3 sample SW004 in spring only	Upstream sample SW555 provides data for fall rounds	Initiated, SW004 wil no longer sampled in fall when Site L2 is sampled
	Remove Site Landfill L3/Landfill L3 upgradient well MW03 from monitoring program	No RG exceedances at Site L3 in-pume well MW410	Initiated, well MW03 will not be sampled beginning spring 2012
	Remove Site L14 in-plume well MW508 from monitoring program	No RG exceedances	Initiated, well MW508 will not be sampled beginning spring 2012
	Remove Site L14 compliance wells MW603 and MW604 from monitoring program	Redundant, no RG exceedances in early warning well H7	Initiated, wells MW603 and MW604 will not be sampled beginning spring 2012
	Remove MFG compliance wells MW115 and MW116 from monitoring program	Redundant, no RG exceedances in upgradient Site M6 early warning wells MW123R and MW162R or Site M7 early warning well MW124R	Initiated, wells MW115 and MW116 will not be sampled beginning spring 2012
	Remove MFG compliance wells MW112 and MW113 from monitoring program	Removal of upgradient Site M5 in-plume well MW207R from monitoring program and Site M5 closure	Initiated, wells MW112 and MW113 will not be sampled beginning spring 2012
	Prepare closure report for Site M8	Removal of in-plume well MW148RR from monitoring program	Closure Report will be prepared in 2013
	Fall Sampling only at M11	Section 4.2.2.5 of LTM Plan, stable and predictable results	Initiated spring 2013. Monitoring wells MW333, MW334, MW803, and MW804 were not sampled in spring 2012.
2012 Semi-annual			
	Install monitoring well downgradient of Site M13 to replace monitoring wells AEHA 14R and AEHA15	Intended to replace monitoring wells AEHA 14R and AEHA15 which were removed from the monitoring program	Pending, monitoring well will be installed following completion of Work Plan Addendum
2012 Annual			
	No new recommendations		
2013 Semi-annual			
	Abandon two unidentified monitoring wells identified at Site M4 and Site M6.	Wells unidentified and not included in monitoring program	Pending
2013 Annual			
	Continue quarterly landfill cap inspections at Landfill M11 through 2014	October 2013 landfill inspection report missing.	Pending
	Do not abandon monitoring well AEHA14R as previously recommended by IEPA	Provides water level control point for Site M13.	Pending
	Redesignate Site L1 monitoring well MW171 from bedrock to overburden	Bottom of the well screen at 7.9 ft bgs and top of bedrock at 8.0 ft bgs.	Completed
	Redesignate Site L14 monitoring well MW603 from overburden to combination	Bottom of the well screen at 16.0 ft bgs and top of bedrock at 13.0 ft bgs.	Completed
	Redesignate Site M1 monitoring well MW642 from overburden to bedrock	Top of the well screen at 29.0 ft bgs and top of bedrock at 29.0 ft bgs.	Completed
	Redesignate Site M1 monitoring well MW647 from overburden to bedrock	Top of the well screen at 7.3 ft bgs and top of bedrock at 6.0 ft bgs.	Completed
	Redesignate Site M1 monitoring well MW649 from overburden to combination	Top of the well screen at 7.0 ft bgs and top of bedrock at 7.5 ft bgs.	Completed
	Redesignate Site M3 monitoring well MW154 from bedrock to combination	Bottom of the well screen at 9.1 ft bgs and top of bedrock at 8.0 ft bgs.	Completed
	Redesignate Site M5 monitoring well MW354R from combination to overburden	Bottom of the well screen at 17.0 ft bgs and top of bedrock at 19.0 ft bgs.	Completed
	Redesignate Site M6 monitoring well MW162R from overburden to bedrock	Top of the well screen at 3.7 ft bgs and top of bedrock at 4.5 ft bgs.	Completed
	Redesignate Site M6 monitoring well MW320R from overburden to bedrock	Top of the well screen at 30.5 ft bgs and top of bedrock at 8.0 ft bgs.	Completed
	Redesignate Other Areas monitoring well MW119 from bedrock to combination	Top of the well screen at 3.3 ft bgs and top of bedrock at 6.0 ft bgs.	Completed
	Redesignate Site M11 monitoring well MW108 from bedrock to combination	Top of the well screen at 7.0 ft bgs and top of bedrock at 9.0 ft bgs.	Completed
	Redesignate Site M11 monitoring well MW804 from combination to bedrock	Top of the well screen at 5.0 ft bgs and top of bedrock at 3.5 ft bgs.	Completed
	Site M11 groundwater flow maps have been revised from a water table and potentiometric to a shallow and deep potentiometric map.	Insufficient overburden wells to create a water table map.	Completed
	Redesignate Site M13 monitoring well MW362 from bedrock to combination	Top of the well screen at 28.0 ft bgs and top of bedrock at 29.5 ft bgs.	Completed
2014 Semi-annual			
	Mow Landfill L3 in December 2014 in opposite direction	Consistent cut height	Pending
	Spot treat woody vegitation on Landfill L3 cap in spring 2015	Kill woody vegitaion	Pending
	Continue quarterly inspections at Landfill M11 through 2014	October 2013 and January 2014 inspections not completed	Pending
	Mow Landfill M11 in December 2014 in opposite direction	Consistent cut height	Pending
	Remove small trees from Landfill M11 rip rap apron	Kill woody vegitaion	Pending
	Spot treat woody vegitation on Landfill M11 cap in spring 2015	Kill woody vegitaion	Pending
	Clear debris from drainage ditch on south side of Landfill M13	Allow proper drainage	Pending
	Mow Landfill M13 in December 2014 in opposite direction	Consistent cut height	Pending
	Spot treat woody vegitation on Landfill M13 cap in spring 2015	Kill woody vegitaion	Pending
	Remove small trees from Landfill M11 rip rap apron	Kill woody vegitaion	Pending
	Complete additional mowing around Landfill M13 perimeter	Reduce encroachment	Pending

Notes:
Does not include minor maintenance activities such as replacing well locks.
Does not include recommendations repeated in subsequent reports.

FIGURES



NOTE

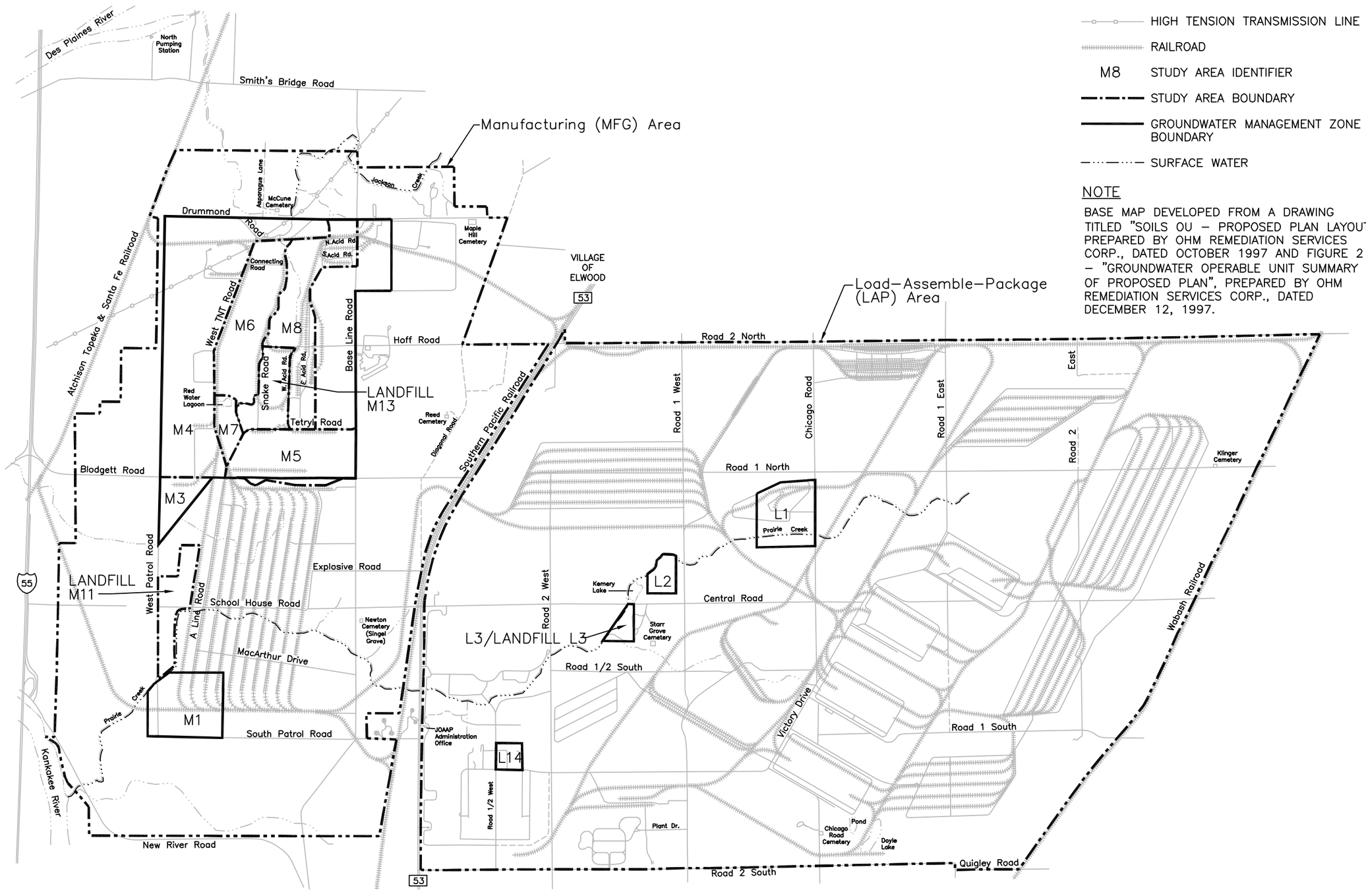
BASE MAP DEVELOPED FROM 2002 MICROSOFT CORPORATION, EXPEDIA.COM.

north

RJR DEVELOPED BY / TLP DRAWN BY	CONTRACT NO. W9124J-14-P-0142	SITE LOCATION MAP	FIGURE 1-1
APPROVED / 1/9/2015 DATE	VERIFY SCALE 0 1/2 1 BAR REPRESENTS ONE INCH — SCALE 1"=4 Miles (Approx.)	2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT JOLIET ARMY AMMUNITION PLANT WILL COUNTY, ILLINOIS	MWH
REVISIONS / DATE			

Drawn By & Date: TLP 01/09/15 | Approved By & Date: RJR 01/09/15 | Revised By & Date: | Approved By & Date:

File: J:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Draft\Figures\CADD\Figure 1-1.dwg Jan 09, 2015 - 4:25pm



LEGEND

- APPROXIMATE JOAAP BOUNDARY
- HIGH TENSION TRANSMISSION LINE
- RAILROAD
- M8 STUDY AREA IDENTIFIER
- STUDY AREA BOUNDARY
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- SURFACE WATER

NOTE

BASE MAP DEVELOPED FROM A DRAWING TITLED "SOILS OU – PROPOSED PLAN LAYOUT", PREPARED BY OHM REMEDIATION SERVICES CORP., DATED OCTOBER 1997 AND FIGURE 2 – "GROUNDWATER OPERABLE UNIT SUMMARY OF PROPOSED PLAN", PREPARED BY OHM REMEDIATION SERVICES CORP., DATED DECEMBER 12, 1997.

Drawn By & Date: TLP 01/09/15 | Approved By & Date: RJR 01/09/15 | Revised By & Date: | Approved By & Date:

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 1/9/15
CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 4000'

REV	DATE	BY	DESCRIPTION

GROUNDWATER STUDY AREAS AND LANDFILL SITES

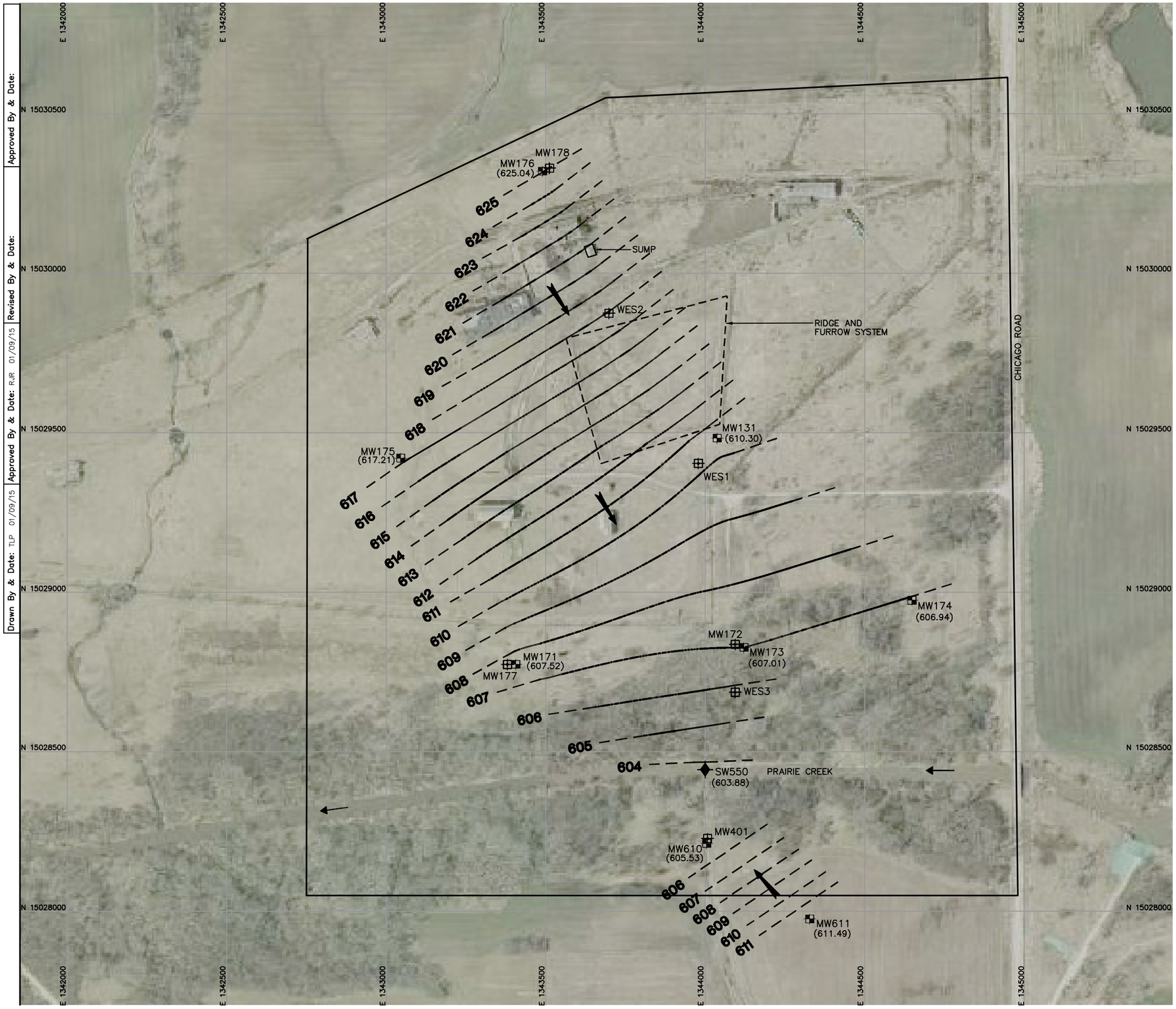
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/9/2015

FIGURE 1-2

DRAWING NUMBER
10506045
120101

MWH



LEGEND

MW175 (617.21)	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
MW178	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
SW550 (603.88)	SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
605	WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
	DIRECTION OF WATER TABLE FLOW
	DIRECTION OF FLOW IN PRAIRIE CREEK
	GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER, 2014.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.

north

Drawn By & Date: TLP 01/09/15 | Approved By & Date: RJR 01/09/15 | Revised By & Date: | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 1/9/2015

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – LAP AREA, SITE L1 (2ND QUARTER – OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/9/2015

FIGURE 3-1

DRAWING NUMBER 10506045 120101

MWH

LEGEND

- MW176 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW178 (618.99) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW550 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 608 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER 2014.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

Drawn By & Date: TLP 01/12/15 | Approved By & Date: RJR 01/12/15 | Revised By & Date: | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 1/12/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – LAP AREA, SITE L1 (2ND QUARTER – OCTOBER 2014)

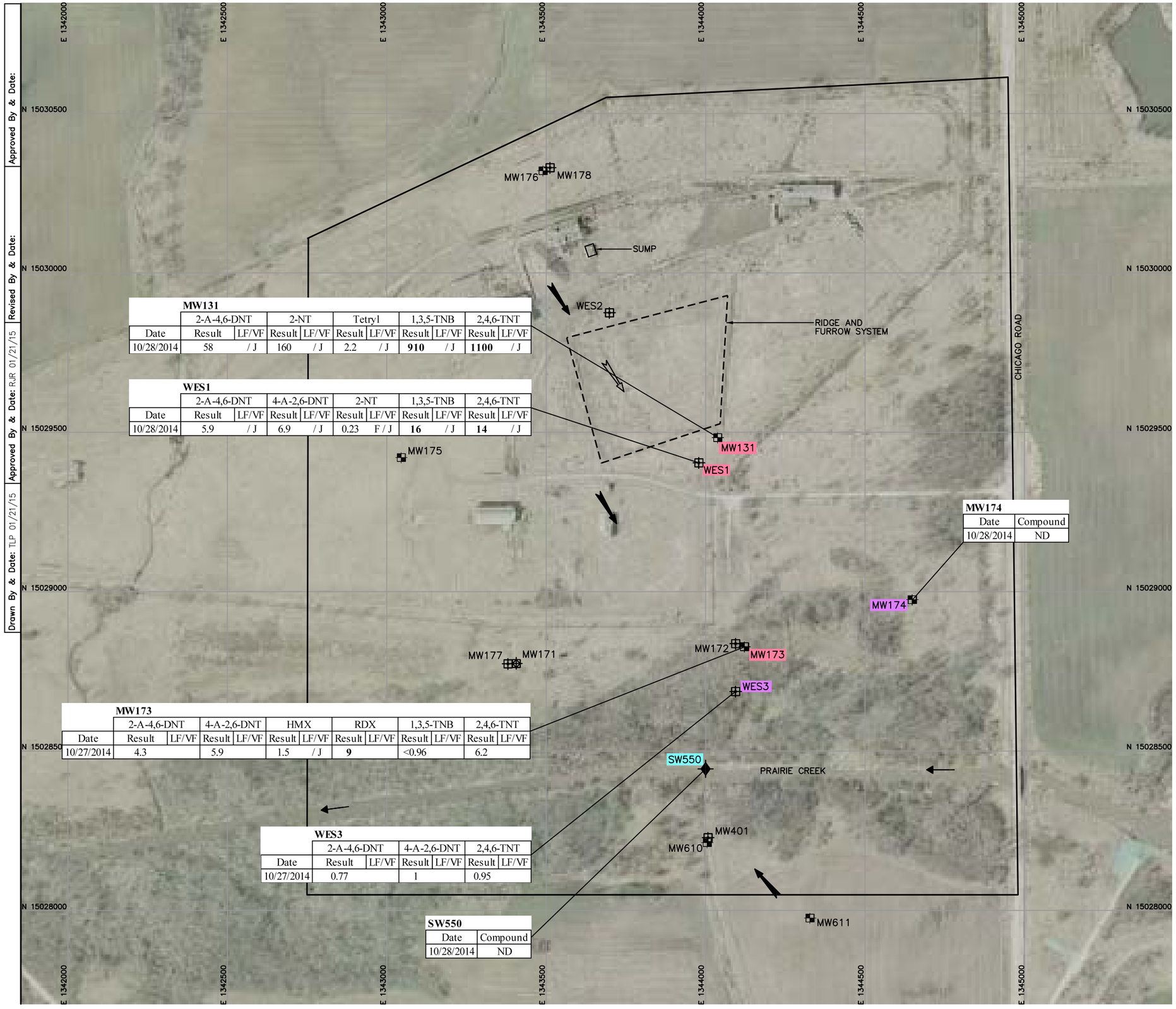
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/12/2015

FIGURE 3-2

DRAWING NUMBER 10506045 120101

MWH



MW131

	2-A-4,6-DNT		2-NT		Tetryl		1,3,5-TNB		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/28/2014	58	/ J	160	/ J	2.2	/ J	**910**	/ J	**1100**	/ J

WES1

	2-A-4,6-DNT		4-A-2,6-DNT		2-NT		1,3,5-TNB		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/28/2014	5.9	/ J	6.9	/ J	0.23	F / J	**16**	/ J	**14**	/ J

MW174

Date	Compound
10/28/2014	ND

MW173

	2-A-4,6-DNT		4-A-2,6-DNT		HMX		RDX		1,3,5-TNB		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/27/2014	4.3		5.9		1.5	/ J	**9**		<0.96		6.2	

WES3

	2-A-4,6-DNT		4-A-2,6-DNT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/27/2014	0.77		1		0.95	

SW550

Date	Compound
10/28/2014	ND

LEGEND

MW173	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
MW171	SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
MW172	DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
SW550	SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
	IN-PLUME MONITORING POINT
	EARLY WARNING MONITORING POINT
	COMPLIANCE MONITORING POINT
	DIRECTION OF WATER TABLE FLOW
	DIRECTION OF BEDROCK FLOW
	DIRECTION OF FLOW IN PRAIRIE CREEK
	GROUNDWATER MANAGEMENT ZONE BOUNDARY
1,3,5-TNB	1,3,5-TRINITROBENZENE
2,4,6-TNT	2,4,6-TRINITROTOLUENE
2-A-4,6-DNT	2-AMINO-4,6-DINITROTOLUENE
2-NT	2-NITROTOLUENE
4-A-2,6-DNT	4-AMINO-2,6-DINITROTOLUENE
HMX	HIGH MELTING EXPLOSIVE
RDX	ROYAL DEMOLITION EXPLOSIVE
F/	CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
/J	ESTIMATED CONCENTRATION
LF/VF	LAB FLAG/VALIDATION FLAG
ND	NOT DETECTED
<	RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
NS	NO STANDARD
RG	REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
1,3,5-TNB	5.1	15
2,4,6-TNT	9.5	75
2-A-4,6-DNT	NS	NS
2-NT	5,100	62
4-A-2,6-DNT	NS	NS
HMX	5,100	260
RDX	2.6	500
Tetryl	200	700

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY MWH PERSONNEL IN OCTOBER 2014.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/21/15
Drawn By & Date: TLP 01/21/15

RJR DEVELOPED BY
TLP DRAWN BY
01/21/15 DATE
APPROVED BY
CONTRACT NO. W912AJ-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – LAP AREA
SITE L1 (2ND QUARTER – OCTOBER 2014)
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 01/21/2015

FIGURE 3-3

DRAWING NUMBER
10506045
120101

MWH

LEGEND

- MW134 (606.42) — OVERBURDEN MONITORING WELL LOCATION, NUMBER AND WATER TABLE ELEVATION
- MW136 (595.01) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW630 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW412 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW777 (588.31) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER ELEVATION
- 600 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER 2014.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW136 IS A COMBINATION OVERBURDEN/BEDROCK WELL USED AS A HORIZONTAL CONTROL POINT.

north

Drawn By & Date: TLP 01/12/15 | Approved By & Date: | Revised By & Date: | Approved By & Date: RJR 01/12/15 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 1/12/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL

SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – LAP AREA, SITE L3/LANDFILL L3 (2ND QUARTER – OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/12/2015

FIGURE 3-4

DRAWING NUMBER 10506045 120101

MWH

LEGEND

- MW134 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW136 (595.01) — COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW630 (588.38) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW412 (592.69) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW777 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 590 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER 2014.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
5. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.
6. MW411 AND MW136 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED FOR HORIZONTAL CONTROL POINTS.

north

Drawn By & Date: TLP 01/12/15 | Approved By & Date: RJR 01/12/15 | Revised By & Date: | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | APPROVED BY: | DATE: 1/12/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL — SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – LAP AREA, SITE L3/LANDFILL L3 (2ND QUARTER – OCTOBER 2014)

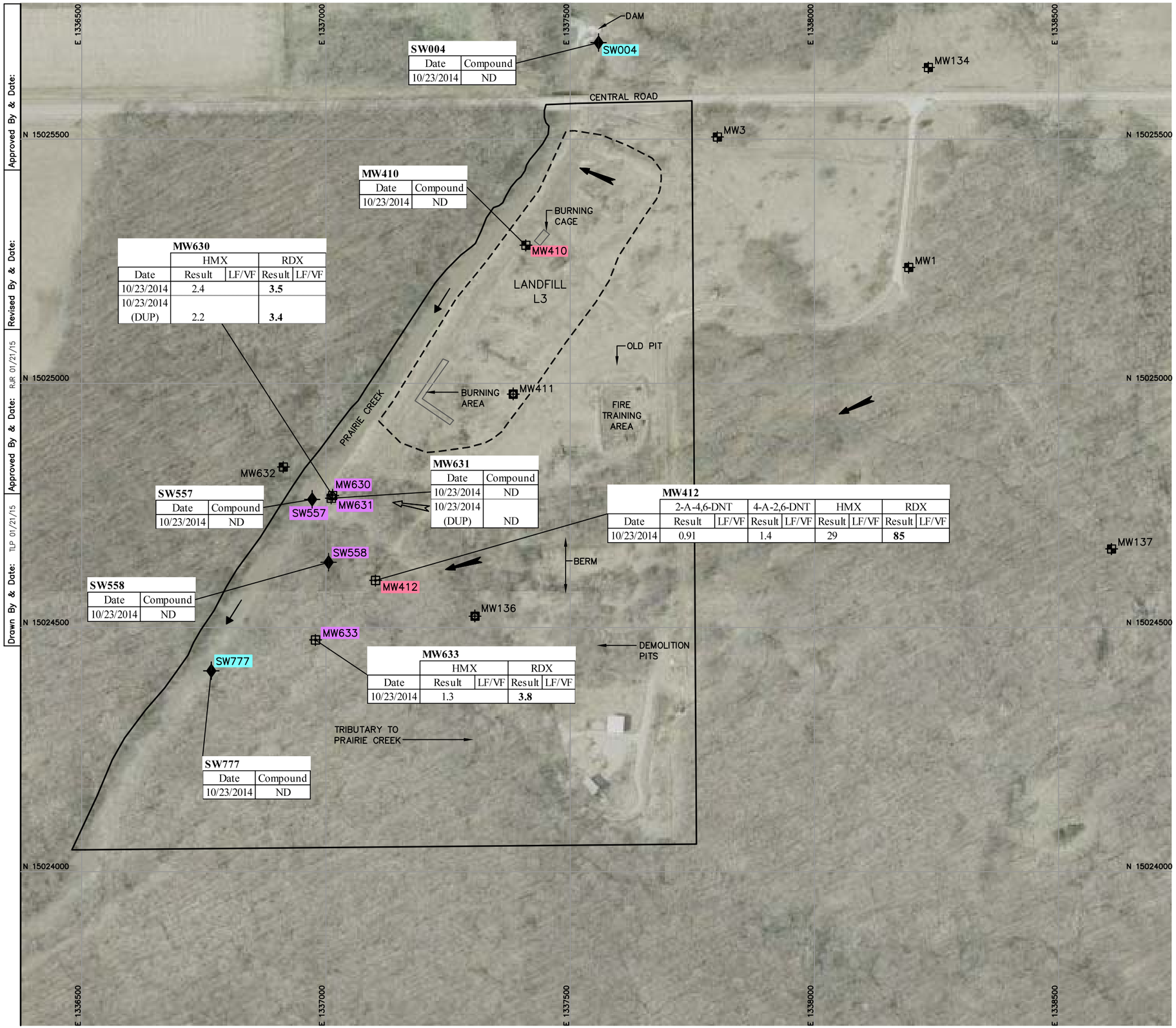
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/12/2015

FIGURE 3-5

DRAWING NUMBER 10506045 120101

MWH



SW004

Date	Compound
10/23/2014	ND

MW410

Date	Compound
10/23/2014	ND

MW630

	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
10/23/2014	2.4		**3.5**	
10/23/2014 (DUP)	2.2		**3.4**	

MW631

Date	Compound
10/23/2014	ND
10/23/2014 (DUP)	ND

SW557

Date	Compound
10/23/2014	ND

MW412

	2-A-4,6-DNT		4-A-2,6-DNT		HMX		RDX	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/23/2014	0.91		1.4		29		**85**	

SW558

Date	Compound
10/23/2014	ND

MW633

	HMX		RDX	
Date	Result	LF/VF	Result	LF/VF
10/23/2014	1.3		**3.8**	

SW777

Date	Compound
10/23/2014	ND

LEGEND

- MW410 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW411 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW630 — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW412 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- SW777 — SURFACE WATER MONITORING LOCATION, NUMBER, AND EXPLSOIVES DETECTIONS
- IN-PLUME/DOWNGRADIENT MONITORING POINT
- EARLY WARNING/DOWNGRADIENT MONITORING POINT
- COMPLIANCE/DOWNGRADIENT AND UPGRADIENT MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- APPROXIMATE LIMITS OF LANDFILL
- 2-A-4,6-DNT — 2-AMINO-4,6-DINITROTOLUENE
- 4-A-2,6-DNT — 4-AMINO-2,6-DINITROTOLUENE
- HMX — HIGH MELTING EXPLOSIVE
- RDX — ROYAL DEMOLITION EXPLOSIVE
- DUP — DUPLICATE
- LF/VF — LAB FLAG/VALIDATION FLAG
- ND — NOT DETECTED
- NS — NO STANDARD
- RG — REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
HMX	5,100	260
2-A-4,6-DNT	NS	NS
4-A-2,6-DNT	NS	NS
RDX	2.6	500

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM A PLAT OF TOPOGRAPHY PREPARED BY GEOTECH INC., CREST HILL, ILLINOIS, DATED MARCH 9, 2007, AND AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY MWH PERSONNEL IN OCTOBER 2014.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM SITE L3 CLOSURE REPORT, PREPARED BY MWH, DATED JUNE 25, 2010.

north

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/21/15
Drawn By & Date: TLP 01/21/15

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY: RJR
DATE: 01/21/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 200'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – LAP AREA, SITE L3/LANDFILL L3 (2ND QUARTER – OCTOBER 2014)
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 01/21/2015

FIGURE 3-6

DRAWING NUMBER
10506045
120101

MWH

LEGEND

- MW104 (542.55) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW105 (548.50) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW201 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- SW709 (532.88) — SURFACE WATER MONITORING LOCATION, NUMBER, AND WATER TABLE ELEVATION
- 540 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER 2014.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW105, MW107 AND MW649 ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

Drawn By & Date: TLP 01/12/15
Approved By & Date: RJR 01/12/15
Revised By & Date:
Approved By & Date:

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 1/12/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, SITE M1 (2ND QUARTER – OCTOBER 2014)
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/12/2015

FIGURE 3-7

DRAWING NUMBER
10506045
120101

MWH

LEGEND

- MW104 — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW105 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW640 (543.92) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- SW709 — SURFACE WATER MONITORING LOCATION AND NUMBER
- 540 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 1 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL IN OCTOBER 2014.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/12/15
Drawn By & Date: TLP 01/12/15

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 1/12/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

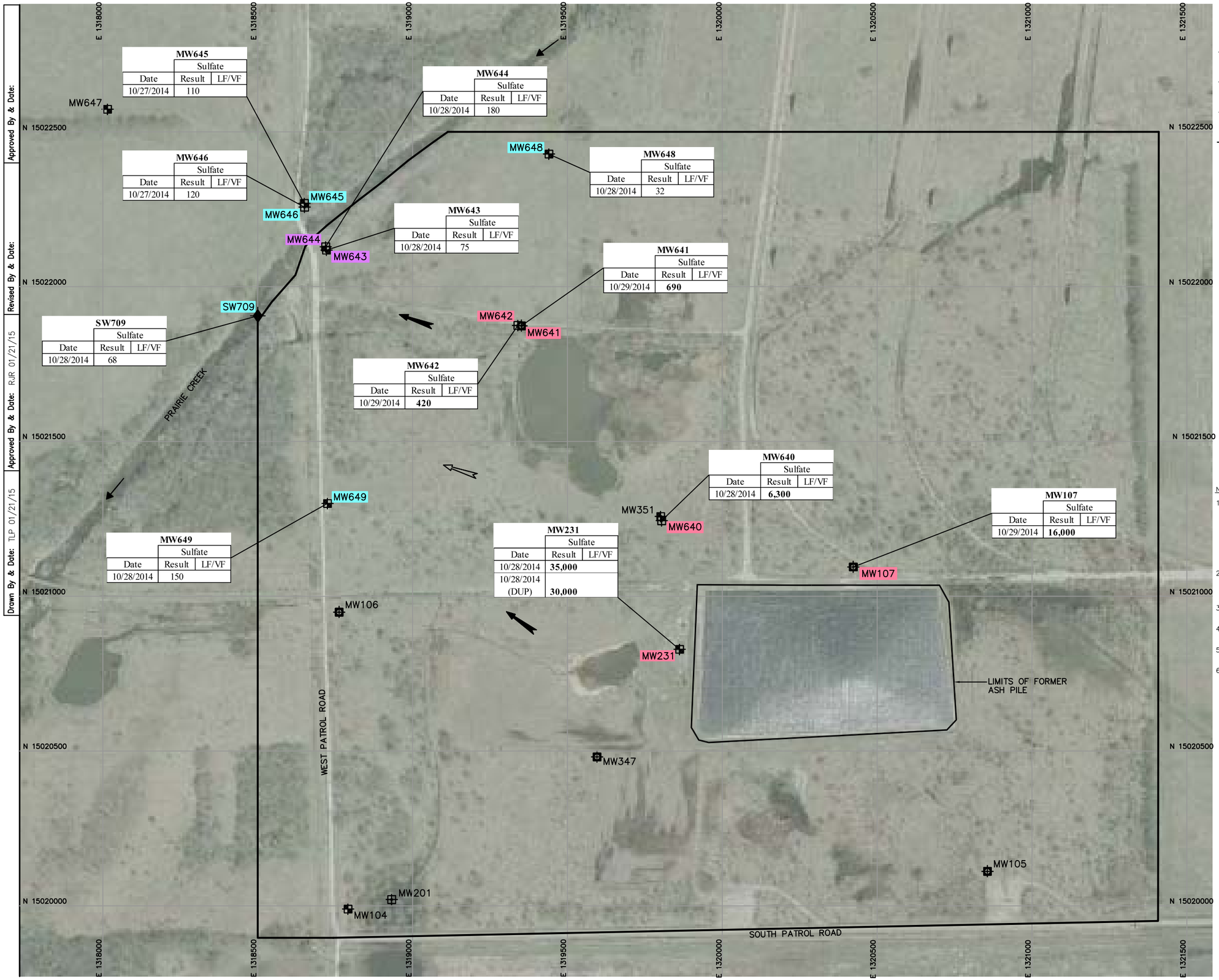
POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA, SITE M1 (2ND QUARTER – OCTOBER 2014)
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/12/2015

FIGURE 3-8

DRAWING NUMBER
10506045
120101

MWH



MW645

	Sulfate	
Date	Result	LF/VF
10/27/2014	110	

MW646

	Sulfate	
Date	Result	LF/VF
10/27/2014	120	

MW644

	Sulfate	
Date	Result	LF/VF
10/28/2014	180	

MW648

	Sulfate	
Date	Result	LF/VF
10/28/2014	32	

MW643

	Sulfate	
Date	Result	LF/VF
10/28/2014	75	

MW641

	Sulfate	
Date	Result	LF/VF
10/29/2014	**690**	

SW709

	Sulfate	
Date	Result	LF/VF
10/28/2014	68	

MW642

	Sulfate	
Date	Result	LF/VF
10/29/2014	**420**	

MW640

	Sulfate	
Date	Result	LF/VF
10/28/2014	**6,300**	

MW107

	Sulfate	
Date	Result	LF/VF
10/29/2014	**16,000**	

MW649

	Sulfate	
Date	Result	LF/VF
10/28/2014	150	

MW231

	Sulfate	
Date	Result	LF/VF
10/28/2014	**35,000**	
10/28/2014 (DUP)	**30,000**	

LEGEND

- MW648 — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW641 — COMBINED MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- MW642 — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND SULFATE DETECTIONS
- SW709 — SURFACE WATER MONITORING LOCATION, NUMBER, AND SULFATE DETECTIONS
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- DIRECTION OF FLOW IN PRAIRIE CREEK
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

DUP	DUPLICATE
LF/VF	LAB FLAG/VALIDATION FLAG
mg/L	MILLIGRAMS PER LITER
NS	NO STANDARD
RG	REMEDIATION GOAL

	Sulfate
Units	mg/L
Project Action Limit[1]	400
Surface Water RG	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY MWH PERSONNEL IN OCTOBER 2014.
5. CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/21/15
Drawn By & Date: TLP 01/21/15

RJR DEVELOPED BY
TLP DRAWN BY
01/21/15 DATE
APPROVED BY

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 300'

REV	DATE	BY	DESCRIPTION

SULFATE DETECTIONS – MANUFACTURING AREA, SITE M1 (2ND QUARTER – OCTOBER 2014)

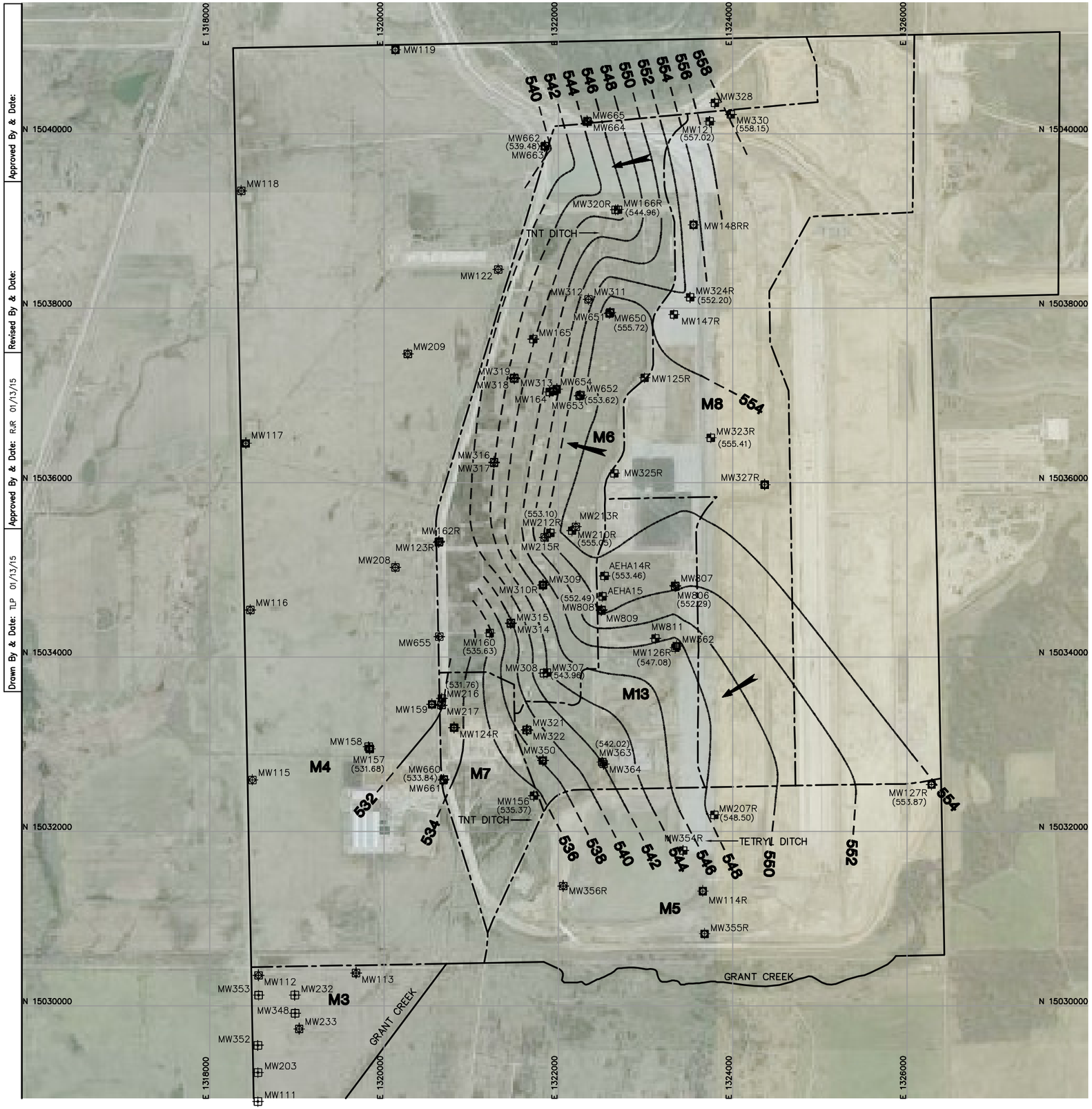
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/21/2015

FIGURE 3-9

DRAWING NUMBER
10506045
120101

MWH



LEGEND

- MW330 (558.15) — OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW652 (553.62) — COMBINED MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
- MW356 — SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- 550 — WATER TABLE CONTOUR (CONTOUR INTERVAL: 2', DASHED WHERE INFERRED)
- DIRECTION OF WATER TABLE FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL OCTOBER 20-29, 2014.
4. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
5. MW117, MW127R, AND MW327R ARE COMBINATION OVERBURDEN/BEDROCK WELLS USED AS HORIZONTAL CONTROL POINTS.

north

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/13/15
Drawn By & Date: TLP 01/13/15

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY: RJR
DATE: 1/13/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 1200'

REV	DATE	BY	DESCRIPTION

SITE FEATURES/WATER TABLE MAP – MANUFACTURING AREA, MFG – SITES M4, M5, M6, M7, M8, M13, AND OTHER AREAS (2ND QUARTER – OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/13/2015

FIGURE 3-10

DRAWING NUMBER
10506045
120101

MWH

LEGEND

- MW325R — OVERBURDEN MONITORING WELL LOCATION AND NUMBER
- MW350 — COMBINED MONITORING WELL LOCATION AND NUMBER
- MW356R (540.28) — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- MW308 (541.87) — DEEPER BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
- 540 — POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL: 2 FT, DASHED WHERE INFERRED)
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
3. WATER LEVELS MEASURED BY MWH PERSONNEL OCTOBER 20-27, 2014.
4. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.

north

Drawn By & Date: TLP 01/20/15
Approved By & Date: RJR 01/20/15
Revised By & Date:
Approved By & Date:

REV	DATE	BY	DESCRIPTION

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY:
DATE: 1/20/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 1200'

POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA, MFG – SITES M4, M5, M6, M7, M8, M13, AND OTHER AREAS (2ND QUARTER – OCTOBER 2014)

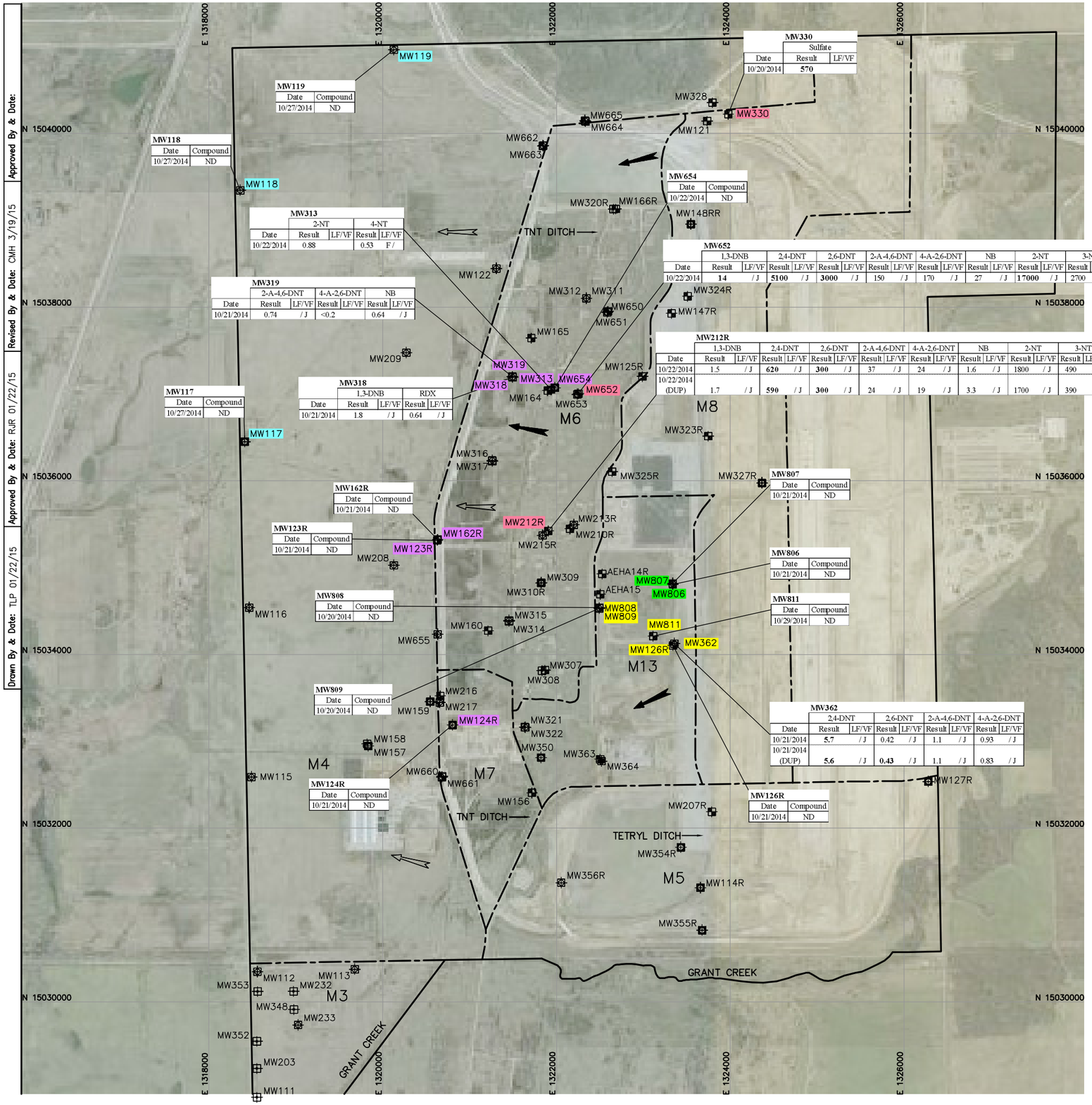
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 1/20/2015

FIGURE 3-11

DRAWING NUMBER
10506045
120101

MWH



MW119

Date	Compound
10/27/2014	ND

MW118

Date	Compound
10/27/2014	ND

MW330

	Sulfate	
Date	Result	LF/VF
10/20/2014	570	

MW654

Date	Compound
10/22/2014	ND

MW313

	2-NT		4-NT	
Date	Result	LF/VF	Result	LF/VF
10/22/2014	0.88		0.53	F/

MW319

	2-A-4,6-DNT		4-A-2,6-DNT		NB	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/21/2014	0.74	/J	<0.2		0.64	/J

MW652

	1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		NB		2-NT		3-NT		4-NT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/22/2014	**14**	/J	**5100**	/J	**3000**	/J	150	/J	170	/J	27	/J	**17000**	/J	2700	/J	16000	/J	**1200**	/J

MW212R

	1,3-DNB		2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT		NB		2-NT		3-NT		4-NT		2,4,6-TNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/22/2014	1.5	/J	**620**	/J	**300**	/J	37	/J	24	/J	1.6	/J	1800	/J	490	/J	1700	/J	**60**	/J
10/22/2014 (DUP)	1.7	/J	**590**	/J	**300**	/J	24	/J	19	/J	3.3	/J	1700	/J	390	/J	1600	/J	**85**	/J

MW117

Date	Compound
10/27/2014	ND

MW318

	1,3-DNB		RDX	
Date	Result	LF/VF	Result	LF/VF
10/21/2014	1.8	/J	0.64	/J

MW807

Date	Compound
10/21/2014	ND

MW162R

Date	Compound
10/21/2014	ND

MW123R

Date	Compound
10/21/2014	ND

MW806

Date	Compound
10/21/2014	ND

MW808

Date	Compound
10/20/2014	ND

MW811

Date	Compound
10/29/2014	ND

MW809

Date	Compound
10/20/2014	ND

MW362

	2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/21/2014	**5.7**	/J	0.42	/J	1.1	/J	0.93	/J
10/21/2014 (DUP)	**5.6**	/J	**0.43**	/J	1.1	/J	0.83	/J

MW124R

Date	Compound
10/21/2014	ND

MW126R

Date	Compound
10/21/2014	ND

LEGEND

- MW212R — OVERBURDEN MONITORING WELL LOCATION NUMBER, AND EXPLOSIVES DETECTIONS
- MW124R — COMBINED MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW115 — SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
- MW308 — DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
- IN-PLUME MONITORING POINT
- EARLY WARNING MONITORING POINT
- COMPLIANCE MONITORING POINT
- DOWNGRADIENT MONITORING POINT
- UPGRADIENT MONITORING POINT
- DIRECTION OF WATER TABLE FLOW
- DIRECTION OF BEDROCK FLOW
- GROUNDWATER MANAGEMENT ZONE BOUNDARY
- STUDY AREA BOUNDARIES
- < — RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
- 1,3-DNB — 1,3-DINITROBENZENE
- 2,4,6-TNT — 2,4,6-TRINITROTOLUENE
- 2,4-DNT — 2,4-DINITROTOLUENE
- 2,6-DNT — 2,6-DINITROTOLUENE
- 2-A-4,6-DNT — 2-AMINO-4,6-DINITROTOLUENE
- 2-NT — 2-NITROTOLUENE
- 3-NT — 3-NITROTOLUENE
- 4-A-2,6-DNT — 4-AMINO-2,6-DINITROTOLUENE
- 4-NT — 4-NITROTOLUENE
- RDX — ROYAL DEMOLITION EXPLOSIVE
- NB — NITROBENZENE
- DUP — DUPLICATE
- F/ — CONCENTRATION BELOW THE REPORTED DETECTION LIMIT
- /J — ESTIMATED CONCENTRATION
- LF/VF — LAB FLAG/VALIDATION FLAG
- ND — NOT DETECTED
- NS — NO STANDARD
- RG — REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
1,3-DNB	10	4
2,4,6-TNT	9.5	75
2,4-DNT	0.42	330
2,6-DNT	0.42	150
2-A-4,6-DNT	NS	NS
NB	51	8000
2-NT	5100	62
3-NT	NS	NS
4-A-2,6-DNT	NS	NS
4-NT	NS	NS
RDX	2.6	500
Sulfate	400	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY MWH PERSONNEL IN OCTOBER 2014.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L) WITH THE EXCEPTION OF SULFATE, REPORTED IN MILLIGRAMS PER LITER (mg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.

north

Drawn By & Date: TLP 01/22/15 | Approved By & Date: RJR 01/22/15 | Revised By & Date: CMH 3/19/15 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | DATE: 01/22/15 | APPROVED BY:

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE — 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL — SCALE 1" = 1200'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES AND SULFATE DETECTIONS MANUFACTURING AREA – SITES M4, M5, M6, M7, M8, M13 AND OTHER AREAS (OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 01/22/2015

FIGURE 3-12

DRAWING NUMBER 10506045 120101

MWH

LEGEND

MW126R (547.08)	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND WATER TABLE ELEVATION
MW350	COMBINED MONITORING WELL LOCATION AND NUMBER
MW356	SHALLOW BEDROCK MONITORING WELL LOCATION AND NUMBER
MW308	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
550	WATER TABLE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
	DIRECTION OF WATER TABLE FLOW
	STUDY AREA BOUNDARIES
	APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-10 FOR WATER TABLE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY MWH PERSONNEL ON OCTOBER 20-22, 2014.
5. MONITORING WELLS USED TO CREATE THE WATER TABLE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-10 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Drawn By & Date: TLP 01/20/15
Approved By & Date: RJR 01/20/15
Revised By & Date:
Approved By & Date:

DEVELOPED BY	RJR
DRAWN BY	TLP
DATE	1/20/15
APPROVED BY	

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

WATER TABLE MAP - MANUFACTURING AREA
SITE M13 LANDFILL (2ND QUARTER - OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/20/2015

FIGURE 3-13

DRAWING NUMBER
10506045
120101

MWH

LEGEND

MW126R	OVERBURDEN MONITORING WELL LOCATION AND NUMBER
MW362 (549.59)	COMBINED MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
MW807 (550.54)	SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND POTENTIOMETRIC SURFACE ELEVATION
MW308	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
545	POTENTIOMETRIC SURFACE CONTOUR (CONTOUR INTERVAL; 1 FT, DASHED WHERE INFERRED)
	DIRECTION OF BEDROCK FLOW
	STUDY AREA BOUNDARIES
	APPROXIMATE LIMITS OF LANDFILL

NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
2. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD 83.
3. SEE FIGURE 3-11 FOR POTENTIOMETRIC SURFACE CONFIGURATION OF AREA SURROUNDING LANDFILL M13.
4. WATER LEVELS MEASURED BY MWH PERSONNEL ON OCTOBER 20-21, 2014.
5. MONITORING WELLS USED TO CREATE THE POTENTIOMETRIC SURFACE MAP ARE SHOWN WITH ELEVATIONS.
6. SEE FIGURE 3-11 FOR GROUNDWATER ELEVATIONS OF MONITORING WELLS AT SITES ADJACENT TO M13.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Approved By & Date:
Revised By & Date:
Approved By & Date: RJR 01/20/15
Drawn By & Date: TLP 01/20/15

DEVELOPED BY: RJR
DRAWN BY: TLP
APPROVED BY
DATE: 1/20/15

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE
0 1/2 1
BAR REPRESENTS ONE INCH ON ORIGINAL
SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

POTENTIOMETRIC SURFACE MAP – MANUFACTURING AREA SITE M13 LANDFILL (2ND QUARTER – OCTOBER 2014)

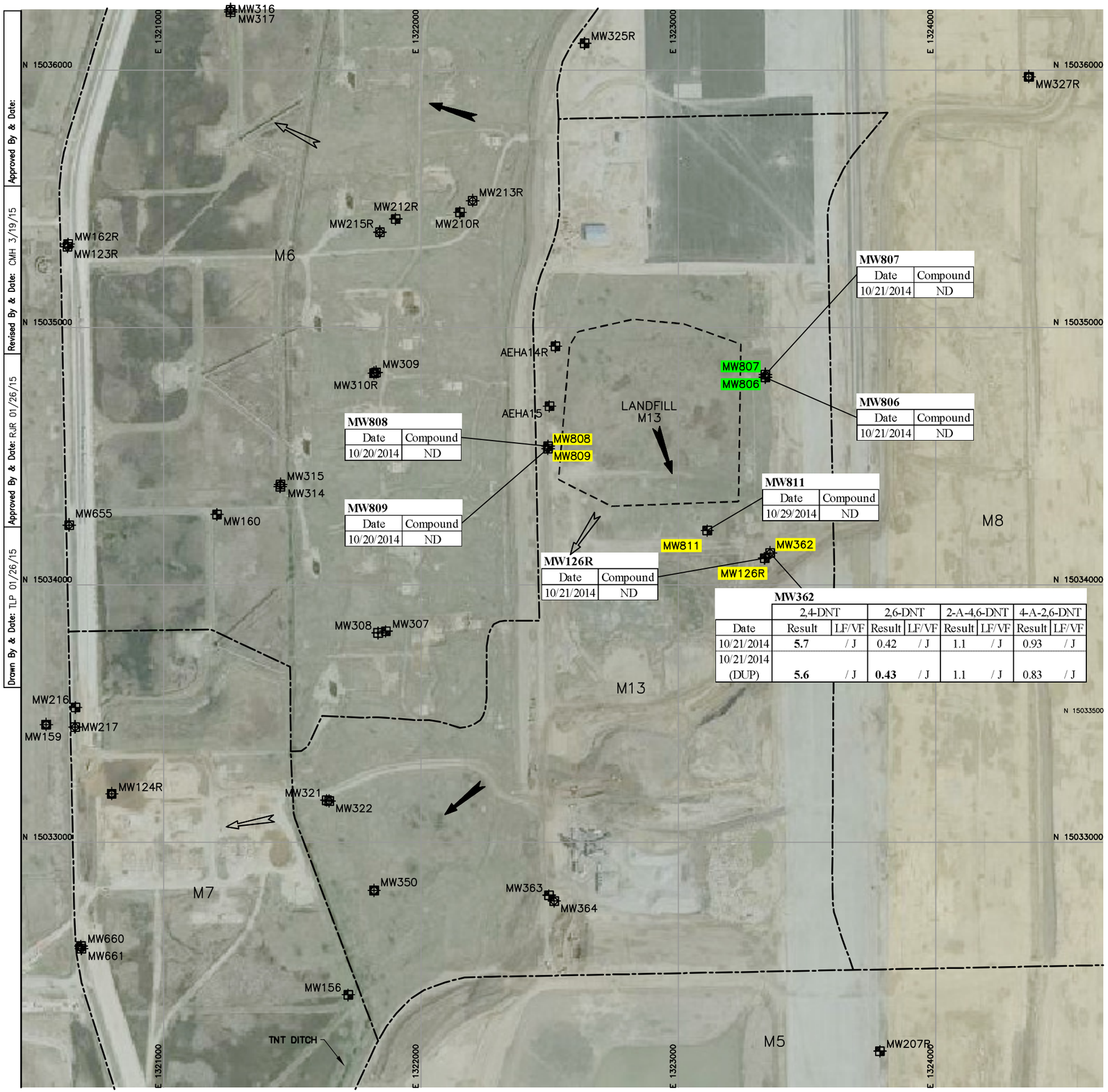
2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED
1/20/2015

FIGURE 3-14

DRAWING NUMBER
10506045
120101

MWH



MW807

Date	Compound
10/21/2014	ND

MW806

Date	Compound
10/21/2014	ND

MW808

Date	Compound
10/20/2014	ND

MW809

Date	Compound
10/20/2014	ND

MW811

Date	Compound
10/29/2014	ND

MW126R

Date	Compound
10/21/2014	ND

MW362

	2,4-DNT		2,6-DNT		2-A-4,6-DNT		4-A-2,6-DNT	
Date	Result	LF/VF	Result	LF/VF	Result	LF/VF	Result	LF/VF
10/21/2014	**5.7**	/ J	0.42	/ J	1.1	/ J	0.93	/ J
10/21/2014 (DUP)	**5.6**	/ J	**0.43**	/ J	1.1	/ J	0.83	/ J

LEGEND

MW126R	OVERBURDEN MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
MW327R	COMBINED MONITORING WELL LOCATION AND NUMBER
MW362	SHALLOW BEDROCK MONITORING WELL LOCATION, NUMBER, AND EXPLOSIVES DETECTIONS
MW308	DEEPER BEDROCK MONITORING WELL LOCATION AND NUMBER
	DOWNGRADIENT MONITORING POINT
	UPGRADIENT MONITORING POINT
	DIRECTION OF WATER TABLE FLOW
	DIRECTION OF BEDROCK FLOW
	STUDY AREA BOUNDARIES
	APPROXIMATE LIMITS OF LANDFILL
<	RESULT SHOWS LAB LIMIT FOR NON-DETECTED RESULTS
2,4-DNT	2,4-DINITROTOLUENE
2,6-DNT	2,6-DINITROTOLUENE
2-A-4,6-DNT	2-AMINO-4,6-DINITROTOLUENE
4-A-2,6-DNT	4-AMINO-2,6-DINITROTOLUENE
1,3,5-TNB	1,3,5 – TRINITROBENZENE
2,4,6-DNT	2,4,6-DINITROTOLUENE
2-NT	2-NITROTOLUENE
DUP	DUPLICATE
LF/VF	LAB FLAG/VALIDATION FLAG
/J	ESTIMATED CONCENTRATION
ND	NOT DETECTED
NS	NO STANDARD
RG	REMEDIATION GOAL

Compound	Project Action Limit[1]	Surface Water RG
1,3,5-TNB	5.1	15
2,4,6-TNT	9.5	75
2,4-DNT	0.42	330
2,6-DNT	0.42	150
2-A-4,6-DNT	NS	NS
2-NT	5100	62
4-A-2,6-DNT	NS	NS

NOTES

1. REMEDIATION GOAL (PROJECT ACTION LIMITS) OBTAINED FROM WORKSHEET #15 OF APPENDIX B (QAPP) OF THE FINAL LONG TERM MONITORING PLAN (TOLTEST, 2010). IEPA CLASS II GROUNDWATER STANDARDS FOR INDUSTRIAL USES ARE PRESENTED WHERE CLASS I AND CLASS II STANDARDS (POTABLE AND INDUSTRIAL USES, RESPECTIVELY) WERE BOTH AVAILABLE.
2. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH OBTAINED FROM WEBSITE HTTP://TERRASERVER-USA.COM, DATED APRIL 10, 2002.
3. COORDINATE SYSTEM BASED ON: DATUM UTM FEET, ZONE 16 (EAST), NAD83.
4. SAMPLES COLLECTED BY MWH PERSONNEL IN OCTOBER 2014.
5. CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER (µg/L).
6. BOLDED VALUE INDICATES RG EXCEEDANCE.
7. APPROXIMATE LIMITS OF LANDFILL OBTAINED FROM A DRAWING, "M13 NEW WELL LOCATIONS", FIGURE 1, PROJECT NO. 7-61M-11686, PREPARED BY AMEC EARTH & ENVIRONMENTAL, DATED MAY 2008.

north

Drawn By & Date: TLP 01/26/15 | Approved By & Date: RJR 01/26/15 | Revised By & Date: CMH 3/19/15 | Approved By & Date:

DEVELOPED BY: RJR | DRAWN BY: TLP | DATE: 01/26/15 | APPROVED BY:

CONTRACT NO. W9124J-14-P-0142

VERIFY SCALE 0 1/2 1 — BAR REPRESENTS ONE INCH ON ORIGINAL — SCALE 1" = 400'

REV	DATE	BY	DESCRIPTION

EXPLOSIVES DETECTIONS – MANUFACTURING AREA, SITE M13 LANDFILL (OCTOBER 2014)

2014 SEMI-ANNUAL GROUNDWATER MONITORING REPORT
JOLIET ARMY AMMUNITION PLANT
WILL COUNTY, ILLINOIS

PRINTED 01/26/2015

FIGURE 3-15

DRAWING NUMBER 10506045 120101

MWH

APPENDIX A

POST-CLOSURE LANDFILL INSPECTION REPORT SECOND QUARTER (OCTOBER) 2014

Former Joliet Army Ammunition Plant
Will County, Illinois

Appendix A
Post-closure Landfill Inspection Report
Second Quarter (October) 2014

Long-Term Monitoring for Multiple Groundwater Sites

Prepared For:
U.S. Army Environmental Command

Firm Fixed Price Contract
W9124J-14-P-0142

MWH

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B Inspection Photographs

ACRONYMS AND ABBREVIATIONS

COC	contaminants of concern
GMZ	Groundwater Management Zone
IAC	Illinois Administrative Code
JOAAP	Joliet Army Ammunition Plant
LAP	Load-Assemble-Package Area
LTM Plan	Final Long-term Monitoring Plan for Environmental Remediation Services (TolTest/MWH, March 2010)
MFG	Manufacturing Area
MWH	MWH Americas, Inc.
PWS	Performance Work Statement, Long-Term Monitoring for Multiple Groundwater Sites, Joliet Army Ammunition Plant, IL dated 27 August 2014
RA	remedial action
Report	Post-closure Landfill Inspection Report, Second Quarter (October) 2014
TolTest	TolTest, Inc.
USAEC	United States Army Environmental Command

ACRONYMS AND ABBREVIATIONS

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TolTest	TolTest, Inc.
USAEC	United States Army Environmental Command

1.0 INTRODUCTION

MWH Americas, Inc. (MWH) has been retained by the United States Army Environmental Command (USAEC) to conduct environmental remediation services at the former Joliet Army Ammunition Plant (JOAAP), Will County, Illinois. Work will be executed under firm fixed-price contract number W9124J-14-P-0142. MWH will perform tasks in accordance with the Performance Work Statement (PWS) dated 27 August 2014 which includes quarterly inspection of the condition of Landfills L3, M11, and M13 located at JOAAP. This Post-closure Landfill Inspection Report, Second Quarter (October) 2014 (Report) documents the conditions identified during the inspection of the landfills conducted in October 2014.

Post-closure monitoring requirements for Landfills L3, L11, and M13 are mandated by Illinois Administrative Code (IAC) Title 5, Subtitle G, Chapter 1, Subchapter c, Part 724, Subpart G for 15 years at Landfill M13 and 30 years at Landfills L3 and M11.

According to the *Final Long-term Monitoring Plan for Environmental Remediation Services* (LTM Plan [TolTest/MWH, March 2010]):

- Section 4.2.1.3.2, *"According to IAC, the Landfill L3 cover will be inspected on a quarterly basis…"*
- Section 4.2.2.3.2, *"According to IAC, the Landfill M11 cover will be inspected quarterly for the first five years and then annually for 25 years."*
- Section 4.2.3.2, *"Long-term monitoring of the landfill cap (M13) will include quarterly inspections of the cap, …"*

Landfill inspections have been conducted on a quarterly basis at Landfills L3, M11, and M13 from October 2008 through July 2013 in accordance with the LTM Plan. Inspection of Landfills L3, M11, and M13 were conducted by TolTest, Inc. (TolTest) in October 2013. Additionally, the caps at Landfills L3, M11, and M13 were mowed by a subcontractor to TolTest during October 2013. However, the Post-closure Inspection Report was not received from TolTest prior to their bankruptcy. During groundwater sampling, the MWH representative did not notice any issues other than what has been previously reported and was not informed by TolTest of any new issues they had identified during their inspection. The October 2013 landfill inspection at M11 would have completed the first five years of quarterly inspections (October 2008 through October 2013). As stated in the *Draft Final 2013 Annual Groundwater Monitoring Report* (MWH, January 2015), *"Quarterly inspections of the landfill cap at Site M11 were required for the first five years, then annually thereafter. However, due to the missing inspections report from October 2013, when the landfill was mowed for the first time, quarterly inspections will continue through 2014."*

Additionally, inspection of Landfills L3, M11, and M13 were not conducted by TolTest in January 2014 prior to their bankruptcy.

Objectives include:

- Confirm that the landfill cap has controlled leaching so that water quality will not be threatened in the future.
- Ensure that the cap is maintained in a manner that will not increase infiltration in the future or otherwise allow waste to be exposed.
- Keep survey points protected and visible to facilitate identification in the future.
- At M13 ensure the fence and signage installed to restrict site access remain in place and serviceable.
- At M13 certify that institutional controls remain in place.

According to IAC and the LTM Plan, Landfills L3, M11, and M13 covers will be inspected on a quarterly basis for:

- Depressions indicating subsidence or other deformations that could breach the cover.
- Erosion features.
- Growth of deep rooted vegetation or invasive species that would adversely affect evapotranspiration and/or erosion armoring.
- Debris or blockage of drainage structure.

Any damages or changes noted will be repaired to comply with the final design specifications for the cover.

In addition, land use restrictions have been imposed across the area within the fence. Annual certification is required to document that none of the following are occurring within the fence:

- Development
- Intrusive work
- Excavation that could mobilize contaminants of concern (COC)
- Alteration of surface water flow
- Vehicle use other than that associated with maintenance of the cover/cap.

2.0 LANDFILL DESCRIPTIONS

2.1 LANDFILL L3

Site L3 comprises approximately 50 acres used as a demolition area located in the Load-Assemble-Package Area (LAP) located on the east side of Highway 53. Site L3 is bounded on the west by Prairie Creek, the south by an unnamed tributary of Prairie Creek, and the east by Star Grove Cemetery. Predominant use of the area was for open burning of combustibles and munitions crates, including some materials with low level explosive contamination. An air curtain destructor was constructed at the site to reduce emissions, but was never put into use. There was also a one-acre fire training area at the site, which consisted of a small depression surrounded by an earthen berm. Specific burning units included "U" and "L" shaped burn pads and a burn cage on a concrete slab. The remedial action (RA) selected for the Site L3 was consolidation and capping into what is now called Landfill L3. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill L3 occupies approximately 3.3 acres of the Site L3 area. Landfill L3 is located on the western edge of the Site L3 Groundwater Management Zone (GMZ) on the east bank of Prairie Creek. The current conceptual site model is that Landfill L3 is believed to contain metals and explosive residues that could continue to contaminate the underlying groundwater and migrate to Prairie Creek. With the implementation of the RA at Site L3, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill. Because the landfill is bordered by Prairie Creek, any contamination that infiltrates from the filled area would be expected to migrate to Prairie Creek and discharge as the groundwater flows upward into the surface water body.

2.1.1 Monitoring Locations

Both groundwater and surface water sample points are monitored at Landfill L3 during the 2nd and 4th quarterly sampling events as follows:

- Upgradient Locations
  - SW004 (Surface location where Prairie Creek first enters the L3 GMZ boundary and upstream of the storm water outfall, 2nd quarter only).
- Downgradient Locations
  - MW410
  - MW412
  - MW630
  - MW631
  - MW633
  - SW777 (Surface water location in Prairie Creek near the L3 GMZ boundary)

- SW557 (Surface water location in Prairie Creek just upstream of the landfill drainage swale discharge)
- SW558 (Surface water location at the constructed drainage swale along the southwest side of the landfill)

2.2 LANDFILL M11

Site M11 comprises approximately 133 acres and is located in the southwestern portion of the Manufacturing Area (MFG) located on the west side of Highway 53. Site M11 was divided into two sections by School House Road and bordered on the west by West Patrol Road. M11 north encompassed approximately 10.5 acres of former gravel pits that were mined and filled with waste. M11 south, a former gravel pit, encompassed approximately 5.6 acres that was also mined and filled with waste. The remedy selected for Site M11 was waste consolidation and capping into what is now called Landfill M11. Implementation of the remedy began in 2006 and was completed in 2008.

Landfill M11 occupies approximately 10.5 acres of the Site M11 north area. There is no GMZ associated with Landfill M11. The current conceptual site model is that Landfill M11 is believed to contain manganese and sulfate containing waste that could potentially contaminate underlying groundwater. With the implementation of the RA at Site M11, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill, thus preventing groundwater contamination.

2.2.1 Monitoring Locations

Groundwater sample points are monitored at Landfill M11 during the 4th quarterly sampling event as follows:

- Upgradient Locations
  - MW802
  - MW803
- Downgradient Locations
  - MW333
  - MW334
  - MW335
  - MW336
  - MW804
  - MW805

2.3 LANDFILL M13

Site M13 comprises approximately 106 acres of the central part of the MFG area formerly known as the gravel pits. It lies north of the Tetryl Production Area, east of the TNT Ditch Complex, and west of the Acid Area. Disposal activities were confined to four discrete areas of the site, none of which extended beyond 12 acres in size. Historical records indicate landfilling took place in the Northern Gravel Pit during the period 1966 to 1984 and involved scrap metals, creosote-treated railroad ties, telephone poles, and construction/demolition debris. The three other pits received waste materials that do not appear to pose a threat to human health and the environment. The RA selected for the Site M13 was consolidation and capping into what is now called Landfill M13. Implementation of the remedy began in 2007 and was completed in 2008.

Landfill M13 comprises approximately 10.2 acres and is located in the northern part of Site M13 and within the MFG GMZ. The current conceptual site model is that metals and benzo(a)pyrene in groundwater may be present as a result of leaching of waste materials in the Northern Gravel Pit. The explosives present in groundwater are far more likely to be present due to infiltration of wastewater in the TNT Ditch. There is no evidence to suggest explosive compounds were ever present in waste materials put into the pit. With the implementation of the RA at Site M13, it is anticipated that the landfill cap will prevent percolation of precipitation through waste consolidated in the landfill and it is anticipated that contaminants in site groundwater will detach from the source areas and migrate as legacy plumes to the west. As such, concentrations are expected to decline with time.

2.3.1 Monitoring Locations

Groundwater is monitored quarterly through sample collection and analysis at seven monitoring wells:

- Upgradient or background wells
  - MW806
  - MW807
- Downgradient or source control wells
  - MW126R
  - MW362
  - MW808
  - MW809
  - MW811 (installed October 2014)

3.0 INSPECTION RESULTS

Landfill inspections were conducted on 29 October 2014 for Landfills L3, M11, and M13. This report includes copies of the inspection checklist, photographs, and recommendations. The Post-closure Inspection Checklists are found in Appendix A, and Inspection Photographs are found in Appendix B.

3.1 LANDFILL L3

The cap for Landfill L3 was mowed October 2014 prior to the inspection being conducted. The vegetative cover was well established. During the inspection evidence indicated that during mowing some of the vegetation was "laid-down" by the mower and not cut by the blades due to its length. The vegetation that was cut was between approximately 4 to 6 inches in height. Additionally, the rip rap along the perimeter of the landfill was mowed to the extent possible. Following mowing, the rip rap was sprayed using 2,4-D to kill the broadleaf and woody vegetation while leaving the grasses which provide erosion control.

The perimeter fence and site postings were in good condition. No evidence of damage due to burrowing animals was observed.

The rip rap along Prairie Creek at Site L3 has been washed away at several locations and is in need of repair. Although small areas of the synthetic cap is exposed at several locations as a result of the rip rap being washed away (see photos), the landfill appears to be stable and does not appear to be failing. The remaining rip rap also appears to be stable.

During the inspection there was no indication of the following:

- Depressions indicating subsidence or other deformations that could breach the cover.
- Erosion features.
- Debris or blockage of drainage structure.

However, following mowing remnants of scattered woody plants were observed on the landfill cap.

During the inspection there was no indication of the following activities:

- Development
- Intrusive work
- Excavation that could mobilize COCs
- Alteration of surface water flow
- Vehicle use other than that associated with maintenance of the cover/cap.

3.2 LANDFILL M11

The cap for Landfill M11 was mowed October 2014 prior to the inspection being conducted. The vegetative cover was well established. During the inspection evidence indicated that during mowing some of the vegetation was "laid-down" by the mower and not cut by the blades due to its length. The vegetation that was cut was between approximately 4 to 6 inches in height. Additionally, the rip rap along the perimeter of the landfill was mowed to the extent possible. Following mowing, the rip rap was sprayed using 2,4-D to kill the broadleaf and woody vegetation while leaving the grasses which provide erosion control.

The perimeter fence and site postings were in good condition. No evidence of damage due to burrowing animals was observed.

The vents were inspected and found to be undamaged and appeared to be in working order. During the inspection valves were closed an opened and found to have free operation. The flange bolts were inspected and tightened as needed.

During the inspection there was no indication of the following:

- Depressions indicating subsidence or other deformations that could breach the cover.
- Erosion features.
- Debris or blockage of drainage structure.

However, following mowing some of the larger woody growth in the rip rap which could not be cut using the mower remains (see photos) and remnants of scattered woody plants were observed on the landfill cap.

During the inspection there was no indication of the following activities:

- Development
- Intrusive work
- Excavation that could mobilize COCs
- Alteration of surface water flow
- Vehicle use other than that associated with maintenance of the cover/cap.

3.3 LANDFILL M13

The cap for Landfill M13 was mowed October 2014 prior to the inspection being conducted. The vegetative cover was well established. During the inspection evidence indicated that during

mowing some of the vegetation was "laid-down" by the mower and not cut by the blades due to its length. The vegetation that was cut was between approximately 4 to 6 inches in height. Additionally, the rip rap along the perimeter of the landfill was mowed to the extent possible. Following mowing, the rip rap was sprayed using 2,4-D to kill the broadleaf and woody vegetation while leaving the grasses which provide erosion control. The area between the Landfill M13 fence and the rip rap surrounding the landfill cap is becoming quite overgrown with grasses, shrubs, and small trees.

The perimeter fence and site postings were in good condition. No evidence of damage due to burrowing animals was observed.

The vents were inspected and found to be undamaged and appeared to be in working order. During the inspection valves were closed an opened and found to have free operation. The flange bolts were inspected and tightened as needed.

During the inspection there was no indication of the following:

- Depressions indicating subsidence or other deformations that could breach the cover.
- Erosion features.

However, following mowing some of the larger woody growth in the rip rap which could not be cut using the mower remains (see photos) and remnants of scattered woody plants were observed on the landfill cap.

Additionally, a drainage ditch located on the south side of the landfill periodically has standing water due to poor drainage. The ditch is filling with plants and sediments.

During the inspection there was no indication of the following activities:

- Development
- Intrusive work – other than installation of monitoring well MW811 and abandonment of monitoring well AEHA15
- Excavation that could mobilize COCs
- Alteration of surface water flow (see above)
- Vehicle use other than that associated with maintenance of the cover/cap

4.0 RECOMMENDATIONS

The deficiencies noted within this Report which need to be addressed include the following:

Landfill L3:

- Repair rip rap along Prairie creek. The Army is currently preparing the contract documentation necessary for implementation of the repairs.
- During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height.
- Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes.

Landfill M11:

- The October 2013 landfill inspection at M11 would have completed the first five years of quarterly inspections (October 2008 through October 2013). According to Sections 4.2.2.2 and 4.2.2.3.2 of the LTM Plan, Landfill M11 is required to have quarterly inspections completed for the first five years, and annually thereafter. As stated in the Draft Final 2013 Annual Groundwater Monitoring Report (MWH, January 2015) currently in review, "Quarterly inspections of the landfill cap at Site M11 were required for the first five years, then annually thereafter. However, due to the missing inspections report from October 2013, when the landfill was mowed for the first time, quarterly inspections will continue through 2014." Some woody growth was observed in the rip rap on the south side of the landfill. The rip rap needs to be cleared of woody growth.
- During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height.
- During the next mowing event scheduled for December 2014, small trees will be removed from the rip rap.
- Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes.

Landfill M13:

- The drainage ditch needs to be modified to eliminate the retention of surface water.
- During the next mowing event scheduled for December 2014, mowing should be conducted in the opposite direction as completed in October to aid in attaining a consistent and proper cut height.

- During the next mowing event scheduled for December 2014, small trees will be removed from the rip rap.
- Scattered woody plants observed on the landfill cap should be spot treated using 2,4-D once the growing season resumes.
- Although the landfill cap was mowed, the overgrowth within the Landfill M13 fenced area and surrounding the perimeter rip rap is limiting access to the landfill. Additionally, having such a dense overgrowth of seed sources in close proximity to the landfill, there will continue to be a high occurrence of invading species. Therefore, additional mowing should be conducted surrounding the landfill, including the drainage ditch located on the south side of the landfill.

Appendix A
Post-Closure Inspection Checklists

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: L3		Date of Inspection: October 29, 2014	
Inspected By: Jeff Ramsby, MWH Americas, Inc.		Weather Conditions: 52 degrees, cloudy	
Names of those present at inspection: None			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?	√		
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal Burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?	√		Some woody vegetation present in rip rap
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		NA	No vents
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?	√		Rip Rap along creek needs repairs
Certification			
Inspector Signature:		Printed Name: Jeff Ramsby	
Title: Lead Supervising Hydrogeologist		Date: October 29, 2014	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: M11		Date of Inspection: October 29, 2014	
Inspected By: Jeff Ramsby, MWH Americas, Inc.		Weather Conditions: 52 degrees, cloudy	
Names of those present at inspection: None			
Checklist	Yes	No	Explanation
Site Security			
a) Was fencing, gates and signs in good condition?	√		
b) Were gates locked?		√	Chained shut with no lock, within locked MNTP grounds
c) Evidence of trespassing		√	
Landfill Cover			
d) Evidence of Settling and/or Ponding?		√	
e) Any desiccation or cracking detected?		√	
f) Erosion around cap?		√	
g) Animal burrowing detected?		√	
Vegetation Condition			
h) Is vegetation well established?	√		
i) Evidence of vegetation detrimental to cap?	√		Some woody vegetation present in rip rap
Landfill structures			
j) Evidence of damage to monitoring wells?		√	
k) Evidence of damage to gas vents?		√	Connecting bolts on flanges tightened
Field Conclusions			
l) Is there an imminent hazard to the integrity of the unit?		√	
m) Are repairs necessary?		√	
Certification			
Inspector Signature:		Printed Name: Jeff Ramsby	
Title: Lead Supervising Hydrogeologist		Date: October 29, 2014	

JOAAP LANDFILL INSPECTION CHECKLIST			
Landfill Designation: M13		Date of Inspection: October 29, 2014	
Inspected By: Jeff Ramsby, MWH Americas, Inc.		Weather Conditions: 52 degrees, cloudy	
Names of those present at inspection: None			
Checklist	Yes	No	Explanation
Site Security			
a. Was fencing, gates and signs in good condition?	√		
b. Were gates locked?	√		
c. Evidence of trespassing		√	
Landfill Cover			
d. Evidence of Settling and/or Ponding?		√	
e. Any desiccation or cracking detected?		√	
f. Erosion around cap?		√	
g. Animal burrowing detected?		√	
Vegetation Condition			
h. Is vegetation well established?	√		
i. Evidence of vegetation detrimental to cap?	√		Some woody vegetation present in rip rap
Landfill structures			
j. Evidence of damage to monitoring wells?		√	
k. Evidence of damage to gas vents?		√	Connecting bolts on flanges tightened
Field Conclusions			
l. Is there an imminent hazard to the integrity of the unit?		√	
m. Are repairs necessary?		√	
Certification			
Inspector Signature:		Printed Name: Jeff Ramsby	
Title: Lead Supervising Hydrogeologist		Date: October 29, 2014	

Appendix B
Inspection Photographs

Landfill L3

Landfill L3 – South Side, East End

Landfill L3 – South Side, West End

Landfill L3 – South Side Rip Rap Apron, Looking West

Landfill L3 – Drainage Tile, South Side

Landfill L3 – West End, North Side, Looking East

Landfill L3 – West End, South Side, Looking East

Landfill L3 – Top, East Half, Looking East

Landfill L3 – Top, West Half, Looking West

Landfill L3 – North End

Landfill L3 – West Side, Looking Southwest

Landfill L3 – Exposed Synthetic Cover in Rip Rap Along Prairie Creek

Landfill M11

Landfill M11 – Southern End, East Side, Looking North

Landfill M11 –Northern End, East Side, Looking Northeast

Landfill M11 – North End, Looking North

Landfill M11 – South End, Looking South

Landfill M11 – West Side, Looking North

Landfill M11 – West Side Rip Rap, Looking North

Landfill M11 – Small Trees at Edge of Rip Rap on West Side

Landfill M11 – Woody Vegetation in Rip Rap, West Side

Landfill M13

Landfill M13 – East Side, Looking North

Landfill M13 – North Side, Looking West

Landfill M13 – West Side, Looking North

Landfill M13 – South Side, Looking East

Landfill M13 – South Side Rip Rap, Looking East

Landfill M13 – Woody Vegetation in Rip Rap, South Side

APPENDIX B

DATA REPORTS

B1 - DATA EVALUATION REPORTS
B2 - DATA USABILITY REPORT

B1 - DATA EVALUATION REPORTS

TestAmerica SDG 280-61566-1

(October 2014 Report 1 of 4)

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W9124J-14-P-0142
Site-Wide Long-Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION

This Data Quality Evaluation Report presents the assessment and verification of analytical data collected from groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP) in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from samples collected on October 20 and 21, 2014 and received by the laboratory on October 22, 2014. The samples were analyzed by TestAmerica Laboratories, Inc., located in Arvada, Colorado. Results have been reported in laboratory report number 280-61566-1.

Groundwater samples were analyzed for volatile organic compounds (VOCs) using *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (SW-846) Method 8260B, semivolatile organic compounds (SVOCs) using SW-846 Method 8270D, explosives using SW-846 Method 8330B, metals using SW-846 Method 6010C, mercury using SW-846 Method 7470A, and anions (nitrate as N and sulfate) using SW-846 Method 9056A**.** Table 1 presents a cross reference of the sample information to the laboratory analytical data package.

Table 1 - Groundwater Samples

Sample ID	Date Sampled	Time Sampled	Lab Sample ID	Analysis	Matrix	Report Date
JP-M8-GWMW330	10/20/2014	1432	280-61566-1	3	water	11/13/2014
JP-M13-GWMW809	10/20/2014	1647	280-61566-2	1	water	11/13/2014
JP-M13-GWMW808	10/20/2014	1653	280-61566-3	1	water	11/13/2014
JP-M13-GWMW806	10/21/2014	1000	280-61566-4	1	water	11/13/2014
JP-M13-GWMW807	10/21/2014	0945	280-61566-5	1	water	11/13/2014
JP-M13-GWMW126R	10/21/2014	1235	280-61566-6	1	water	11/13/2014
JP-M13-GWMW362	10/21/2014	1220	280-61566-7	1	water	11/13/2014
JP-M13-GWMW999	10/21/2014	1400	280-61566-8	1	water	11/13/2014
TRIP BLANK 102114	10/20/2014	1432	280-61566-9TB	2	water	11/13/2014

Sample Analysis
1. VOCs, SVOCs, explosives, metals, anions
2. VOCs
3. Sulfate

OVERVIEW

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois* (TolTest, Inc. March 2010) (QAPP), the Department of Defense (DoD) Quality Systems Manual (QSM) Version 4.2 (10/25/2010), and United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control

samples (LCS), method blanks, trip blank, matrix spike/matrix spike duplicate (MS/MSD) analysis, initial and continuing calibration verifications and blanks (ICV, CCV, ICB, CCB), and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP. A Level IV data review was completed on approximately ten percent of the samples. A Level IV data review includes a complete reconstruction review of the analytical results.

SUMMARY

This section summarizes the data evaluation findings of the laboratory analytical data package. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the validation flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW-846 Method 8260B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).

In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990, which meets quality control requirements.

The average relative response factors (RRF) for all system performance check compounds (SPCC) were within quality control requirements.

The RRFs and RSD were calculated for each of the six concentrations and were acceptable. The initial calibration data for several VOCs were verified.

Second Source Calibration Verification (Initial Calibration Verification)

The initial calibration verification (ICV) percent differences (%Ds) were within quality control requirements of less than or equal to 20% for each individual compound.

Continuing Calibration

The continuing calibration verification (CCV) samples were run every twelve hours, consistent with the method, DoD QSM, and USEPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

The %Ds for the CCCs and the continuing calibration response factors for the SPCCs were within quality control limits. The %Ds for all compounds were within the quality control requirements of less than or equal to 20%.

The CCV response factors (RFs) and %D for several VOCs were verified. The CCV recalculations were reviewed and were acceptable.

Blanks

The method blank met quality control requirements of no contamination greater than one-half the reporting limit. However, acetone was detected at less than one-half the reporting limit. Acetone was also detected in several associated samples at levels comparable to the detection in the method blank. Therefore, all detected acetone results from associated samples were qualified with a "B" to denote this contamination.

Trip blank results were non-detect for all compounds, except acetone which was detected at a concentration comparable to the detection in the associated method blank.

Compound	QC Sample	Concentration	Associated Samples	Concentration	Flag
Acetone	Method Blank	2.84 ug/L	JP-M13-GWMW809 JP-M13-GWMW808 JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW999 TRIP BLANK 102114	3.7 J ug/L 3.6 J ug/L 4.1 J ug/L 3.7 J ug/L 6.5 J ug/L 3.8 J ug/L	B

Surrogate Spikes

Surrogate percent recoveries (%R) were within quality control requirements. Surrogate recoveries were recalculated for several samples and were acceptable.

Matrix Spikes/Matrix Spike Duplicates

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Samples

The %Rs for the LCS were within quality control limits. Several VOCs were recalculated and were acceptable.

Internal Standards

The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method; however, the quarterly check may not be required at this time. The data are not affected.

Sample Results Verification

Approximately 10% of the VOC sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. The recalculations verified that sample results were acceptable as reported.

EPA SW-846 Method 8270D

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The %RSDs were less than or equal to 15% for each individual compound and less than or equal to 30% for CCCs.

In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r2) were greater than or equal to 0.990.

The RRFs for all SPCCs were within quality control requirements.

The RRF and RSD were calculated for each of the eight concentrations and were acceptable. The initial calibration data for several SVOCs were verified.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Ds were within quality control requirements of less than or equal to 20% for each individual compound.

Continuing Calibration

The CCV samples were run every twelve hours consistent with the method, DoD QSM, and USEPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

The %Ds for all compounds were within the quality control requirements of less than or equal to 20%.

The continuing calibration response factors for SPCCs were within quality control limits.

The %Ds for the CCCs met the quality control requirements.

The CCV RFs and %Ds for several SVOCs were verified. The CCV recalculations were reviewed and were acceptable.

Blanks

The method blanks met quality control requirements of no contamination greater than one-half the reporting limit. Dimethyl phthalate was detected in the method blank at less than one-half the reporting limit. Dimethyl phthalate was not detected in any of the associated samples.

Surrogate Spikes

Surrogate %Rs were within quality control requirements. Surrogate recoveries were recalculated for several samples and were acceptable.

Matrix Spikes/Matrix Spike Duplicates

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Samples

The %Rs for the LCS were within quality control limits. Several SVOCs were recalculated and were acceptable.

Internal Standards

The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

The QC/MRL is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method; however, the quarterly check may not be required at this time. The data are not affected.

Sample Results Verification

Approximately 10% of the SVOC sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. The recalculations verified that sample results were acceptable as reported.

EPA SW-846 Method 8330B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The %RSDs were within quality control requirements for both columns. The initial calibration recalculations were reviewed and were acceptable.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Ds were within quality control requirements on both columns.

Continuing Calibration

The CCV %Ds for all compounds were within the quality control requirements of less than or equal to 15% on both columns. The CCV RFs and %Ds for the explosive compounds were recalculated and verified and were acceptable.

Blanks

Method blank analysis met quality control requirements of no detected contamination greater than one-half the reporting limit. The compound 2-amino-4,6-dinitrotoluene was detected in the method blank at less than one-half the reporting limit. This compound was either not detected in the associated samples, or was detected at more than ten times the concentration in the method blank. No data were qualified.

Surrogate Spikes

Surrogate %Rs were within quality control requirements with the following exceptions:

- The %R for surrogate 1,2-dinitrobenzene in sample JP-M13-GWMW362 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M13-GWMW999 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.

Surrogate	%R	Acceptance Limits	Associated Compound	Associated Samples	Flag
1,2-dinitrobenzene	423%	83%-119%	2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 4-amino-2,6-dinitrotoluene	JP-M13-GWMW362	J for detects
1,2-dinitrobenzene	414%	83%-119%	2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 4-amino-2,6-dinitrotoluene	JP-M13-GWMW999	J for detects

Surrogate recoveries were recalculated for several samples and were acceptable.

Matrix Spikes/Matrix Spike Duplicates

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Sample/Laboratory Control Sample Duplicate

The %Rs for the LCS and LCSD were within quality control limits with the following exception:

- The %R for 2-amino-4,6-dinitrotoluene was less than the lower control limit in the LCS. The %R for tetryl was less than the lower control limit in the LCS and LCSD. The laboratory has stated that the recovery for both compounds was within the laboratory's historical limits and therefore re-extraction and/or reanalysis was not performed. The associated sample results were qualified with a "J" flag for detects and a "UJ" flag for non-detects. The RPDs were within quality control requirements.

QC Sample	Compound	%R	Associated Sample	Flag
LCS 280-249777/2-A LCSD 280-249777/3-A	2-amino-4,6-dinitrotoluene tetryl	78%/81% 60%/52%	JP-M13-GWMW809 JP-M13-GWMW808 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW999	J (all detects) UJ (all non-detects)

Several explosive compounds were recalculated and were acceptable.

Sample Analysis

Sample analysis met method requirements for secondary column confirmation and dilutions. The retention times were within the quality control requirements. The RPDs between the primary and secondary columns were within the quality control limit of less than or equal to 40% in samples.

Sample Results Verification

Approximately 10% of the explosive sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. The recalculations verified that sample results were acceptable as reported.

EPA SW-846 Method 6010C

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibrations were within quality control requirements. Recalculations of the correlation coefficients for metals were acceptable.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements. Recalculations of the CCV for metals were acceptable.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements with the following exception:

- Arsenic and barium were detected in continuing calibration blanks (CCB) at concentrations less than one-half the reporting limit. Arsenic was detected in samples JP-M13-GWMW808 and JP-M13-GWMW806 at a concentration comparable to that in the CCB. Arsenic was qualified with a "B" flag in these samples. Barium was detected in associated samples at concentrations more than ten times that in the CCB; therefore, results were not qualified.
- Sodium was detected in a CCB at a concentration greater than one-half the reporting limit. The associated sample had a concentration of sodium that was four orders of magnitude greater than in the CCB; therefore, sodium was not qualified.

- Compound	QC Sample	Concentration	Associated Samples	Concentration	Flag
Arsenic	CCB	4.67 J ug/L/ 4.61 J ug/L	JP-M13-GWMW808 JP-M13-GWMW806	4.9 J ug/L 5.9 J ug/L	B

Matrix Spike/Matrix Spike Duplicate Analysis

The %Rs for the MS and MSD samples were within quality control requirements with the following exception:

- The %R for sodium in the MS and MSD was greater than the upper control limit. Sodium in the parent sample exceeded four times the spiking amount. Consequently, sodium was not qualified in the sample.

The RPDs were within quality control requirements. MS recovery results for metals analyses were verified through recalculations and were acceptable.

Laboratory Control Sample

The %Rs for the LCS were within quality control requirements. LCS recalculations for metals were acceptable.

Quality Control/Method Reporting Limit Check

The QC/MRL is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method; however, the quarterly check may not be required at this time. The data are not affected.

The serial dilution was not calculable for most metals (Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, K, Mn, Ni, Pb, Sb, Se, Tl, V, and Zn). The reported calculated %Ds were within quality control requirements for Ca, Mg, and Na. The post digestion spike analysis was performed.

The post digestion spike was within quality control requirements with the exception that calcium was recovered below the lower control limit. Calcium was qualified as "J" for sample JP-M13-GWMW999.

QC Sample	Compound	%R	Associated Sample	Flag
Post Digestion Spike	Calcium	70%	JP-M13-GWMW999	J

Serial dilution was within quality control requirements.

Interelement Check Standard

The interference check standard (ICS-A and ICS-AB) met quality control requirements with the exception that cadmium, chromium, copper, and manganese were detected at a level greater than the LOD for analytical batch 280-251206. The case narrative indicates that the laboratory believes the solution contains trace impurities of these elements and that the results are not due to matrix interference. The results are consistent with those found by the manufacturer of the solution. The associated sample results were not qualified.

Sample Results Verification

Approximately 10% of the metal sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. The recalculations verified that sample results were acceptable as reported.

EPA SW-846 Method 7470A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration %Rs were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements. Recalculations of the CCV for mercury were acceptable.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Sample

The %Rs for the LCS were within quality control requirements. LCS recalculations for mercury were acceptable.

Sample Results Verification

Approximately 10% of the mercury sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. the recalculations verified that sample results were acceptable as reported.

EPA SW-846 Method 9056A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements, with exception of the following:

- Samples JP-M13-GWMW809 and JP-M13-GWMW808 were analyzed for nitrate out of the 48-hour holding time by approximately 4-5 hours. Nitrate was detected in both samples and was qualified “J” as estimated.

QC Requirement	Compound	Date/Time of Collection	Date/Time of Analysis	Associated Sample	Flag
Analyzed within 48 hours of collection time	Nitrate	10/20/14 1647 10/20/14 1653	10/22/14 2015 10/22/14 2127	JP-M13-GWMW809 JP-M13-GWMW808	J J

Initial Calibration

Initial calibration met quality control requirements. Correlation coefficients for anions were recalculated and were acceptable.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

The %Rs for the MS and MSD sample were within quality control requirements with the following exception:

- The %R for sulfate was greater than the upper control limit in the MSD. Sulfate was detected in the parent sample (JP-M13-GWMW809) and was qualified "J" as estimated.

QC Sample	Compound	%R	Associated Sample	Flag
JP-M13-GWMW809MS / JP-M13-GWMW809MSD	Sulfate	112/114%	JP-M13-GWMW809	J

The RPDs were within quality control requirements. MS/MSD recovery results were verified through recalculations and were acceptable.

Laboratory Control Sample

The %Rs for the LCS and LCSD were within quality control requirements. The RPD was within quality control requirements. Recalculation of the LCS was acceptable.

Quality Control/Method Reporting Limit Check

The MRL results met quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Sample Results Verification

Approximately 10% of the anion sample results were verified through recalculation of results. Sample calculations were performed to verify the results reported by the laboratory were accurate. the recalculations verified that sample results were acceptable as reported.

Summary

Based on the data validation presented herein, and the QC requirements as specified in the project QAPP and guidance documents, data is considered usable as qualified and noted above.

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2
Client Matrix: Water

Date Sampled: 10/20/2014 1647
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1213.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1001			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1001				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	0.40	U	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	3.7	J B	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.20	U	0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2

Client Matrix: Water

Date Sampled: 10/20/2014 1647

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1213.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1001			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1001				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	99		81 - 118
4-Bromofluorobenzene (Surr)	92		85 - 114
Dibromofluoromethane (Surr)	99		80 - 119
Toluene-d8 (Surr)	97		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3

Client Matrix: Water

Date Sampled: 10/20/2014 1653

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1214.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1021			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1021				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	0.40	U	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	3.6	J B	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.20	U	0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3

Client Matrix: Water

Date Sampled: 10/20/2014 1653

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1214.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1021			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1021				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	100		81 - 118
4-Bromofluorobenzene (Surr)	91		85 - 114
Dibromofluoromethane (Surr)	101		80 - 119
Toluene-d8 (Surr)	95		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4

Client Matrix: Water

Date Sampled: 10/21/2014 1000

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1215.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1041			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1041				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	0.40	U	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	6.4	U	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.20	U	0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4

Client Matrix: Water

Date Sampled: 10/21/2014 1000

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1215.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1041			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1041				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	104		81 - 118
4-Bromofluorobenzene (Surr)	96		85 - 114
Dibromofluoromethane (Surr)	105		80 - 119
Toluene-d8 (Surr)	93		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5

Client Matrix: Water

Date Sampled: 10/21/2014 0945

Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1216.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1101			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1101				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	1.5		0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	6.4	U	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	1.1		0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5
Client Matrix: Water

Date Sampled: 10/21/2014 0945
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1216.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1101			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1101				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.19	J	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	102		81 - 118
4-Bromofluorobenzene (Surr)	90		85 - 114
Dibromofluoromethane (Surr)	100		80 - 119
Toluene-d8 (Surr)	93		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6
Client Matrix: Water

Date Sampled: 10/21/2014 1235
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1217.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1121			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1121				

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U		0.17	1.0
1,1,1-Trichloroethane	0.20	U		0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U		0.20	1.0
1,1,2-Trichloroethane	0.40	U		0.32	1.0
1,1-Dichloroethane	0.40	U		0.16	1.0
1,1-Dichloroethene	0.40	U		0.14	1.0
1,1-Dichloropropene	0.40	U		0.15	1.0
1,2,3-Trichlorobenzene	0.40	U		0.18	1.0
1,2,3-Trichloropropane	0.80	U		0.77	3.0
1,2,4-Trichlorobenzene	0.80	U		0.32	1.0
1,2,4-Trimethylbenzene	0.20	U		0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U		0.81	5.0
1,2-Dichlorobenzene	0.20	U		0.13	1.0
1,2-Dichloroethane	0.40	U		0.13	1.0
1,2-Dichloropropane	0.40	U		0.13	1.0
1,3,5-Trimethylbenzene	0.40	U		0.14	1.0
1,3-Dichlorobenzene	0.20	U		0.16	1.0
1,3-Dichloropropane	0.40	U		0.15	1.0
1,4-Dichlorobenzene	0.40	U		0.16	1.0
2,2-Dichloropropane	0.40	U		0.20	1.0
2-Butanone (MEK)	3.2	U		1.8	6.0
2-Chlorotoluene	0.40	U		0.17	1.0
2-Hexanone	3.2	U		1.4	5.0
4-Chlorotoluene	0.40	U		0.17	1.0
4-Isopropyltoluene	0.40	U		0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U		1.0	5.0
Acetone	4.1	J	B	1.9	10
Benzene	0.20	U		0.16	1.0
Bromobenzene	0.20	U		0.17	1.0
Bromochloromethane	0.40	U		0.10	1.0
Bromodichloromethane	0.20	U		0.17	1.0
Bromoform	0.40	U		0.19	1.0
Bromomethane	0.40	U		0.21	2.0
Carbon disulfide	0.80	U		0.45	2.0
Carbon tetrachloride	0.40	U		0.19	2.0
Chlorobenzene	0.20	U		0.17	1.0
Chloroethane	1.6	U		0.41	2.0
Chloroform	0.20	U		0.16	1.0
Chloromethane	0.80	U		0.30	2.0
cis-1,2-Dichloroethene	0.20	U		0.15	1.0
cis-1,3-Dichloropropene	0.20	U		0.16	1.0
Dibromochloromethane	0.40	U		0.17	1.0
Dibromomethane	0.40	U		0.17	1.0
Dichlorodifluoromethane	0.80	U		0.31	2.0
Ethylbenzene	0.20	U		0.16	1.0
Ethylene Dibromide	0.40	U		0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6
Client Matrix: Water

Date Sampled: 10/21/2014 1235
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1217.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1121			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1121				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	104		81 - 118
4-Bromofluorobenzene (Surr)	95		85 - 114
Dibromofluoromethane (Surr)	104		80 - 119
Toluene-d8 (Surr)	93		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7
Client Matrix: Water

Date Sampled: 10/21/2014 1220
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1218.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1141			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1141				

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U		0.17	1.0
1,1,1-Trichloroethane	0.20	U		0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U		0.20	1.0
1,1,2-Trichloroethane	0.40	U		0.32	1.0
1,1-Dichloroethane	0.46	J		0.16	1.0
1,1-Dichloroethene	0.40	U		0.14	1.0
1,1-Dichloropropene	0.40	U		0.15	1.0
1,2,3-Trichlorobenzene	0.40	U		0.18	1.0
1,2,3-Trichloropropane	0.80	U		0.77	3.0
1,2,4-Trichlorobenzene	0.80	U		0.32	1.0
1,2,4-Trimethylbenzene	0.20	U		0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U		0.81	5.0
1,2-Dichlorobenzene	0.20	U		0.13	1.0
1,2-Dichloroethane	0.40	U		0.13	1.0
1,2-Dichloropropane	0.40	U		0.13	1.0
1,3,5-Trimethylbenzene	0.40	U		0.14	1.0
1,3-Dichlorobenzene	0.20	U		0.16	1.0
1,3-Dichloropropane	0.40	U		0.15	1.0
1,4-Dichlorobenzene	0.40	U		0.16	1.0
2,2-Dichloropropane	0.40	U		0.20	1.0
2-Butanone (MEK)	3.2	U		1.8	6.0
2-Chlorotoluene	0.40	U		0.17	1.0
2-Hexanone	3.2	U		1.4	5.0
4-Chlorotoluene	0.40	U		0.17	1.0
4-Isopropyltoluene	0.40	U		0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U		1.0	5.0
Acetone	3.7	J	B	1.9	10
Benzene	0.20	U		0.16	1.0
Bromobenzene	0.20	U		0.17	1.0
Bromochloromethane	0.40	U		0.10	1.0
Bromodichloromethane	0.20	U		0.17	1.0
Bromoform	0.40	U		0.19	1.0
Bromomethane	0.40	U		0.21	2.0
Carbon disulfide	0.80	U		0.45	2.0
Carbon tetrachloride	0.40	U		0.19	2.0
Chlorobenzene	0.20	U		0.17	1.0
Chloroethane	1.6	U		0.41	2.0
Chloroform	0.20	U		0.16	1.0
Chloromethane	0.80	U		0.30	2.0
cis-1,2-Dichloroethene	0.20	U		0.15	1.0
cis-1,3-Dichloropropene	0.20	U		0.16	1.0
Dibromochloromethane	0.40	U		0.17	1.0
Dibromomethane	0.40	U		0.17	1.0
Dichlorodifluoromethane	0.80	U		0.31	2.0
Ethylbenzene	0.20	U		0.16	1.0
Ethylene Dibromide	0.40	U		0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7
Client Matrix: Water

Date Sampled: 10/21/2014 1220
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1218.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1141			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1141				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.27	J	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		81 - 118
4-Bromofluorobenzene (Surr)	92		85 - 114
Dibromofluoromethane (Surr)	103		80 - 119
Toluene-d8 (Surr)	95		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8
Client Matrix: Water

Date Sampled: 10/21/2014 1400
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1219.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1201			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1201				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.17	J	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	0.48	J	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	6.5	J B	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.16	J	0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8
Client Matrix: Water

Date Sampled: 10/21/2014 1400
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1219.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1201			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1201				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.28	J	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	107		81 - 118
4-Bromofluorobenzene (Surr)	97		85 - 114
Dibromofluoromethane (Surr)	106		80 - 119
Toluene-d8 (Surr)	94		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **TRIP BLANK 102114**

Lab Sample ID: 280-61566-9TB
Client Matrix: Water

Date Sampled: 10/20/2014 1432
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1220.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1221			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1221				

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U		0.17	1.0
1,1,1-Trichloroethane	0.20	U		0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U		0.20	1.0
1,1,2-Trichloroethane	0.40	U		0.32	1.0
1,1-Dichloroethane	0.40	U		0.16	1.0
1,1-Dichloroethene	0.40	U		0.14	1.0
1,1-Dichloropropene	0.40	U		0.15	1.0
1,2,3-Trichlorobenzene	0.40	U		0.18	1.0
1,2,3-Trichloropropane	0.80	U		0.77	3.0
1,2,4-Trichlorobenzene	0.80	U		0.32	1.0
1,2,4-Trimethylbenzene	0.20	U		0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U		0.81	5.0
1,2-Dichlorobenzene	0.20	U		0.13	1.0
1,2-Dichloroethane	0.40	U		0.13	1.0
1,2-Dichloropropane	0.40	U		0.13	1.0
1,3,5-Trimethylbenzene	0.40	U		0.14	1.0
1,3-Dichlorobenzene	0.20	U		0.16	1.0
1,3-Dichloropropane	0.40	U		0.15	1.0
1,4-Dichlorobenzene	0.40	U		0.16	1.0
2,2-Dichloropropane	0.40	U		0.20	1.0
2-Butanone (MEK)	3.2	U		1.8	6.0
2-Chlorotoluene	0.40	U		0.17	1.0
2-Hexanone	3.2	U		1.4	5.0
4-Chlorotoluene	0.40	U		0.17	1.0
4-Isopropyltoluene	0.40	U		0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U		1.0	5.0
Acetone	3.8	J	B	1.9	10
Benzene	0.20	U		0.16	1.0
Bromobenzene	0.20	U		0.17	1.0
Bromochloromethane	0.40	U		0.10	1.0
Bromodichloromethane	0.20	U		0.17	1.0
Bromoform	0.40	U		0.19	1.0
Bromomethane	0.40	U		0.21	2.0
Carbon disulfide	0.80	U		0.45	2.0
Carbon tetrachloride	0.40	U		0.19	2.0
Chlorobenzene	0.20	U		0.17	1.0
Chloroethane	1.6	U		0.41	2.0
Chloroform	0.20	U		0.16	1.0
Chloromethane	0.80	U		0.30	2.0
cis-1,2-Dichloroethene	0.20	U		0.15	1.0
cis-1,3-Dichloropropene	0.20	U		0.16	1.0
Dibromochloromethane	0.40	U		0.17	1.0
Dibromomethane	0.40	U		0.17	1.0
Dichlorodifluoromethane	0.80	U		0.31	2.0
Ethylbenzene	0.20	U		0.16	1.0
Ethylene Dibromide	0.40	U		0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **TRIP BLANK 102114**

Lab Sample ID: 280-61566-9TB
Client Matrix: Water

Date Sampled: 10/20/2014 1432
Date Received: 10/22/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-249707	Instrument ID:	VMS_Q
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	Q1220.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	10/27/2014 1221			Final Weight/Volume:	20 mL
Prep Date:	10/27/2014 1221				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	105		81 - 118
4-Bromofluorobenzene (Surr)	96		85 - 114
Dibromofluoromethane (Surr)	104		80 - 119
Toluene-d8 (Surr)	94		89 - 112

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2
Client Matrix: Water

Date Sampled: 10/20/2014 1647
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15015.D
Dilution:	1.0			Initial Weight/Volume:	1056.7 mL
Analysis Date:	11/11/2014 1804			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.95	U	0.26	9.5
1,2-Dichlorobenzene	0.95	U	0.22	9.5
1,2-Diphenylhydrazine	0.95	U	0.22	9.5
1,3-Dichlorobenzene	0.95	U	0.28	9.5
1,4-Dichlorobenzene	0.95	U	0.30	9.5
2,2'-oxybis[1-chloropropane]	0.95	U	0.26	9.5
2,4,5-Trichlorophenol	0.95	U	0.43	19
2,4,6-Trichlorophenol	0.95	U	0.27	19
2,4-Dichlorophenol	1.9	U	0.61	9.5
2,4-Dimethylphenol	3.8	U	0.55	9.5
2,4-Dinitrophenol	19	U	9.5	76
2,4-Dinitrotoluene	3.8	U	1.6	19
2,6-Dinitrotoluene	3.8	U	1.8	19
2-Chloronaphthalene	0.95	U	0.25	9.5
2-Chlorophenol	3.8	U	1.9	9.5
2-Methylnaphthalene	0.95	U	0.27	9.5
2-Methylphenol	3.8	U	0.93	9.5
2-Nitroaniline	3.8	U	1.6	47
2-Nitrophenol	0.95	U	0.37	19
3 & 4 Methylphenol	0.95	U	0.24	19
3,3'-Dichlorobenzidine	9.5	U	1.9	47
3-Nitroaniline	1.9	U	1.9	47
4,6-Dinitro-2-methylphenol	9.5	U	3.8	76
4-Bromophenyl phenyl ether	0.95	U	0.41	9.5
4-Chloro-3-methylphenol	4.7	U	2.3	19
4-Chloroaniline	4.7	U	2.0	24
4-Chlorophenyl phenyl ether	3.8	U	1.6	9.5
4-Nitroaniline	3.8	U	1.9	47
4-Nitrophenol	9.5	U	1.2	47
Acenaphthene	0.95	U	0.26	9.5
Acenaphthylene	0.95	U	0.46	9.5
Anthracene	0.95	U	0.40	9.5
Benzidine	95	U	47	190
Benzo[a]anthracene	0.95	U	0.33	9.5
Benzo[a]pyrene	0.95	U	0.29	9.5
Benzo[b]fluoranthene	0.95	U	0.50	9.5
Benzo[g,h,i]perylene	0.95	U	0.47	9.5
Benzo[k]fluoranthene	0.95	U	0.44	9.5
Benzoic acid	47	U	9.5	76
Benzyl alcohol	0.95	U	0.22	24
Bis(2-chloroethoxy)methane	3.8	U	0.92	9.5
Bis(2-chloroethyl)ether	0.95	U	0.39	19
Bis(2-ethylhexyl) phthalate	0.95	U	0.53	9.5
Butyl benzyl phthalate	3.8	U	0.95	19
Carbazole	0.95	U	0.41	9.5
Chrysene	0.95	U	0.51	9.5

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2
Client Matrix: Water

Date Sampled: 10/20/2014 1647
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15015.D
Dilution:	1.0			Initial Weight/Volume:	1056.7 mL
Analysis Date:	11/11/2014 1804			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.95	U	0.48	9.5
Dibenzofuran	0.95	U	0.27	9.5
Diethyl phthalate	0.95	U	0.36	19
Dimethyl phthalate	0.95	U	0.20	19
Di-n-butyl phthalate	3.8	U	1.1	19
Di-n-octyl phthalate	0.95	U	0.33	19
Fluoranthene	0.95	U	0.19	19
Fluorene	0.95	U	0.29	9.5
Hexachlorobenzene	0.95	U	0.62	9.5
Hexachlorobutadiene	9.5	U	3.1	28
Hexachloroethane	3.8	U	2.0	9.5
Indeno[1,2,3-cd]pyrene	0.95	U	0.62	9.5
Isophorone	0.95	U	0.20	9.5
Naphthalene	0.95	U	0.27	9.5
Nitrobenzene	1.9	U	0.77	19
N-Nitrosodimethylamine	0.95	U	0.27	9.5
N-Nitrosodi-n-propylamine	0.95	U	0.33	19
N-Nitrosodiphenylamine	0.95	U	0.42	9.5
Pentachlorophenol	38	U	19	76
Phenanthrene	0.95	U	0.25	9.5
Phenol	4.7	U	1.9	9.5
Pyrene	0.95	U	0.35	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	72		43 - 140
2-Fluorobiphenyl	64		44 - 119
2-Fluorophenol (Surr)	66		19 - 119
Nitrobenzene-d5 (Surr)	65		44 - 120
Phenol-d5 (Surr)	68		10 - 115
Terphenyl-d14 (Surr)	77		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3
Client Matrix: Water

Date Sampled: 10/20/2014 1653
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15016.D
Dilution:	1.0			Initial Weight/Volume:	1040.5 mL
Analysis Date:	11/11/2014 1831			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.96	U	0.27	9.6
1,2-Dichlorobenzene	0.96	U	0.22	9.6
1,2-Diphenylhydrazine	0.96	U	0.22	9.6
1,3-Dichlorobenzene	0.96	U	0.29	9.6
1,4-Dichlorobenzene	0.96	U	0.31	9.6
2,2'-oxybis[1-chloropropane]	0.96	U	0.27	9.6
2,4,5-Trichlorophenol	0.96	U	0.43	19
2,4,6-Trichlorophenol	0.96	U	0.28	19
2,4-Dichlorophenol	1.9	U	0.62	9.6
2,4-Dimethylphenol	3.8	U	0.56	9.6
2,4-Dinitrophenol	19	U	9.6	77
2,4-Dinitrotoluene	3.8	U	1.6	19
2,6-Dinitrotoluene	3.8	U	1.8	19
2-Chloronaphthalene	0.96	U	0.25	9.6
2-Chlorophenol	3.8	U	1.9	9.6
2-Methylnaphthalene	0.96	U	0.28	9.6
2-Methylphenol	3.8	U	0.94	9.6
2-Nitroaniline	3.8	U	1.7	48
2-Nitrophenol	0.96	U	0.37	19
3 & 4 Methylphenol	0.96	U	0.24	19
3,3'-Dichlorobenzidine	9.6	U	1.9	48
3-Nitroaniline	1.9	U	1.9	48
4,6-Dinitro-2-methylphenol	9.6	U	3.8	77
4-Bromophenyl phenyl ether	0.96	U	0.41	9.6
4-Chloro-3-methylphenol	4.8	U	2.3	19
4-Chloroaniline	4.8	U	2.1	24
4-Chlorophenyl phenyl ether	3.8	U	1.6	9.6
4-Nitroaniline	3.8	U	1.9	48
4-Nitrophenol	9.6	U	1.2	48
Acenaphthene	0.96	U	0.27	9.6
Acenaphthylene	0.96	U	0.47	9.6
Anthracene	0.96	U	0.40	9.6
Benzidine	96	U	48	190
Benzo[a]anthracene	0.96	U	0.34	9.6
Benzo[a]pyrene	0.96	U	0.30	9.6
Benzo[b]fluoranthene	0.96	U	0.51	9.6
Benzo[g,h,i]perylene	0.96	U	0.48	9.6
Benzo[k]fluoranthene	0.96	U	0.44	9.6
Benzoic acid	48	U	9.6	77
Benzyl alcohol	0.96	U	0.22	24
Bis(2-chloroethoxy)methane	3.8	U	0.93	9.6
Bis(2-chloroethyl)ether	0.96	U	0.39	19
Bis(2-ethylhexyl) phthalate	0.96	U	0.54	9.6
Butyl benzyl phthalate	3.8	U	0.96	19
Carbazole	0.96	U	0.41	9.6
Chrysene	0.96	U	0.52	9.6

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3
Client Matrix: Water

Date Sampled: 10/20/2014 1653
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15016.D
Dilution:	1.0			Initial Weight/Volume:	1040.5 mL
Analysis Date:	11/11/2014 1831			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.96	U	0.49	9.6
Dibenzofuran	0.96	U	0.28	9.6
Diethyl phthalate	0.96	U	0.37	19
Dimethyl phthalate	0.96	U	0.20	19
Di-n-butyl phthalate	3.8	U	1.1	19
Di-n-octyl phthalate	0.96	U	0.34	19
Fluoranthene	0.96	U	0.19	19
Fluorene	0.96	U	0.30	9.6
Hexachlorobenzene	0.96	U	0.63	9.6
Hexachlorobutadiene	9.6	U	3.2	29
Hexachloroethane	3.8	U	2.0	9.6
Indeno[1,2,3-cd]pyrene	0.96	U	0.62	9.6
Isophorone	0.96	U	0.20	9.6
Naphthalene	0.96	U	0.28	9.6
Nitrobenzene	1.9	U	0.78	19
N-Nitrosodimethylamine	0.96	U	0.28	9.6
N-Nitrosodi-n-propylamine	0.96	U	0.34	19
N-Nitrosodiphenylamine	0.96	U	0.42	9.6
Pentachlorophenol	38	U	19	77
Phenanthrene	0.96	U	0.25	9.6
Phenol	4.8	U	1.9	9.6
Pyrene	0.96	U	0.36	9.6

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	53		43 - 140
2-Fluorobiphenyl	64		44 - 119
2-Fluorophenol (Surr)	44		19 - 119
Nitrobenzene-d5 (Surr)	63		44 - 120
Phenol-d5 (Surr)	44		10 - 115
Terphenyl-d14 (Surr)	55		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4
Client Matrix: Water

Date Sampled: 10/21/2014 1000
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15017.D
Dilution:	1.0			Initial Weight/Volume:	1053.2 mL
Analysis Date:	11/11/2014 1858			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.95	U	0.27	9.5
1,2-Dichlorobenzene	0.95	U	0.22	9.5
1,2-Diphenylhydrazine	0.95	U	0.22	9.5
1,3-Dichlorobenzene	0.95	U	0.28	9.5
1,4-Dichlorobenzene	0.95	U	0.30	9.5
2,2'-oxybis[1-chloropropane]	0.95	U	0.27	9.5
2,4,5-Trichlorophenol	0.95	U	0.43	19
2,4,6-Trichlorophenol	0.95	U	0.28	19
2,4-Dichlorophenol	0.82	J	0.61	9.5
2,4-Dimethylphenol	3.8	U	0.55	9.5
2,4-Dinitrophenol	19	U	9.5	76
2,4-Dinitrotoluene	3.8	U	1.6	19
2,6-Dinitrotoluene	3.8	U	1.8	19
2-Chloronaphthalene	0.95	U	0.25	9.5
2-Chlorophenol	3.8	U	1.9	9.5
2-Methylnaphthalene	0.95	U	0.28	9.5
2-Methylphenol	3.8	U	0.93	9.5
2-Nitroaniline	3.8	U	1.6	47
2-Nitrophenol	0.95	U	0.37	19
3 & 4 Methylphenol	0.95	U	0.24	19
3,3'-Dichlorobenzidine	9.5	U	1.9	47
3-Nitroaniline	1.9	U	1.9	47
4,6-Dinitro-2-methylphenol	9.5	U	3.8	76
4-Bromophenyl phenyl ether	0.95	U	0.41	9.5
4-Chloro-3-methylphenol	4.7	U	2.3	19
4-Chloroaniline	4.7	U	2.0	24
4-Chlorophenyl phenyl ether	3.8	U	1.6	9.5
4-Nitroaniline	3.8	U	1.9	47
4-Nitrophenol	9.5	U	1.2	47
Acenaphthene	0.95	U	0.27	9.5
Acenaphthylene	0.95	U	0.47	9.5
Anthracene	0.95	U	0.40	9.5
Benzidine	95	U	47	190
Benzo[a]anthracene	0.95	U	0.33	9.5
Benzo[a]pyrene	0.95	U	0.29	9.5
Benzo[b]fluoranthene	0.95	U	0.50	9.5
Benzo[g,h,i]perylene	0.95	U	0.47	9.5
Benzo[k]fluoranthene	0.95	U	0.44	9.5
Benzoic acid	47	U	9.5	76
Benzyl alcohol	0.95	U	0.22	24
Bis(2-chloroethoxy)methane	3.8	U	0.92	9.5
Bis(2-chloroethyl)ether	0.95	U	0.39	19
Bis(2-ethylhexyl) phthalate	0.95	U	0.53	9.5
Butyl benzyl phthalate	3.8	U	0.95	19
Carbazole	0.95	U	0.41	9.5
Chrysene	0.95	U	0.51	9.5

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4
Client Matrix: Water

Date Sampled: 10/21/2014 1000
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15017.D
Dilution:	1.0			Initial Weight/Volume:	1053.2 mL
Analysis Date:	11/11/2014 1858			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.95	U	0.48	9.5
Dibenzofuran	0.95	U	0.28	9.5
Diethyl phthalate	0.95	U	0.36	19
Dimethyl phthalate	0.95	U	0.20	19
Di-n-butyl phthalate	3.8	U	1.1	19
Di-n-octyl phthalate	0.95	U	0.33	19
Fluoranthene	0.95	U	0.19	19
Fluorene	0.95	U	0.29	9.5
Hexachlorobenzene	0.95	U	0.63	9.5
Hexachlorobutadiene	9.5	U	3.1	28
Hexachloroethane	3.8	U	2.0	9.5
Indeno[1,2,3-cd]pyrene	0.95	U	0.62	9.5
Isophorone	0.95	U	0.20	9.5
Naphthalene	0.95	U	0.28	9.5
Nitrobenzene	1.9	U	0.77	19
N-Nitrosodimethylamine	0.95	U	0.28	9.5
N-Nitrosodi-n-propylamine	0.95	U	0.33	19
N-Nitrosodiphenylamine	0.95	U	0.42	9.5
Pentachlorophenol	38	U	19	76
Phenanthrene	0.95	U	0.25	9.5
Phenol	4.7	U	1.9	9.5
Pyrene	0.95	U	0.35	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	75		43 - 140
2-Fluorobiphenyl	70		44 - 119
2-Fluorophenol (Surr)	70		19 - 119
Nitrobenzene-d5 (Surr)	70		44 - 120
Phenol-d5 (Surr)	71		10 - 115
Terphenyl-d14 (Surr)	72		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5
Client Matrix: Water

Date Sampled: 10/21/2014 0945
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15018.D
Dilution:	1.0			Initial Weight/Volume:	861.7 mL
Analysis Date:	11/11/2014 1926			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	1.2	U	0.32	12
1,2-Dichlorobenzene	1.2	U	0.27	12
1,2-Diphenylhydrazine	1.2	U	0.27	12
1,3-Dichlorobenzene	1.2	U	0.35	12
1,4-Dichlorobenzene	1.2	U	0.37	12
2,2'-oxybis[1-chloropropane]	1.2	U	0.32	12
2,4,5-Trichlorophenol	1.2	U	0.52	23
2,4,6-Trichlorophenol	1.2	U	0.34	23
2,4-Dichlorophenol	2.3	U	0.74	12
2,4-Dimethylphenol	4.6	U	0.67	12
2,4-Dinitrophenol	23	U	12	93
2,4-Dinitrotoluene	4.6	U	1.9	23
2,6-Dinitrotoluene	4.6	U	2.2	23
2-Chloronaphthalene	1.2	U	0.30	12
2-Chlorophenol	4.6	U	2.3	12
2-Methylnaphthalene	1.2	U	0.34	12
2-Methylphenol	4.6	U	1.1	12
2-Nitroaniline	4.6	U	2.0	58
2-Nitrophenol	1.2	U	0.45	23
3 & 4 Methylphenol	1.2	U	0.29	23
3,3'-Dichlorobenzidine	12	U	2.3	58
3-Nitroaniline	2.3	U	2.3	58
4,6-Dinitro-2-methylphenol	12	U	4.6	93
4-Bromophenyl phenyl ether	1.2	U	0.50	12
4-Chloro-3-methylphenol	5.8	U	2.8	23
4-Chloroaniline	5.8	U	2.5	29
4-Chlorophenyl phenyl ether	4.6	U	1.9	12
4-Nitroaniline	4.6	U	2.3	58
4-Nitrophenol	12	U	1.4	58
Acenaphthene	1.2	U	0.32	12
Acenaphthylene	1.2	U	0.57	12
Anthracene	1.2	U	0.49	12
Benzidine	120	U	58	230
Benzo[a]anthracene	1.2	U	0.41	12
Benzo[a]pyrene	1.2	U	0.36	12
Benzo[b]fluoranthene	1.2	U	0.62	12
Benzo[g,h,i]perylene	1.2	U	0.58	12
Benzo[k]fluoranthene	1.2	U	0.53	12
Benzoic acid	58	U	12	93
Benzyl alcohol	1.2	U	0.27	29
Bis(2-chloroethoxy)methane	4.6	U	1.1	12
Bis(2-chloroethyl)ether	1.2	U	0.48	23
Bis(2-ethylhexyl) phthalate	1.2	U	0.65	12
Butyl benzyl phthalate	4.6	U	1.2	23
Carbazole	1.2	U	0.50	12
Chrysene	1.2	U	0.63	12

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5
Client Matrix: Water

Date Sampled: 10/21/2014 0945
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15018.D
Dilution:	1.0			Initial Weight/Volume:	861.7 mL
Analysis Date:	11/11/2014 1926			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	1.2	U	0.59	12
Dibenzofuran	1.2	U	0.34	12
Diethyl phthalate	1.2	U	0.44	23
Dimethyl phthalate	1.2	U	0.24	23
Di-n-butyl phthalate	4.6	U	1.3	23
Di-n-octyl phthalate	1.2	U	0.41	23
Fluoranthene	1.2	U	0.23	23
Fluorene	1.2	U	0.36	12
Hexachlorobenzene	1.2	U	0.77	12
Hexachlorobutadiene	12	U	3.8	35
Hexachloroethane	4.6	U	2.4	12
Indeno[1,2,3-cd]pyrene	1.2	U	0.75	12
Isophorone	1.2	U	0.24	12
Naphthalene	1.2	U	0.34	12
Nitrobenzene	2.3	U	0.94	23
N-Nitrosodimethylamine	1.2	U	0.34	12
N-Nitrosodi-n-propylamine	1.2	U	0.41	23
N-Nitrosodiphenylamine	1.2	U	0.51	12
Pentachlorophenol	46	U	23	93
Phenanthrene	1.2	U	0.30	12
Phenol	5.8	U	2.3	12
Pyrene	1.2	U	0.43	12

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	78		43 - 140
2-Fluorobiphenyl	71		44 - 119
2-Fluorophenol (Surr)	71		19 - 119
Nitrobenzene-d5 (Surr)	70		44 - 120
Phenol-d5 (Surr)	73		10 - 115
Terphenyl-d14 (Surr)	79		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6
Client Matrix: Water

Date Sampled: 10/21/2014 1235
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15019.D
Dilution:	1.0			Initial Weight/Volume:	1051.8 mL
Analysis Date:	11/11/2014 1953			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.95	U	0.27	9.5
1,2-Dichlorobenzene	0.95	U	0.22	9.5
1,2-Diphenylhydrazine	0.95	U	0.22	9.5
1,3-Dichlorobenzene	0.95	U	0.29	9.5
1,4-Dichlorobenzene	0.95	U	0.30	9.5
2,2'-oxybis[1-chloropropane]	0.95	U	0.27	9.5
2,4,5-Trichlorophenol	0.95	U	0.43	19
2,4,6-Trichlorophenol	0.95	U	0.28	19
2,4-Dichlorophenol	1.9	U	0.61	9.5
2,4-Dimethylphenol	3.8	U	0.55	9.5
2,4-Dinitrophenol	19	U	9.5	76
2,4-Dinitrotoluene	3.8	U	1.6	19
2,6-Dinitrotoluene	3.8	U	1.8	19
2-Chloronaphthalene	0.95	U	0.25	9.5
2-Chlorophenol	3.8	U	1.9	9.5
2-Methylnaphthalene	0.95	U	0.28	9.5
2-Methylphenol	3.8	U	0.93	9.5
2-Nitroaniline	3.8	U	1.6	48
2-Nitrophenol	0.95	U	0.37	19
3 & 4 Methylphenol	0.95	U	0.24	19
3,3'-Dichlorobenzidine	9.5	U	1.9	48
3-Nitroaniline	1.9	U	1.9	48
4,6-Dinitro-2-methylphenol	9.5	U	3.8	76
4-Bromophenyl phenyl ether	0.95	U	0.41	9.5
4-Chloro-3-methylphenol	4.8	U	2.3	19
4-Chloroaniline	4.8	U	2.0	24
4-Chlorophenyl phenyl ether	3.8	U	1.6	9.5
4-Nitroaniline	3.8	U	1.9	48
4-Nitrophenol	9.5	U	1.2	48
Acenaphthene	0.95	U	0.27	9.5
Acenaphthylene	0.95	U	0.47	9.5
Anthracene	0.95	U	0.40	9.5
Benzidine	95	U	48	190
Benzo[a]anthracene	0.95	U	0.33	9.5
Benzo[a]pyrene	0.95	U	0.29	9.5
Benzo[b]fluoranthene	0.95	U	0.50	9.5
Benzo[g,h,i]perylene	0.95	U	0.48	9.5
Benzo[k]fluoranthene	0.95	U	0.44	9.5
Benzoic acid	48	U	9.5	76
Benzyl alcohol	0.95	U	0.22	24
Bis(2-chloroethoxy)methane	3.8	U	0.92	9.5
Bis(2-chloroethyl)ether	0.95	U	0.39	19
Bis(2-ethylhexyl) phthalate	0.95	U	0.53	9.5
Butyl benzyl phthalate	3.8	U	0.95	19
Carbazole	0.95	U	0.41	9.5
Chrysene	0.95	U	0.51	9.5

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6
Client Matrix: Water

Date Sampled: 10/21/2014 1235
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15019.D
Dilution:	1.0			Initial Weight/Volume:	1051.8 mL
Analysis Date:	11/11/2014 1953			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.95	U	0.48	9.5
Dibenzofuran	0.95	U	0.28	9.5
Diethyl phthalate	0.95	U	0.36	19
Dimethyl phthalate	0.95	U	0.20	19
Di-n-butyl phthalate	3.8	U	1.1	19
Di-n-octyl phthalate	0.95	U	0.33	19
Fluoranthene	0.95	U	0.19	19
Fluorene	0.95	U	0.29	9.5
Hexachlorobenzene	0.95	U	0.63	9.5
Hexachlorobutadiene	9.5	U	3.1	29
Hexachloroethane	3.8	U	2.0	9.5
Indeno[1,2,3-cd]pyrene	0.95	U	0.62	9.5
Isophorone	0.95	U	0.20	9.5
Naphthalene	0.95	U	0.28	9.5
Nitrobenzene	1.9	U	0.77	19
N-Nitrosodimethylamine	0.95	U	0.28	9.5
N-Nitrosodi-n-propylamine	0.95	U	0.33	19
N-Nitrosodiphenylamine	0.95	U	0.42	9.5
Pentachlorophenol	38	U	19	76
Phenanthrene	0.95	U	0.25	9.5
Phenol	4.8	U	1.9	9.5
Pyrene	0.95	U	0.35	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	78		43 - 140
2-Fluorobiphenyl	77		44 - 119
2-Fluorophenol (Surr)	79		19 - 119
Nitrobenzene-d5 (Surr)	77		44 - 120
Phenol-d5 (Surr)	79		10 - 115
Terphenyl-d14 (Surr)	83		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7
Client Matrix: Water

Date Sampled: 10/21/2014 1220
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15020.D
Dilution:	1.0			Initial Weight/Volume:	1056.3 mL
Analysis Date:	11/11/2014 2020			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.95	U	0.27	9.5
1,2-Dichlorobenzene	0.95	U	0.22	9.5
1,2-Diphenylhydrazine	0.95	U	0.22	9.5
1,3-Dichlorobenzene	0.95	U	0.28	9.5
1,4-Dichlorobenzene	0.95	U	0.30	9.5
2,2'-oxybis[1-chloropropane]	0.95	U	0.27	9.5
2,4,5-Trichlorophenol	0.95	U	0.43	19
2,4,6-Trichlorophenol	0.95	U	0.27	19
2,4-Dichlorophenol	0.78	J	0.61	9.5
2,4-Dimethylphenol	3.8	U	0.55	9.5
2,4-Dinitrophenol	19	U	9.5	76
2,4-Dinitrotoluene	3.4	J	1.6	19
2,6-Dinitrotoluene	3.8	U	1.8	19
2-Chloronaphthalene	0.95	U	0.25	9.5
2-Chlorophenol	3.8	U	1.9	9.5
2-Methylnaphthalene	0.95	U	0.27	9.5
2-Methylphenol	3.8	U	0.93	9.5
2-Nitroaniline	3.8	U	1.6	47
2-Nitrophenol	0.95	U	0.37	19
3 & 4 Methylphenol	0.95	U	0.24	19
3,3'-Dichlorobenzidine	9.5	U	1.9	47
3-Nitroaniline	1.9	U	1.9	47
4,6-Dinitro-2-methylphenol	9.5	U	3.8	76
4-Bromophenyl phenyl ether	0.95	U	0.41	9.5
4-Chloro-3-methylphenol	4.7	U	2.3	19
4-Chloroaniline	4.7	U	2.0	24
4-Chlorophenyl phenyl ether	3.8	U	1.6	9.5
4-Nitroaniline	3.8	U	1.9	47
4-Nitrophenol	9.5	U	1.2	47
Acenaphthene	0.95	U	0.27	9.5
Acenaphthylene	0.95	U	0.46	9.5
Anthracene	0.95	U	0.40	9.5
Benzidine	95	U	47	190
Benzo[a]anthracene	0.95	U	0.33	9.5
Benzo[a]pyrene	0.95	U	0.29	9.5
Benzo[b]fluoranthene	0.95	U	0.50	9.5
Benzo[g,h,i]perylene	0.95	U	0.47	9.5
Benzo[k]fluoranthene	0.95	U	0.44	9.5
Benzoic acid	47	U	9.5	76
Benzyl alcohol	0.95	U	0.22	24
Bis(2-chloroethoxy)methane	3.8	U	0.92	9.5
Bis(2-chloroethyl)ether	0.95	U	0.39	19
Bis(2-ethylhexyl) phthalate	0.95	U	0.53	9.5
Butyl benzyl phthalate	3.8	U	0.95	19
Carbazole	0.95	U	0.41	9.5
Chrysene	0.95	U	0.51	9.5

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7
Client Matrix: Water

Date Sampled: 10/21/2014 1220
Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15020.D
Dilution:	1.0			Initial Weight/Volume:	1056.3 mL
Analysis Date:	11/11/2014 2020			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.95	U	0.48	9.5
Dibenzofuran	0.95	U	0.27	9.5
Diethyl phthalate	0.95	U	0.36	19
Dimethyl phthalate	0.95	U	0.20	19
Di-n-butyl phthalate	3.8	U	1.1	19
Di-n-octyl phthalate	0.95	U	0.33	19
Fluoranthene	0.95	U	0.19	19
Fluorene	0.95	U	0.29	9.5
Hexachlorobenzene	0.95	U	0.62	9.5
Hexachlorobutadiene	9.5	U	3.1	28
Hexachloroethane	3.8	U	2.0	9.5
Indeno[1,2,3-cd]pyrene	0.95	U	0.62	9.5
Isophorone	0.95	U	0.20	9.5
Naphthalene	0.95	U	0.27	9.5
Nitrobenzene	1.9	U	0.77	19
N-Nitrosodimethylamine	0.95	U	0.27	9.5
N-Nitrosodi-n-propylamine	0.95	U	0.33	19
N-Nitrosodiphenylamine	0.95	U	0.42	9.5
Pentachlorophenol	38	U	19	76
Phenanthrene	0.95	U	0.25	9.5
Phenol	4.7	U	1.9	9.5
Pyrene	0.95	U	0.35	9.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	85		43 - 140
2-Fluorobiphenyl	80		44 - 119
2-Fluorophenol (Surr)	87		19 - 119
Nitrobenzene-d5 (Surr)	84		44 - 120
Phenol-d5 (Surr)	88		10 - 115
Terphenyl-d14 (Surr)	85		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15021.D
Dilution:	1.0			Initial Weight/Volume:	1026.2 mL
Analysis Date:	11/11/2014 2048			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,2,4-Trichlorobenzene	0.97	U	0.27	9.7
1,2-Dichlorobenzene	0.97	U	0.22	9.7
1,2-Diphenylhydrazine	0.97	U	0.22	9.7
1,3-Dichlorobenzene	0.97	U	0.29	9.7
1,4-Dichlorobenzene	0.97	U	0.31	9.7
2,2'-oxybis[1-chloropropane]	0.97	U	0.27	9.7
2,4,5-Trichlorophenol	0.97	U	0.44	19
2,4,6-Trichlorophenol	0.97	U	0.28	19
2,4-Dichlorophenol	0.66	J	0.62	9.7
2,4-Dimethylphenol	3.9	U	0.57	9.7
2,4-Dinitrophenol	19	U	9.7	78
2,4-Dinitrotoluene	2.9	J	1.6	19
2,6-Dinitrotoluene	3.9	U	1.8	19
2-Chloronaphthalene	0.97	U	0.25	9.7
2-Chlorophenol	3.9	U	1.9	9.7
2-Methylnaphthalene	0.97	U	0.28	9.7
2-Methylphenol	3.9	U	0.95	9.7
2-Nitroaniline	3.9	U	1.7	49
2-Nitrophenol	0.97	U	0.38	19
3 & 4 Methylphenol	0.97	U	0.24	19
3,3'-Dichlorobenzidine	9.7	U	1.9	49
3-Nitroaniline	1.9	U	1.9	49
4,6-Dinitro-2-methylphenol	9.7	U	3.9	78
4-Bromophenyl phenyl ether	0.97	U	0.42	9.7
4-Chloro-3-methylphenol	4.9	U	2.3	19
4-Chloroaniline	4.9	U	2.1	24
4-Chlorophenyl phenyl ether	3.9	U	1.6	9.7
4-Nitroaniline	3.9	U	1.9	49
4-Nitrophenol	9.7	U	1.2	49
Acenaphthene	0.97	U	0.27	9.7
Acenaphthylene	0.97	U	0.48	9.7
Anthracene	0.97	U	0.41	9.7
Benzidine	97	U	49	190
Benzo[a]anthracene	0.97	U	0.34	9.7
Benzo[a]pyrene	0.97	U	0.30	9.7
Benzo[b]fluoranthene	0.97	U	0.52	9.7
Benzo[g,h,i]perylene	0.97	U	0.49	9.7
Benzo[k]fluoranthene	0.97	U	0.45	9.7
Benzoic acid	49	U	9.7	78
Benzyl alcohol	0.97	U	0.22	24
Bis(2-chloroethoxy)methane	3.9	U	0.95	9.7
Bis(2-chloroethyl)ether	0.97	U	0.40	19
Bis(2-ethylhexyl) phthalate	0.97	U	0.55	9.7
Butyl benzyl phthalate	3.9	U	0.97	19
Carbazole	0.97	U	0.42	9.7
Chrysene	0.97	U	0.53	9.7

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-249895	Lab File ID:	G6_15021.D
Dilution:	1.0			Initial Weight/Volume:	1026.2 mL
Analysis Date:	11/11/2014 2048			Final Weight/Volume:	1 mL
Prep Date:	10/27/2014 1433			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Dibenz(a,h)anthracene	0.97	U	0.50	9.7
Dibenzofuran	0.97	U	0.28	9.7
Diethyl phthalate	0.97	U	0.37	19
Dimethyl phthalate	0.97	U	0.20	19
Di-n-butyl phthalate	3.9	U	1.1	19
Di-n-octyl phthalate	0.97	U	0.34	19
Fluoranthene	0.97	U	0.19	19
Fluorene	0.97	U	0.30	9.7
Hexachlorobenzene	0.97	U	0.64	9.7
Hexachlorobutadiene	9.7	U	3.2	29
Hexachloroethane	3.9	U	2.0	9.7
Indeno[1,2,3-cd]pyrene	0.97	U	0.63	9.7
Isophorone	0.97	U	0.20	9.7
Naphthalene	0.97	U	0.28	9.7
Nitrobenzene	1.9	U	0.79	19
N-Nitrosodimethylamine	0.97	U	0.28	9.7
N-Nitrosodi-n-propylamine	0.97	U	0.34	19
N-Nitrosodiphenylamine	0.97	U	0.43	9.7
Pentachlorophenol	39	U	19	78
Phenanthrene	0.97	U	0.25	9.7
Phenol	4.9	U	1.9	9.7
Pyrene	0.97	U	0.36	9.7

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	77		43 - 140
2-Fluorobiphenyl	67		44 - 119
2-Fluorophenol (Surr)	65		19 - 119
Nitrobenzene-d5 (Surr)	65		44 - 120
Phenol-d5 (Surr)	69		10 - 115
Terphenyl-d14 (Surr)	77		50 - 134

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2
Client Matrix: Water

Date Sampled: 10/20/2014 1647
Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	498.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 1746			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	106		83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3

Client Matrix: Water

Date Sampled: 10/20/2014 1653

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	493.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 1809			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.41	U M	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.090	0.41
2,4,6-Trinitrotoluene	0.15	U	0.073	0.41
2,4-Dinitrotoluene	0.15	U	0.085	0.41
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.087	0.41
3-Nitrotoluene	0.15	U	0.085	0.41
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.41	U	0.20	1.0
HMX	0.15	U	0.089	0.41
Nitrobenzene	0.15	U	0.092	0.41
RDX	0.15	U	0.053	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4
Client Matrix: Water

Date Sampled: 10/21/2014 1000
Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	497 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 1832			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.092	0.40
RDX	0.15	U	0.053	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	102		83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5

Client Matrix: Water

Date Sampled: 10/21/2014 0945

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	500.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 1855			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.064	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.085	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	100	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6

Client Matrix: Water

Date Sampled: 10/21/2014 1235

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	503.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 1918			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,3,5-Trinitrobenzene	0.40	U		0.20	0.99
1,3-Dinitrobenzene	0.15	U		0.088	0.40
2,4,6-Trinitrotoluene	0.15	U		0.072	0.40
2,4-Dinitrotoluene	0.15	U		0.083	0.40
2,6-Dinitrotoluene	0.15	U		0.064	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q	UJ	0.050	0.20
2-Nitrotoluene	0.15	U		0.085	0.40
3-Nitrotoluene	0.15	U		0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U		0.057	0.20
4-Nitrotoluene	0.40	U		0.20	0.99
HMX	0.15	U		0.087	0.40
Nitrobenzene	0.15	U		0.090	0.40
RDX	0.15	U		0.052	0.20
Tetryl	0.15	U Q	UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7

Client Matrix: Water

Date Sampled: 10/21/2014 1220

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	509.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2004			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.20	0.98
1,3-Dinitrobenzene	0.15	U	0.087	0.39
2,4,6-Trinitrotoluene	0.15	U	0.071	0.39
2,4-Dinitrotoluene	5.7		0.082	0.39
2,6-Dinitrotoluene	0.42		0.063	0.20
2-Amino-4,6-dinitrotoluene	1.1	Q	0.050	0.20
2-Nitrotoluene	0.15	U	0.084	0.39
3-Nitrotoluene	0.15	U	0.082	0.39
4-Amino-2,6-dinitrotoluene	0.93		0.057	0.20
4-Nitrotoluene	0.39	U	0.20	0.98
HMX	0.15	U	0.086	0.39
RDX	0.15	U	0.051	0.20
Tetryl	0.15	U Q	0.078	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	423	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7

Client Matrix: Water

Date Sampled: 10/21/2014 1220

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	509.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2114			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Nitrobenzene	0.15	U	0.089	0.39

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7

Client Matrix: Water

Date Sampled: 10/21/2014 1220

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	509.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2114			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2027			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	5.6		0.084	0.40
2,6-Dinitrotoluene	0.43		0.065	0.20
2-Amino-4,6-dinitrotoluene	1.1	Q	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.83		0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	414	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2153			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Nitrobenzene	0.15	U	0.091	0.40

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2153			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		83 - 119

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2

Client Matrix: Water

Date Sampled: 10/20/2014 1647

Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2032			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Barium	0.034		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	45		0.035	1.0
Chromium	0.00084	J Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0018	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	34		0.011	0.50
Manganese	0.0011	J Q	0.00025	0.010
Nickel	0.0017	J	0.0013	0.040
Potassium	3.2		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0011	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0045			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1446			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	23		0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2
Client Matrix: Water

Date Sampled: 10/20/2014 1647
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1617			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3
Client Matrix: Water

Date Sampled: 10/20/2014 1653
Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2035			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.0049	J B	0.0044	0.025
Barium	0.059		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00066	J Q	0.00045	0.0050
Calcium	200		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0038	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	75		0.011	0.50
Manganese	1.5	J Q	0.00025	0.010
Nickel	0.040		0.0013	0.040
Potassium	17		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0014	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0047			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1448			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	120		0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3
Client Matrix: Water

Date Sampled: 10/20/2014 1653
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1620			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4
Client Matrix: Water

Date Sampled: 10/21/2014 1000
Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2037			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.0059	J B	0.0044	0.025
Barium	0.10		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	83		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0016	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	48		0.011	0.50
Manganese	0.045	Q	0.00025	0.010
Nickel	0.0015	J	0.0013	0.040
Potassium	2.1	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0933			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.36		0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1451			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	28		0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4
Client Matrix: Water

Date Sampled: 10/21/2014 1000
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1622			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5
Client Matrix: Water

Date Sampled: 10/21/2014 0945
Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2040			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Barium	0.12		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	230		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0012	J	0.0012	0.015
Copper	0.0034	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	110		0.011	0.50
Manganese	0.16	Q	0.00025	0.010
Nickel	0.0040	J	0.0013	0.040
Potassium	9.5		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0017	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	5.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0052			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.75	D	0.11	0.50

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	5.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1454			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	650	D	0.46	25

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5
Client Matrix: Water

Date Sampled: 10/21/2014 0945
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1624			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6
Client Matrix: Water

Date Sampled: 10/21/2014 1235
Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2043			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Barium	0.060		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	74		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0019	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	47		0.011	0.50
Manganese	0.035	Q	0.00025	0.010
Nickel	0.0015	J	0.0013	0.040
Potassium	2.6	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0012	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0055			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.14		0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1456			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	27		0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6

Client Matrix: Water

Date Sampled: 10/21/2014 1235

Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1627			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7

Client Matrix: Water

Date Sampled: 10/21/2014 1220

Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2046			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Barium	0.053		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	190		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0012	J	0.0012	0.015
Copper	0.0031	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	110		0.011	0.50
Manganese	0.18	Q	0.00025	0.010
Nickel	0.0067	J	0.0013	0.040
Potassium	7.7		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0017	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0107			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1459			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	330		0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7
Client Matrix: Water

Date Sampled: 10/21/2014 1220
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1634			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8
Client Matrix: Water

Date Sampled: 10/21/2014 1400
Date Received: 10/22/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251206	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110314.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/03/2014 2059			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Barium	0.051		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U Q	0.00045	0.0050
Calcium	190	J	0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0033	J Q	0.0014	0.015
Lead	0.0050	U	0.0026	0.015
Magnesium	110		0.011	0.50
Manganese	0.18	Q	0.00025	0.010
Nickel	0.0067	J	0.0013	0.040
Potassium	7.3		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0012	J	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-251407	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249621	Lab File ID:	26d110414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/05/2014 0110			Final Weight/Volume:	50 mL
Prep Date:	10/27/2014 1500				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.023	J	0.022	0.10

Analysis Method:	6010C	Analysis Batch:	280-252654	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-252023	Lab File ID:	26a111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 1528			Final Weight/Volume:	50 mL
Prep Date:	11/10/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Sodium	320	J	0.092	5.0

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61566-1

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8
Client Matrix: Water

Date Sampled: 10/21/2014 1400
Date Received: 10/22/2014 0930

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1636			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61566-1

General Chemistry

Client Sample ID: **JP-M8-GWMW330**

Lab Sample ID: 280-61566-1

Client Matrix: Water

Date Sampled: 10/20/2014 1432

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	570	D	mg/L	1.2	25	5.0	9056A

Analysis Batch: 280-251629 Analysis Date: 11/06/2014 2103

Client: MWH Americas Inc

Job Number: 280-61566-1

General Chemistry

Client Sample ID: **JP-M13-GWMW809**

Lab Sample ID: 280-61566-2

Client Matrix: Water

Date Sampled: 10/20/2014 1647

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.078 J	J H	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2015						
Sulfate	14 J	J	mg/L	0.23	5.0	1.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2118						

General Chemistry

Client Sample ID: **JP-M13-GWMW808**

Lab Sample ID: 280-61566-3

Client Matrix: Water

Date Sampled: 10/20/2014 1653

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.29 J	J H	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2127						
Sulfate	210	D	mg/L	1.2	25	5.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2220						

Client: MWH Americas Inc

Job Number: 280-61566-1

General Chemistry

Client Sample ID: **JP-M13-GWMW806**

Lab Sample ID: 280-61566-4

Client Matrix: Water

Date Sampled: 10/21/2014 1000

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.16	J	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2144						
Sulfate	68		mg/L	0.23	5.0	1.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2307						

Client: MWH Americas Inc

Job Number: 280-61566-1

General Chemistry

Client Sample ID: **JP-M13-GWMW807**

Lab Sample ID: 280-61566-5

Client Matrix: Water

Date Sampled: 10/21/2014 0945

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.10	U	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2202						
Sulfate	250	D	mg/L	1.2	25	5.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2322						

General Chemistry

Client Sample ID: **JP-M13-GWMW126R**

Lab Sample ID: 280-61566-6

Client Matrix: Water

Date Sampled: 10/21/2014 1235

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.10	U	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2220						
Sulfate	55		mg/L	0.23	5.0	1.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2338						

General Chemistry

Client Sample ID: **JP-M13-GWMW362**

Lab Sample ID: 280-61566-7

Client Matrix: Water

Date Sampled: 10/21/2014 1220

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.10	U	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2238						
Sulfate	270	D	mg/L	1.2	25	5.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/06/2014 2353						

General Chemistry

Client Sample ID: **JP-M13-GWMW999**

Lab Sample ID: 280-61566-8

Client Matrix: Water

Date Sampled: 10/21/2014 1400

Date Received: 10/22/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	0.048	J	mg/L	0.042	0.50	1.0	9056A
Analysis Batch: 280-249024	Analysis Date: 10/22/2014 2256						
Sulfate	260	D	mg/L	1.2	25	5.0	9056A
Analysis Batch: 280-251629	Analysis Date: 11/07/2014 0009						

TestAmerica SDG 280-61741-1

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Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W9124J-14-P-0142
Site-Wide Long-Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION

This Data Quality Evaluation Report presents the assessment and verification of analytical data collected from groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP) in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from samples collected on October 21 through October 23, 2014 and received by the laboratory on October 24, 2014. The samples were analyzed by TestAmerica Laboratories, Inc., located in Arvada, Colorado. Results have been reported in laboratory report number 280-61741-1.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (SW-846) Method 8330B, metals using SW-846 Method 6010C, and mercury using SW-846 Method 7470A. Table 1 presents a cross reference of the sample information to the laboratory analytical data package.

Table 1 - Groundwater Samples

Sample ID	Date Sampled	Time Sampled	Lab Sample ID	Analysis	Matrix	Report Date
JP-L3-GWMW412	10/23/2014	1425	280-61741-1	1	water	11/25/2014
JP-L3-GWMW631	10/23/2014	1205	280-61741-2	1	water	11/25/2014
JP-L3-GWMW996	10/23/2014	1230	280-61741-3	2	water	11/25/2014
JP-L3-SW004	10/23/2014	0930	280-61741-4	1	water	11/25/2014
JP-L3-GWMW410	10/23/2014	1037	280-61741-5	2	water	11/25/2014
JP-L3-GWMW630	10/23/2014	1145	280-61741-6	1	water	11/25/2014
JP-L3-GWMW633	10/23/2014	1325	280-61741-7	1	water	11/25/2014
JP-M6-GWMW212R	10/22/2014	1050	280-61741-8	2	water	11/25/2014
JP-M6-GWMW652	10/22/2014	1450	280-61741-9	2	water	11/25/2014
JP-M6-GWMW313	10/22/2014	1405	280-61741-10	2	water	11/25/2014
JP-M6-GWMW998	10/22/2014	1200	280-61741-11	2	water	11/25/2014
JP-M6-GWMW654	10/22/2014	1355	280-61741-12	2	water	11/25/2014

JP-M7-GWMW124R	10/21/2014	1730	280-61741-13	2	water	11/25/2014
JP-M6-GWMW318	10/21/2014	1528	280-61741-14	2	water	11/25/2014
JP-M6-GWMW162R	10/21/2014	1645	280-61741-15	2	water	11/25/2014
JP-M6-GWMW319	10/21/2014	1558	280-61741-16	2	water	11/25/2014
JP-M6-GWMW123R	10/21/2014	1646	280-61741-17	2	water	11/25/2014
JP-L3-GWMW997	10/23/2014	1200	280-61741-18	1	water	11/25/2014
JP-L3-SW777	10/23/2014	1340	280-61741-19	1	water	11/25/2014
JP-L3-SW558	10/23/2014	1405	280-61741-20	1	water	11/25/2014
JP-L3-SW557	10/23/2014	1120	280-61741-21	1	water	11/25/2014

Sample Analysis
1. Explosives, metals
2. Explosives

OVERVIEW

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois* (TolTest, Inc. March 2010) (QAPP), the Department of Defense (DoD) Quality Systems Manual (QSM) Version 4.2 (10/25/2010), and United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, surrogates, laboratory control samples (LCS), method blanks, matrix spike/matrix spike duplicate (MS/MSD) analysis, initial and continuing calibration verifications and blanks (ICV, CCV, ICB, CCB), and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP.

SUMMARY

This section summarizes the data evaluation findings of the laboratory analytical data package. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the validation flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW-846 Method 8330B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The percent relative standard deviations (%RSD) were within quality control requirements for both columns.

Second Source Calibration Verification (Initial Calibration Verification)

The initial calibration verification (ICV) percent differences (%Ds) were within quality control requirements on both columns.

Continuing Calibration

The continuing calibration verification (CCV) %Ds for all compounds were within the quality control requirements of less than or equal to 15% on both columns.

Blanks

Method blank analysis met quality control requirements of no detected contamination greater than one-half the reporting limit on the primary column. The compound 2-amino-4,6-dinitrotoluene was detected in method blanks at less than one-half the reporting limit. This compound was either not detected in the associated samples, or was detected at more than ten times the concentration in the method blank. No data were qualified. The compound 2-nitrotoluene was detected in one method blank at less than one-half the reporting limit. This compound was not detected in the associated samples; therefore, no data were qualified.

Surrogate Spikes

Surrogate percent recoveries (%Rs) were within quality control requirements with the following exceptions:

- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW212R and JP-M6-GWMW212RDL was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW652 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW998 and JP-M6-GWMW998DL was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW318 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW162R was greater than the upper quality control limit on the primary column. No compounds were detected in this sample; therefore, no data were qualified.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW319 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag. The %R for surrogate 1,2-dinitrobenzene in sample JP-M6-GWMW319 was less than the lower quality control limit on the secondary column. Compounds that were detected were qualified with a J" flag and those that were not detected were qualified with a "UJ" flag.

Surrogate	%R	Acceptance Limits	Associated Compound	Associated Samples	Flag
1,2-dinitrobenzene 1,2-dinitrobenzene	4750% 4745%	83%-119% 83%-119%	1,3-dinitrobenzene 2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	JP-M6-GWMW212R/DL	J for detects

1,2-dinitrobenzene	2555%	83%-119%	1,3-dinitrobenzene 2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	JP-M6-GWMW652	J for detects
1,2-dinitrobenzene 1,2-dinitrobenzene	2654% 2051%	83%-119% 83%-119%	2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	JP-M6-GWMW998/DL	J for detects
1,2-dinitrobenzene	294%	83%-119%	1,3-dinitrobenzene RDX	JP-M6-GWMW318	J for detects
1,2-dinitrobenzene	1787%	83%-119%	2-amino-4,6-dinitrotoluene	JP-M6-GWMW319	J for detects
1,2-dinitrobenzene	63%	83%-119%	1,3,5-trinitrobenzene 1,3-dinitrobenzene nitrobenzene	JP-M6-GWMW319	UJ UJ J

Matrix Spikes/Matrix Spike Duplicates

The %Rs for the matrix spike (MS) and matrix spike duplicate (MSD) sample were within quality control requirements with the following exception:

- The %R for 2-nitrotoluene was less than the lower control limit for both the MS and MSD. This compound was not detected in the parent sample (JP-L3-GWMW630) and was qualified with a "UJ" flag.

QC Sample	Compound	%R	Associated Sample	Flag
JP-L3-GWMW630MS/MSD	2-nitrotoluene	61%/57%	JP-L3-GWMW630	UJ

All RPDs were within quality control requirements.

Laboratory Control Sample/Laboratory Control Sample Duplicate

The %Rs for the LCS and LCSD were within quality control limits with the following exception:

- The %R for 2-amino-4,6-dinitrotoluene was less than the lower control limit in LCS 280-249777/2-A; the %R for tetryl was less than the lower control limit in LCS 280-249777/2-A and LCSD 280-249777/3-A. The %R for tetryl was less than the lower control limit in LCS 280-250003/2-A. The %R for tetryl was less than the lower control limit in LCS 280-250250/2-A. The %R for tetryl was less than the lower control limit in LCS 280-252663/2-A and LCSD 280-252663/3-A. The laboratory has stated that the recoveries for these compounds were within the laboratory's historical limits and therefore re-extraction and/or

reanalysis was not performed. The associated sample results were qualified with a "J" flag for the detects and a "UJ" flag for the non-detects. The RPDs were within quality control requirements with the exception of tetryl in LCS 280-250003/2-A/LCSD 280-250003/3-A.

QC Sample	Compound	%R	Associated Sample	Flag
LCS 280-249777/2-A/LCSD 280-249777/3-A	2-amino-4,6-dinitrotoluene tetryl	78%/81% 60%/52%	JP-M7-GWMW124R JP-M6-GWMW318 JP-M6-GWMW162R JP-M6-GWMW319 JP-M6-GWMW123R JP-L3-GWMW997 JP-L3-SW777 JP-L3-SW558	J (all detects) UJ (all non-detects)
LCS 280-250003/2-A/LCSD 280-250003/3-A	tetryl	54%/66%	JP-M6-GWMW212R JP-M6-GWMW652 JP-M6-GWMW313 JP-M6-GWMW998 JP-M6-GWMW654	J (all detects) UJ (all non-detects)
LCS 280-250250/2-A	tetryl	53%	JP-L3-GWMW412 JP-L3-GWMW631 JP-L3-GWMW996 JP-L3-SW004 JP-L3-GWMW410 JP-L3-GWMW630 JP-L3-GWMW633 JP-L3-SW557	J (all detects) UJ (all non-detects)

Sample Analysis

Sample analysis met method requirements for secondary column confirmation and dilutions, with the following exceptions:

- The %RPD between the primary and confirmation columns exceeded 40% for 1,3-dinitrobenzene and nitrobenzene in sample JP-M6-GWMW212R. These compounds were qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene in sample JP-M6-GWMW652. These compounds were qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 4-nitrotoluene in sample JP-M6-GWMW313. This compound was qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 1,3-dinitrobenzene; 4-amino-2,6-dinitrotoluene; and 2-amino-4,6-dinitrotoluene in sample JP-M6-GWMW998. These compounds were qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 1,3-dinitrobenzene and RDX in sample JP-M6-GWMW318. These compounds were qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 2-amino-4,6-dinitrotoluene and nitrobenzene in sample JP-M6-GWMW319. These compounds were qualified with a "J" flag.

Date	Compound	%RPD	Associated Samples	Flag
10/30/2014	1,3-dinitrobenzene nitrobenzene	78.9% 95.6%	JP-M6-GWMW212R	J J
10/30/2014	4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	55.7% 71.6%	JP-M6-GWMW652	J J
10/30/2014	4-nitrotoluene	51.7%	JP-M6-GWMW313	J
10/30/2014	1,3-dinitrobenzene 4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	76.2% 50.4% 44.4%	JP-M6-GWMW998	J J J
11/5/2014	1,3-dinitrobenzene RDX	190.1% 137.2%	JP-M6-GWMW318	J J
11/5/2014	2-amino-4,6-dinitrotoluene nitrobenzene	157.5% 194.4%	JP-M6-GWMW319	J J

- RDX and HMX were out of calibration range in Sample JP-L3-GWMW412. This sample was analyzed at a 10X dilution. RDX and HMX should be reported from this dilution.

- The compounds 2,4,6-trinitrotoluene; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2-amino-4,6-dinitrotoluene; 2-nitrotoluene; 3-nitrotoluene; and 4-nitrotoluene were out of calibration range in Sample JP-M6-GWMW212R. This sample was analyzed at a 10X dilution. These compounds should be reported from this dilution.

- The compounds 2,4,6-trinitrotoluene; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2-amino-4,6-dinitrotoluene; 2-nitrotoluene; 3-nitrotoluene; 4-amino-2,6-dinitrotoluene; and 4-nitrotoluene were out of calibration range in sample JP-M6-GWMW652. This sample was analyzed at a 2000X dilution. These compounds should be reported from this dilution.

- The compounds 2,4,6-trinitrotoluene; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 2-nitrotoluene; 3-nitrotoluene; and 4-nitrotoluene were out of calibration range in sample JP-M6-GWMW998. This sample was analyzed at a 200X dilution. These compounds should be reported from this dilution.

EPA SW-846 Method 6010C

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibrations were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements with the following exceptions:

- Chromium was detected in the method blank at a concentration less than one-half the reporting limit. Chromium was not detected in any of the associated samples; therefore, results were not qualified.
- Barium was detected in a continuing calibration blank (CCB) at a concentration less than one-half the reporting limit. Barium was detected in associated samples at concentrations more than ten times that in the CCB; therefore, results were not qualified.

Matrix Spike/Matrix Spike Duplicate Analysis

The %Rs for the MS and MSD samples were within quality control requirements. The RPDs were within quality control requirements.

Laboratory Control Sample

The %Rs for the LCS were within quality control requirements.

CRQL Check Standard

The CRQL check standard met quality control requirements.

The serial dilution was not calculable for most metals (Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, K, Mn, Na, Ni, Pb, Sb, Se, Tl, V, and Zn). The reported calculated %Ds were within quality control requirements for Ca and Mg. The post digestion spike analysis was performed.

The post digestion spike was within quality control requirements with the exception that iron, lead, potassium, selenium, and sodium were recovered above the upper control limit and silver was recovered below the lower control limit. All analytes were qualified as "J" or "UJ" for sample JP-M13-GWMW999.

QC Sample	Compound	%R	Associated Sample	Flag
Post Digestion Spike	Iron	129%	JP-L3-GWMW630	J
	Lead	125%		UJ
	Potassium	131%		J
	Selenium	124%		UJ
	Silver	7%		UJ
	Sodium	128%		J

Interelement Check Standard

The interference check standard (ICS-A and ICS-AB) met quality control requirements with the exception that chromium and manganese were detected at a level greater than the LOD for analytical batch 280-249814. The case narrative indicates that the laboratory believes the solution contains trace impurities of these elements and that the results are not due to matrix interference. The results are consistent with those found by the manufacturer of the solution. The associated sample results were not qualified.

EPA SW-846 Method 7470A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration %Rs were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements.

Matrix Spikes/Matrix Spike Duplicates

The %Rs for the MS and MSD samples were within quality control requirements. The RPDs were within quality control requirements.

Laboratory Control Sample

The %Rs for the LCS were within quality control requirements.

Summary

Based on the data validation presented herein, and the QC requirements as specified in the project QAPP and guidance documents, data is considered usable as qualified and noted above.

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	504.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1654			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	0.99
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.083	0.40
2,6-Dinitrotoluene	0.15	U	0.064	0.20
2-Amino-4,6-dinitrotoluene	0.91		0.050	0.20
2-Nitrotoluene	0.15	U	0.085	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	1.4		0.057	0.20
4-Nitrotoluene	0.40	U	0.20	0.99
HMX	29	J M	0.087	0.40
Nitrobenzene	0.15	U	0.090	0.40
RDX	85	J M	0.052	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252068	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	504.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/08/2014 1845			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	0.15	U	0.088	0.40
Tetryl	0.15	U Q UJ	0.079	0.24

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252068	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	504.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/08/2014 1845			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	94		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253849	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	499 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 1953	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U H	0.20	1.0
2,4,6-Trinitrotoluene	0.15	U H	0.073	0.40
2,4-Dinitrotoluene	0.15	U H	0.084	0.40
2,6-Dinitrotoluene	0.15	U H	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.90	H	0.051	0.20
2-Nitrotoluene	0.15	U H	0.086	0.40
3-Nitrotoluene	0.15	U H	0.084	0.40
4-Amino-2,6-dinitrotoluene	1.3	H	0.058	0.20
4-Nitrotoluene	0.40	U H	0.20	1.0
HMX	27	H J	0.088	0.40
Nitrobenzene	0.15	U H	0.091	0.40
RDX	82	H J	0.052	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253855	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	499 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 2046	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	0.15	U H	0.089	0.40
Tetryl	0.15	U H Q	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	87		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	504.2 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	11/08/2014 1101	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	4.0	U	2.0	9.9
2,4,6-Trinitrotoluene	1.5	U	0.72	4.0
2,4-Dinitrotoluene	1.5	U	0.83	4.0
2,6-Dinitrotoluene	1.5	U	0.64	2.0
2-Amino-4,6-dinitrotoluene	0.72	J D	0.50	2.0
2-Nitrotoluene	1.5	U	0.85	4.0
3-Nitrotoluene	1.5	U	0.83	4.0
4-Amino-2,6-dinitrotoluene	1.1	J D	0.57	2.0
4-Nitrotoluene	4.0	U	2.0	9.9
HMX	29	D M	0.87	4.0
Nitrobenzene	1.5	U	0.90	4.0
RDX	86	D	0.52	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-254199	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	499 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	11/21/2014 1320	Run Type:	REDL	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	4.0	U H	2.0	10
1,3-Dinitrobenzene	1.5	U H	0.89	4.0
2,4,6-Trinitrotoluene	1.5	U H	0.73	4.0
2,4-Dinitrotoluene	1.5	U H	0.84	4.0
2,6-Dinitrotoluene	1.5	U H	0.65	2.0
2-Amino-4,6-dinitrotoluene	0.91	J D H	0.51	2.0
2-Nitrotoluene	1.5	U H	0.86	4.0
3-Nitrotoluene	1.5	U H	0.84	4.0
4-Amino-2,6-dinitrotoluene	0.97	H D J	0.58	2.0
4-Nitrotoluene	4.0	U H	2.0	10
HMX	29	D H	0.88	4.0
Nitrobenzene	1.5	U H	0.91	4.0
RDX	78	D M H	0.52	2.0
Tetryl	1.5	U H Q	0.79	2.4

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1

Client Matrix: Water

Date Sampled: 10/23/2014 1425

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-254201	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	499 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	11/21/2014 1456	Run Type:	REDL	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW631**

Lab Sample ID: 280-61741-2
Client Matrix: Water

Date Sampled: 10/23/2014 1205
Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	525.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1716			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.95
1,3-Dinitrobenzene	0.14	U	0.084	0.38
2,4,6-Trinitrotoluene	0.14	U	0.069	0.38
2,4-Dinitrotoluene	0.14	U	0.080	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.055	0.19
4-Nitrotoluene	0.38	U	0.19	0.95
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.087	0.38
RDX	0.14	U	0.050	0.19
Tetryl	0.14	U Q UJ	0.075	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	108		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW996**

Lab Sample ID: 280-61741-3

Client Matrix: Water

Date Sampled: 10/23/2014 1230

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	527.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1739			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.95
1,3-Dinitrobenzene	0.14	U	0.084	0.38
2,4,6-Trinitrotoluene	0.14	U	0.069	0.38
2,4-Dinitrotoluene	0.14	U	0.079	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.055	0.19
4-Nitrotoluene	0.38	U	0.19	0.95
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.086	0.38
RDX	0.14	U	0.050	0.19
Tetryl	0.14	U Q UJ	0.075	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	102		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3- SW004**

Lab Sample ID: 280-61741-4

Client Matrix: Water

Date Sampled: 10/23/2014 0930

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	524.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1802			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.95
1,3-Dinitrobenzene	0.14	U	0.085	0.38
2,4,6-Trinitrotoluene	0.14	U	0.069	0.38
2,4-Dinitrotoluene	0.14	U	0.080	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.055	0.19
4-Nitrotoluene	0.38	U	0.19	0.95
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.087	0.38
RDX	0.14	U	0.050	0.19
Tetryl	0.14	U Q UJ	0.076	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW410**

Lab Sample ID: 280-61741-5

Client Matrix: Water

Date Sampled: 10/23/2014 1037

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	515.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1825			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.19	0.97
1,3-Dinitrobenzene	0.15	U	0.086	0.39
2,4,6-Trinitrotoluene	0.15	U	0.070	0.39
2,4-Dinitrotoluene	0.15	U	0.081	0.39
2,6-Dinitrotoluene	0.15	U	0.063	0.19
2-Amino-4,6-dinitrotoluene	0.15	U	0.049	0.19
2-Nitrotoluene	0.15	U	0.083	0.39
3-Nitrotoluene	0.15	U	0.081	0.39
4-Amino-2,6-dinitrotoluene	0.15	U	0.056	0.19
4-Nitrotoluene	0.39	U	0.19	0.97
HMX	0.15	U	0.085	0.39
Nitrobenzene	0.15	U	0.088	0.39
RDX	0.15	U	0.051	0.19
Tetryl	0.15	U Q UJ	0.077	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6

Client Matrix: Water

Date Sampled: 10/23/2014 1145

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	525 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1848			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.95
1,3-Dinitrobenzene	0.14	U	0.084	0.38
2,4,6-Trinitrotoluene	0.14	U	0.069	0.38
2,4-Dinitrotoluene	0.14	U	0.080	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U UJ	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.055	0.19
4-Nitrotoluene	0.38	U	0.19	0.95
HMX	2.4	M	0.083	0.38
Nitrobenzene	0.14	U	0.087	0.38
RDX	3.5	M	0.050	0.19
Tetryl	0.14	U Q UJ	0.076	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	107		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6

Client Matrix: Water

Date Sampled: 10/23/2014 1145

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252068	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	525 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/08/2014 2003			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6

Client Matrix: Water

Date Sampled: 10/23/2014 1145

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253849	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	523.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 2015	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U H	0.19	0.96
1,3-Dinitrobenzene	0.14	U H	0.085	0.38
2,4,6-Trinitrotoluene	0.14	U H	0.069	0.38
2,4-Dinitrotoluene	0.14	U H	0.080	0.38
2,6-Dinitrotoluene	0.14	U H	0.062	0.19
2-Amino-4,6-dinitrotoluene	0.14	U H	0.048	0.19
2-Nitrotoluene	0.14	U H	0.082	0.38
3-Nitrotoluene	0.14	U H	0.080	0.38
4-Amino-2,6-dinitrotoluene	0.14	U H	0.055	0.19
4-Nitrotoluene	0.38	U H	0.19	0.96
HMX	2.1	H M	0.084	0.38
Nitrobenzene	0.14	U H	0.087	0.38
RDX	3.5	H M	0.050	0.19
Tetryl	0.14	U H Q	0.076	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	85	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6

Client Matrix: Water

Date Sampled: 10/23/2014 1145

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253855	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	523.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 2125	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	87		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7

Client Matrix: Water

Date Sampled: 10/23/2014 1325

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	544.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 1957			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.37	U	0.18	0.92
1,3-Dinitrobenzene	0.14	U	0.081	0.37
2,4,6-Trinitrotoluene	0.14	U	0.067	0.37
2,4-Dinitrotoluene	0.14	U	0.077	0.37
2,6-Dinitrotoluene	0.14	U	0.059	0.18
2-Amino-4,6-dinitrotoluene	0.14	U	0.047	0.18
2-Nitrotoluene	0.14	U	0.079	0.37
3-Nitrotoluene	0.14	U	0.077	0.37
4-Amino-2,6-dinitrotoluene	0.14	U	0.053	0.18
4-Nitrotoluene	0.37	U	0.18	0.92
HMX	1.3	M	0.080	0.37
Nitrobenzene	0.14	U	0.084	0.37
RDX	3.8	M	0.048	0.18
Tetryl	0.14	U Q UJ	0.073	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7

Client Matrix: Water

Date Sampled: 10/23/2014 1325

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252068	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	544.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/08/2014 2042			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	104	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7

Client Matrix: Water

Date Sampled: 10/23/2014 1325

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253849	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	516.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 2100	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U H	0.19	0.97
1,3-Dinitrobenzene	0.15	U H	0.086	0.39
2,4,6-Trinitrotoluene	0.15	U H	0.070	0.39
2,4-Dinitrotoluene	0.15	U H	0.081	0.39
2,6-Dinitrotoluene	0.15	U H	0.062	0.19
2-Amino-4,6-dinitrotoluene	0.15	U H	0.049	0.19
2-Nitrotoluene	0.15	U H	0.083	0.39
3-Nitrotoluene	0.15	U H	0.081	0.39
4-Amino-2,6-dinitrotoluene	0.15	U H	0.056	0.19
4-Nitrotoluene	0.39	U H	0.19	0.97
HMX	1.3	H M	0.085	0.39
Nitrobenzene	0.15	U H	0.088	0.39
RDX	3.7	H M	0.051	0.19
Tetryl	0.15	U H Q	0.077	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7

Client Matrix: Water

Date Sampled: 10/23/2014 1325

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253855	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-252663	Initial Weight/Volume:	516.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/19/2014 2243	Run Type:	RE	Injection Volume:	100 uL
Prep Date:	11/12/2014 1113			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW212R**

Lab Sample ID: 280-61741-8

Client Matrix: Water

Date Sampled: 10/22/2014 1050

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250495	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	509.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/30/2014 1753			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.20	0.98
1,3-Dinitrobenzene	1.5	J	0.087	0.39
2,4,6-Trinitrotoluene	60	J	0.071	0.39
2,4-Dinitrotoluene	620	J	0.082	0.39
2,6-Dinitrotoluene	300	J	0.063	0.20
2-Amino-4,6-dinitrotoluene	37	J	0.050	0.20
2-Nitrotoluene	1800	J	0.084	0.39
3-Nitrotoluene	490	J	0.082	0.39
4-Amino-2,6-dinitrotoluene	24		0.057	0.20
4-Nitrotoluene	1700	J	0.20	0.98
HMX	0.15	U	0.086	0.39
Nitrobenzene	1.6	M J	0.089	0.39
RDX	0.15	U	0.051	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	4750	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW212R**

Lab Sample ID: 280-61741-8

Client Matrix: Water

Date Sampled: 10/22/2014 1050

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	509.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1713			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Tetryl	0.15	U Q UJ	0.078	0.24

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW212R**

Lab Sample ID: 280-61741-8

Client Matrix: Water

Date Sampled: 10/22/2014 1050

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	509.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1713			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW212R**

Lab Sample ID: 280-61741-8

Client Matrix: Water

Date Sampled: 10/22/2014 1050

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250704	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	509.1 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1519	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,3,5-Trinitrobenzene	79	U		39	200
1,3-Dinitrobenzene	29	U		17	79
2,4,6-Trinitrotoluene	60	J D	J	14	79
2,4-Dinitrotoluene	1100	D		16	79
2,6-Dinitrotoluene	310	D		13	39
2-Amino-4,6-dinitrotoluene	36	J D		10	39
2-Nitrotoluene	3800	D		17	79
3-Nitrotoluene	510	D		16	79
4-Amino-2,6-dinitrotoluene	24	J D		11	39
4-Nitrotoluene	2700	D		39	200
HMX	29	U		17	79
Nitrobenzene	29	U		18	79
RDX	180	D	J	10	39
Tetryl	29	U Q	UJ	16	47

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	4745	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW652**

Lab Sample ID: 280-61741-9

Client Matrix: Water

Date Sampled: 10/22/2014 1450

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250495	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	501.1 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	10/30/2014 1816			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	14	D M J	0.89	4.0
2,4,6-Trinitrotoluene	1200	D J	0.72	4.0
2,4-Dinitrotoluene	5100	D J	0.84	4.0
2,6-Dinitrotoluene	3000	D J	0.64	2.0
2-Amino-4,6-dinitrotoluene	150	D J	0.51	2.0
2-Nitrotoluene	17000	D J	0.85	4.0
3-Nitrotoluene	2700	D J	0.83	4.0
4-Amino-2,6-dinitrotoluene	170	D J	0.58	2.0
4-Nitrotoluene	16000	D J	2.0	10
Nitrobenzene	27	D M	0.91	4.0
RDX	1.5	U	0.52	2.0
Tetryl	1.5	U Q UJ	0.79	2.4

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	2555	M D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW652**

Lab Sample ID: 280-61741-9

Client Matrix: Water

Date Sampled: 10/22/2014 1450

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	501.1 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1830			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	4.0	U	2.0	10
HMX	1.5	U	0.87	4.0

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW652**

Lab Sample ID: 280-61741-9

Client Matrix: Water

Date Sampled: 10/22/2014 1450

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	501.1 mL
Dilution:	10			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1830			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	132	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW652**

Lab Sample ID: 280-61741-9

Client Matrix: Water

Date Sampled: 10/22/2014 1450

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250704	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	501.1 mL
Dilution:	2000			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1542	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	800	U	400	2000
1,3-Dinitrobenzene	300	U	180	800
2,4,6-Trinitrotoluene	1200	D M	140	800
2,4-Dinitrotoluene	6900	D M	170	800
2,6-Dinitrotoluene	3200	D	130	400
2-Amino-4,6-dinitrotoluene	140	J D M	100	400
2-Nitrotoluene	34000	D M	170	800
3-Nitrotoluene	2800	D M	170	800
4-Amino-2,6-dinitrotoluene	200	J D M	120	400
4-Nitrotoluene	22000	D M	400	2000
HMX	300	U	170	800
Nitrobenzene	300	U	180	800
RDX	300	U	100	400
Tetryl	300	U Q WS	160	480

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW313**

Lab Sample ID: 280-61741-10

Client Matrix: Water

Date Sampled: 10/22/2014 1405

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250495	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	510 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/30/2014 1839			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.20	0.98
1,3-Dinitrobenzene	0.15	U	0.087	0.39
2,4,6-Trinitrotoluene	0.15	U	0.071	0.39
2,4-Dinitrotoluene	0.15	U	0.082	0.39
2,6-Dinitrotoluene	0.15	U	0.063	0.20
2-Amino-4,6-dinitrotoluene	0.15	U	0.050	0.20
2-Nitrotoluene	0.88		0.084	0.39
3-Nitrotoluene	0.15	U	0.082	0.39
4-Amino-2,6-dinitrotoluene	0.15	U	0.057	0.20
4-Nitrotoluene	0.53	J	0.20	0.98
Nitrobenzene	0.15	U	0.089	0.39
RDX	0.15	U	0.051	0.20
Tetryl	0.15	U Q UJ	0.078	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	108	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW313**

Lab Sample ID: 280-61741-10

Client Matrix: Water

Date Sampled: 10/22/2014 1405

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	510 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1948			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
HMX	0.15	U	0.086	0.39

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW313**

Lab Sample ID: 280-61741-10
Client Matrix: Water

Date Sampled: 10/22/2014 1405
Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	510 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1948			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW998**

Lab Sample ID: 280-61741-11

Client Matrix: Water

Date Sampled: 10/22/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250495	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	494.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/30/2014 1902			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
2,4,6-Trinitrotoluene	85	J	0.073	0.40
2,4-Dinitrotoluene	590	J	0.085	0.40
2,6-Dinitrotoluene	300	J	0.065	0.20
2-Amino-4,6-dinitrotoluene	24	J	0.051	0.20
2-Nitrotoluene	1700	M J	0.086	0.40
3-Nitrotoluene	390	M J	0.084	0.40
4-Amino-2,6-dinitrotoluene	19	J	0.058	0.20
4-Nitrotoluene	1600	M J	0.20	1.0
HMX	0.15	U	0.089	0.40
Nitrobenzene	3.3		0.092	0.40
RDX	0.15	U	0.053	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	2654	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW998**

Lab Sample ID: 280-61741-11

Client Matrix: Water

Date Sampled: 10/22/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	494.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 2027			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,3,5-Trinitrobenzene	0.40	U		0.20	1.0
1,3-Dinitrobenzene	1.7	J	J	0.090	0.40
Tetryl	0.15	U	UJ	0.080	0.24

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW998**

Lab Sample ID: 280-61741-11

Client Matrix: Water

Date Sampled: 10/22/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	494.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 2027			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	90		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW998**

Lab Sample ID: 280-61741-11

Client Matrix: Water

Date Sampled: 10/22/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250704	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	494.6 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 1627	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	81	U	40	200
2,4,6-Trinitrotoluene	88	D M J	15	81
2,4-Dinitrotoluene	950	D	17	81
2,6-Dinitrotoluene	300	D M	13	40
2-Amino-4,6-dinitrotoluene	22	D M J	10	40
2-Nitrotoluene	3200	D	17	81
3-Nitrotoluene	400	D	17	81
4-Amino-2,6-dinitrotoluene	17	J D M	12	40
4-Nitrotoluene	2200	D	40	200
HMX	30	U	18	81
Nitrobenzene	30	U	18	81
Tetryl	30	U Q UJ	16	49

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	2051	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW998**

Lab Sample ID: 280-61741-11

Client Matrix: Water

Date Sampled: 10/22/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	494.6 mL
Dilution:	200			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 2106	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	30	U	18	81
RDX	30	U	11	40

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW654**

Lab Sample ID: 280-61741-12
Client Matrix: Water

Date Sampled: 10/22/2014 1355
Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250495	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	513.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/30/2014 1925			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.19	0.97
1,3-Dinitrobenzene	0.15	U	0.086	0.39
2,4,6-Trinitrotoluene	0.15	U	0.070	0.39
2,4-Dinitrotoluene	0.15	U	0.082	0.39
2,6-Dinitrotoluene	0.15	U	0.063	0.19
2-Amino-4,6-dinitrotoluene	0.15	U	0.049	0.19
2-Nitrotoluene	0.15	U	0.083	0.39
3-Nitrotoluene	0.15	U	0.081	0.39
4-Amino-2,6-dinitrotoluene	0.15	U	0.056	0.19
4-Nitrotoluene	0.39	U	0.19	0.97
HMX	0.15	U	0.085	0.39
Nitrobenzene	0.15	U	0.089	0.39
Tetryl	0.15	U Q UJ	0.077	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	105	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW654**

Lab Sample ID: 280-61741-12

Client Matrix: Water

Date Sampled: 10/22/2014 1355

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	513.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 2145			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
RDX	0.15	U	0.051	0.19

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW654**

Lab Sample ID: 280-61741-12

Client Matrix: Water

Date Sampled: 10/22/2014 1355

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-250700	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250003	Initial Weight/Volume:	513.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	10/31/2014 2145			Injection Volume:	100 uL
Prep Date:	10/28/2014 1035			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M7-GWMW124R**

Lab Sample ID: 280-61741-13

Client Matrix: Water

Date Sampled: 10/21/2014 1730

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	502.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2049			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	0.99
1,3-Dinitrobenzene	0.15	U	0.088	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.083	0.40
2,6-Dinitrotoluene	0.15	U	0.064	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.050	0.20
2-Nitrotoluene	0.15	U	0.085	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.057	0.20
4-Nitrotoluene	0.40	U	0.20	0.99
HMX	0.15	U	0.087	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	83	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW318**

Lab Sample ID: 280-61741-14

Client Matrix: Water

Date Sampled: 10/21/2014 1528

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	498.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2112			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
Nitrobenzene	0.15	U	0.091	0.40
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	1648	M Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW318**

Lab Sample ID: 280-61741-14

Client Matrix: Water

Date Sampled: 10/21/2014 1528

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	498.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2232			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,3,5-Trinitrobenzene	0.40	U		0.20	1.0
1,3-Dinitrobenzene	1.8	J	J	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U		0.073	0.40
HMX	0.15	U		0.088	0.40
RDX	0.64	J M	J	0.052	0.20

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW318**

Lab Sample ID: 280-61741-14
Client Matrix: Water

Date Sampled: 10/21/2014 1528
Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	498.5 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/06/2014 2232			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	294	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW162R**

Lab Sample ID: 280-61741-15

Client Matrix: Water

Date Sampled: 10/21/2014 1645

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	499.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2135			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U M	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	136	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW319**

Lab Sample ID: 280-61741-16

Client Matrix: Water

Date Sampled: 10/21/2014 1558

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	496 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2158			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.74	Q M J J	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
RDX	0.15	U	0.053	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	1787	M Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW319**

Lab Sample ID: 280-61741-16

Client Matrix: Water

Date Sampled: 10/21/2014 1558

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	496 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0029			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	UJ	0.20	1.0
1,3-Dinitrobenzene	0.15	U	UJ	0.089	0.40
Nitrobenzene	0.64	J	J	0.092	0.40

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW319**

Lab Sample ID: 280-61741-16
Client Matrix: Water

Date Sampled: 10/21/2014 1558
Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251706	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	496 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0029			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	63	Q M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-M6-GWMW123R**

Lab Sample ID: 280-61741-17

Client Matrix: Water

Date Sampled: 10/21/2014 1646

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	498.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2221			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	87	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW997**

Lab Sample ID: 280-61741-18

Client Matrix: Water

Date Sampled: 10/23/2014 1200

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	499.1 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2244			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	2.2	M	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	3.4	M	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW777**

Lab Sample ID: 280-61741-19

Client Matrix: Water

Date Sampled: 10/23/2014 1340

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	496.3 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2307			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.073	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.084	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.092	0.40
RDX	0.15	U	0.053	0.20
Tetryl	0.15	U Q UJ	0.080	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	93	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW558**

Lab Sample ID: 280-61741-20

Client Matrix: Water

Date Sampled: 10/23/2014 1405

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251387	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-249777	Initial Weight/Volume:	502.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/05/2014 2330			Injection Volume:	100 uL
Prep Date:	10/27/2014 1110			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	0.99
1,3-Dinitrobenzene	0.15	U	0.088	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.083	0.40
2,6-Dinitrotoluene	0.15	U	0.064	0.20
2-Amino-4,6-dinitrotoluene	0.15	U Q UJ	0.050	0.20
2-Nitrotoluene	0.15	U	0.085	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.057	0.20
4-Nitrotoluene	0.40	U	0.20	0.99
HMX	0.15	U	0.087	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	91	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW557**

Lab Sample ID: 280-61741-21

Client Matrix: Water

Date Sampled: 10/23/2014 1120

Date Received: 10/24/2014 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251879	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-250250	Initial Weight/Volume:	529.6 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 2020			Injection Volume:	100 uL
Prep Date:	10/29/2014 1130			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.94
1,3-Dinitrobenzene	0.14	U	0.084	0.38
2,4,6-Trinitrotoluene	0.14	U	0.068	0.38
2,4-Dinitrotoluene	0.14	U	0.079	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.054	0.19
4-Nitrotoluene	0.38	U	0.19	0.94
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.086	0.38
RDX	0.14	U	0.049	0.19
Tetryl	0.14	U Q WJ	0.075	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1
Client Matrix: Water

Date Sampled: 10/23/2014 1425
Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0055			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.046		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00062	J	0.00045	0.0050
Calcium	89		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	46		0.011	0.50
Manganese	0.00050	U Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1650			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.2	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	6.7		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 2330			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW412**

Lab Sample ID: 280-61741-1
Client Matrix: Water

Date Sampled: 10/23/2014 1425
Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1645			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW631**

Lab Sample ID: 280-61741-2

Client Matrix: Water

Date Sampled: 10/23/2014 1205

Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0057			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.018		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U	0.00045	0.0050
Calcium	63		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	33		0.011	0.50
Manganese	0.032	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1653			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.13		0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	5.3		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	28		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 2333			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.0045	J	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW631**

Lab Sample ID: 280-61741-2
Client Matrix: Water

Date Sampled: 10/23/2014 1205
Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1647			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3- SW004**

Lab Sample ID: 280-61741-4
Client Matrix: Water

Date Sampled: 10/23/2014 0930
Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0100			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.044		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00058	J	0.00045	0.0050
Calcium	90		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	39		0.011	0.50
Manganese	0.035	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1655			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.036	J	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.5	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	16		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 2335			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3- SW004**

Lab Sample ID: 280-61741-4

Client Matrix: Water

Date Sampled: 10/23/2014 0930

Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1650			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6
Client Matrix: Water

Date Sampled: 10/23/2014 1145
Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0103			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.013		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00047	J	0.00045	0.0050
Calcium	78		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	40		0.011	0.50
Manganese	0.067	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1658			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier		DL	LOQ
Iron	0.17		J	0.022	0.10
Lead	0.0050	U	UJ	0.0026	0.015
Potassium	5.1		J	0.24	3.0
Selenium	0.012	U	UJ	0.0049	0.022
Silver	0.0020	U	UJ	0.00093	0.015
Sodium	25		J	0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/11/2014 2338			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW630**

Lab Sample ID: 280-61741-6
Client Matrix: Water

Date Sampled: 10/23/2014 1145
Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1657			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7
Client Matrix: Water

Date Sampled: 10/23/2014 1325
Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0125			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.051		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U	0.00045	0.0050
Calcium	85		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	36		0.011	0.50
Manganese	0.00050	U Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.0089	J	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1721			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.3	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	4.7	J	0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/12/2014 0001			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW633**

Lab Sample ID: 280-61741-7

Client Matrix: Water

Date Sampled: 10/23/2014 1325

Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1704			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW997**

Lab Sample ID: 280-61741-18

Client Matrix: Water

Date Sampled: 10/23/2014 1200

Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0128			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.013		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U	0.00045	0.0050
Calcium	77		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	39		0.011	0.50
Manganese	0.066	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1723			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.15		0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	5.0		0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	24		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/12/2014 0004			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-GWMW997**

Lab Sample ID: 280-61741-18

Client Matrix: Water

Date Sampled: 10/23/2014 1200

Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1706			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW777**

Lab Sample ID: 280-61741-19
Client Matrix: Water

Date Sampled: 10/23/2014 1340
Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0130			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.043		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00048	J	0.00045	0.0050
Calcium	87		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	38		0.011	0.50
Manganese	0.026	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1726			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.5	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	15		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/12/2014 0007			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.0062	J	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW777**

Lab Sample ID: 280-61741-19

Client Matrix: Water

Date Sampled: 10/23/2014 1340

Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1708			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW558**

Lab Sample ID: 280-61741-20

Client Matrix: Water

Date Sampled: 10/23/2014 1405

Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0133			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.045		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00080	U	0.00045	0.0050
Calcium	89		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	38		0.011	0.50
Manganese	0.0025	J Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1729			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.035	J	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.3	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	4.9	J	0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/12/2014 0009			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW558**

Lab Sample ID: 280-61741-20

Client Matrix: Water

Date Sampled: 10/23/2014 1405

Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1710			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW557**

Lab Sample ID: 280-61741-21

Client Matrix: Water

Date Sampled: 10/23/2014 1120

Date Received: 10/24/2014 1000

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-251856	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25D110614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/07/2014 0136			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Aluminum	0.031	U	0.018	0.30
Antimony	0.0080	U	0.0031	0.020
Barium	0.044		0.00058	0.010
Beryllium	0.00050	U	0.00047	0.0015
Cadmium	0.00057	J	0.00045	0.0050
Calcium	89		0.035	1.0
Chromium	0.0015	U Q	0.00066	0.015
Cobalt	0.0020	U	0.0012	0.015
Copper	0.0035	U	0.0014	0.015
Magnesium	39		0.011	0.50
Manganese	0.027	Q	0.00025	0.010
Nickel	0.0030	U	0.0013	0.040
Thallium	0.012	U	0.0049	0.040
Vanadium	0.0025	U	0.0011	0.015
Zinc	0.013	U	0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-252212	Instrument ID:	MT_025
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	25a110814.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/08/2014 1731			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Iron	0.030	U	0.022	0.10
Lead	0.0050	U	0.0026	0.015
Potassium	1.5	J	0.24	3.0
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	15		0.092	5.0

Analysis Method:	6010C	Analysis Batch:	280-252658	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-249814	Lab File ID:	26e111114.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/12/2014 0012			Final Weight/Volume:	50 mL
Prep Date:	10/30/2014 1400				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Arsenic	0.012	U	0.0044	0.025

7470A Mercury (CVAA)-Dissolved

Client: MWH Americas Inc

Job Number: 280-61741-1

Client Sample ID: **JP-L3-SW557**

Lab Sample ID: 280-61741-21
Client Matrix: Water

Date Sampled: 10/23/2014 1120
Date Received: 10/24/2014 1000

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1713			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

TestAmerica SDG 280-61925-1

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Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W9124J-14-P-0142
Site-Wide Long-Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION

This Data Quality Evaluation Report presents the assessment and verification of analytical data collected from groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP) in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from samples collected on October 27 and October 28, 2014 and received by the laboratory on October 29, 2014. The samples were analyzed by TestAmerica Laboratories, Inc., located in Arvada, Colorado. Results have been reported in laboratory report number 280-61925-1.

Groundwater samples were analyzed for explosives using *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (SW-846) Method 8330B and sulfate using SW-846 Method 9056A. Table 1 presents a cross reference of the sample information to the laboratory analytical data package.

Table 1 - Groundwater Samples

Sample ID	Date Sampled	Time Sampled	Lab Sample ID	Analysis	Matrix	Report Date
JP-M6-GWMW117	10/27/2014	1047	280-61925-1	1	water	11/20/2014
JP-OA-GWMW118	10/27/2014	1132	280-61925-2	1	water	11/20/2014
JP-OA-GWMW119	10/27/2014	1130	280-61925-3	1	water	11/20/2014
JP-M1-GWMW646	10/27/2014	1335	280-61925-4	2	water	11/20/2014
JP-M1-GWMW645	10/27/2014	1330	280-61925-5	2	water	11/20/2014
JP-L1-GWWES3	10/27/2014	1447	280-61925-6	1	water	11/20/2014
JP-L1-GWMW173	10/27/2014	1440	280-61925-7	1	water	11/20/2014
JP-L1-GWMW174	10/28/2014	0842	280-61925-8	1	water	11/20/2014
JP-L1-SW550	10/28/2014	0850	280-61925-9	1	water	11/20/2014
JP-L1-GWWES1	10/28/2014	1030	280-61925-10	1	water	11/20/2014
JP-L1-GWMW131	10/28/2014	1035	280-61925-11	1	water	11/20/2014

Sample Analysis
1. Explosives
2. Sulfate

OVERVIEW

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois* (TolTest, Inc. March 2010) (QAPP), the Department of Defense (DoD) Quality Systems Manual (QSM) Version 4.2 (10/25/2010), and United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines in

conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, surrogates, laboratory control samples (LCS), method blanks, matrix spike/matrix spike duplicate (MS/MSD) analysis, initial and continuing calibration verifications and blanks (ICV, CCV, ICB, CCB), and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP.

SUMMARY

This section summarizes the data evaluation findings of the laboratory analytical data package. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the validation flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW-846 Method 8330B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The percent relative standard deviations (%RSD) were within quality control requirements for both columns.

Second Source Calibration Verification (Initial Calibration Verification)

The initial calibration verification (ICV) percent differences (%Ds) were within quality control requirements on both columns.

Continuing Calibration

The continuing calibration verification (CCV) %Ds for all compounds were within the quality control requirements of less than or equal to 15% on both columns.

Blanks

Method blank analysis met quality control requirements of no detected contamination greater than one-half the reporting limit. The compound 2-amino-4,6-dinitrotoluene was detected in method blanks at less than one-half the reporting limit. This compound was either not detected in the associated samples, or was detected at more than ten times the concentration in the method blank. No data were qualified. The compound 4-amino-2,6-dinitrotoluene was detected in one method blank at less than one-half the reporting limit. This compound was either not detected in the associated samples, or was detected at more than ten times the concentration in the method blank. No data were qualified.

Surrogate Spikes

Surrogate percent recoveries (%Rs) were within quality control requirements with the following exceptions:

- The %R for surrogate 1,2-dinitrobenzene in sample JP-L1-GWMW173 was greater than the upper quality control limit on the secondary column. Compounds that were detected were qualified with a “J” flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-L1-SW550 was greater than the upper quality control limit on the primary column. No compounds were detected; therefore, no data were qualified.

- The %R for surrogate 1,2-dinitrobenzene in sample JP-L1-GWWES1 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.
- The %R for surrogate 1,2-dinitrobenzene in sample JP-L1-GWMW131 was greater than the upper quality control limit on the primary column. Compounds that were detected were qualified with a "J" flag.

Surrogate	%R	Acceptance Limits	Associated Compound	Associated Samples	Flag
1,2-dinitrobenzene	222%	83%-119%	HMX	JP-L1-GWMW173	J for detects
1,2-dinitrobenzene	146%	83%-119%	1,3,5-trinitrobenzene 2,4,6-trinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 4-amino-2,6-dinitrotoluene	JP-L1-GWWES1	J for detects
1,2-dinitrobenzene	301%	83%-119%	1,3,5-trinitrobenzene 2,4,6-trinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene	JP-L1-GWMW131	J for detects

Matrix Spikes/Matrix Spike Duplicates

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Sample/Laboratory Control Sample Duplicate

The %Rs for the LCS and LCSD were within quality control limits with the following exception:

- The %R for tetryl was less than the lower control limit in LCS 280-250976/2-A and LCSD 280-250976/3-A. The %R for tetryl was less than the lower control limit in LCS 280-251163/2-A. The laboratory has stated that tetryl has been identified as a poor performing analyte; therefore re-extraction and/or reanalysis was not performed. The associated sample results were qualified with a "J" flag for detects and a "UJ" flag for non-detects. The RPDs were within quality control requirements.

QC Sample	Compound	%R	Associated Sample	Flag
LCS 280-250976/2-A/LCSD 280-250976/3-A	tetryl	52%/59%	JP-M6-GWMW117 JP-OA-GWMW118 JP-OA-GWMW119 JP-L1-GWWES3 JP-L1-GWMW173	UJ (all non-detects)
LCS 280-251163/2-A	tetryl	47%	JP-L1-GWMW174 JP-L1-SW550 JP-L1-GWWES1 JP-L1-GWMW131	J (all detects) UJ (all non-detects)

Sample Analysis

Sample analysis met method requirements for secondary column confirmation and dilutions, with the following exceptions:

- The %RPD between the primary and confirmation columns exceeded 40% for HMX in sample JP-L1-GWMW173. The chromatograms for sample JP-L1-GWMW173 indicate interference for both columns for HMX; consequently, the lower concentration has been reported. HMX was qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for 2-nitrotoluene in sample JP-L1-GWWES1. The chromatograms for sample JP-L1-GWWES1 indicate interference on the secondary column for 2-nitrotoluene; consequently, the result from the primary column was reported. This compound was qualified with a "J" flag.

- The %RPD between the primary and confirmation columns exceeded 40% for tetryl; 2-amino-4,6-dinitrotoluene; and 2-nitrotoluene in sample JP-L1-GWMW131. The chromatograms for sample JP-L1-GWMW131 indicate interference on the primary column for tetryl and on the secondary column for 2-amino-4,6-dinitrotoluene and 2-nitrotoluene. Consequently, the results from the column without interference have been reported. These compounds were qualified with a "J" flag.

Date	Compound	%RPD	Associated Samples	Flag
11/13/2014	HMX	89.8%	JP-L1-GWMW173	J
11/7/2014	2-nitrotoluene	192.2%	JP-L1-GWWES1	J
11/7/2014	tetryl 2-amino-4,6-dinitrotoluene 2-nitrotoluene	132.2% 136.5% 177.4%	JP-L1-GWMW131	J J J

- The compounds 1,3,5-trinitrobenzene and 2,4,6-trinitrotoluene were out of calibration range in Sample JP-L1-GWMW131. This sample was analyzed at a 500X dilution. These compounds should be reported from this dilution.

EPA SW-846 Method 9056A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration met quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met quality control requirements.

Matrix Spike/Matrix Spike Duplicate Analysis

An MS/MSD pair was not analyzed with the sample data. The data are not affected.

Laboratory Control Sample

The %Rs for the LCS and LCSD were within quality control requirements. The RPD was within quality control requirements.

Quality Control/Method Reporting Limit Check

The MRL results met quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

Based on the data validation presented herein, and the QC requirements as specified in the project QAPP and guidance documents, data is considered usable as qualified and noted above.

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-M6-GWMW117**

Lab Sample ID: 280-61925-1
Client Matrix: Water

Date Sampled: 10/27/2014 1047
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252809	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	509.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/13/2014 1230			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.20	0.98
1,3-Dinitrobenzene	0.15	U	0.087	0.39
2,4,6-Trinitrotoluene	0.15	U	0.071	0.39
2,4-Dinitrotoluene	0.15	U	0.082	0.39
2,6-Dinitrotoluene	0.15	U	0.063	0.20
2-Amino-4,6-dinitrotoluene	0.15	U	0.050	0.20
2-Nitrotoluene	0.15	U	0.084	0.39
3-Nitrotoluene	0.15	U	0.082	0.39
4-Amino-2,6-dinitrotoluene	0.15	U	0.057	0.20
4-Nitrotoluene	0.39	U	0.20	0.98
HMX	0.15	U	0.086	0.39
Nitrobenzene	0.15	U	0.089	0.39
RDX	0.15	U	0.051	0.20
Tetryl	0.15	U Q UJ	0.078	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	88	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-OA-GWMW118**

Lab Sample ID: 280-61925-2
Client Matrix: Water

Date Sampled: 10/27/2014 1132
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252809	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	530.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/13/2014 1252			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.38	U	0.19	0.94
1,3-Dinitrobenzene	0.14	U	0.084	0.38
2,4,6-Trinitrotoluene	0.14	U	0.068	0.38
2,4-Dinitrotoluene	0.14	U	0.079	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.048	0.19
2-Nitrotoluene	0.14	U	0.081	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
4-Nitrotoluene	0.38	U	0.19	0.94
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.086	0.38
RDX	0.14	U	0.049	0.19
Tetryl	0.14	U Q WJ	0.075	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	88		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-OA-GWMW118**

Lab Sample ID: 280-61925-2

Client Matrix: Water

Date Sampled: 10/27/2014 1132

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	530.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0717			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
4-Amino-2,6-dinitrotoluene	0.14	U	0.054	0.19

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-OA-GWMW118**

Lab Sample ID: 280-61925-2
Client Matrix: Water

Date Sampled: 10/27/2014 1132
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	530.8 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0717			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	94		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-OA-GWMW119**

Lab Sample ID: 280-61925-3
Client Matrix: Water

Date Sampled: 10/27/2014 1130
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252809	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	518.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/13/2014 1314			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.19	0.96
1,3-Dinitrobenzene	0.14	U	0.086	0.39
2,4,6-Trinitrotoluene	0.14	U	0.070	0.39
2,4-Dinitrotoluene	0.14	U	0.081	0.39
2,6-Dinitrotoluene	0.14	U	0.062	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.049	0.19
2-Nitrotoluene	0.14	U	0.082	0.39
3-Nitrotoluene	0.14	U	0.080	0.39
4-Amino-2,6-dinitrotoluene	0.14	U	0.056	0.19
4-Nitrotoluene	0.39	U	0.19	0.96
HMX	0.14	U	0.084	0.39
Nitrobenzene	0.14	U	0.088	0.39
RDX	0.14	U	0.050	0.19
Tetryl	0.14	U Q UJ	0.076	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	89		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES3**

Lab Sample ID: 280-61925-6
Client Matrix: Water

Date Sampled: 10/27/2014 1447
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252809	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	542.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/13/2014 1337			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.37	U	0.18	0.92
2,4,6-Trinitrotoluene	0.95		0.067	0.37
2,4-Dinitrotoluene	0.14	U	0.077	0.37
2,6-Dinitrotoluene	0.14	U	0.059	0.18
2-Amino-4,6-dinitrotoluene	0.77		0.047	0.18
2-Nitrotoluene	0.14	U	0.079	0.37
3-Nitrotoluene	0.14	U	0.077	0.37
4-Amino-2,6-dinitrotoluene	1.0		0.053	0.18
4-Nitrotoluene	0.37	U	0.18	0.92
HMX	0.14	U	0.081	0.37
Nitrobenzene	0.14	U	0.084	0.37
Tetryl	0.14	U Q UJ	0.073	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	86		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES3**

Lab Sample ID: 280-61925-6

Client Matrix: Water

Date Sampled: 10/27/2014 1447

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	542.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0756			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	0.14	U	0.082	0.37
RDX	0.14	U	0.048	0.18

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES3**

Lab Sample ID: 280-61925-6

Client Matrix: Water

Date Sampled: 10/27/2014 1447

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	542.4 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0756			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	241	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW173**

Lab Sample ID: 280-61925-7
Client Matrix: Water

Date Sampled: 10/27/2014 1440
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252809	Instrument ID:	CHHPLC_X3
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	518.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/13/2014 1359			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.39	U	0.19	0.96
2,4,6-Trinitrotoluene	6.2		0.070	0.39
2,4-Dinitrotoluene	0.14	U	0.081	0.39
2,6-Dinitrotoluene	0.14	U	0.062	0.19
2-Amino-4,6-dinitrotoluene	4.3		0.049	0.19
2-Nitrotoluene	0.14	U	0.082	0.39
3-Nitrotoluene	0.14	U	0.080	0.39
4-Amino-2,6-dinitrotoluene	5.9		0.056	0.19
4-Nitrotoluene	0.39	U	0.19	0.96
Nitrobenzene	0.14	U	0.088	0.39
RDX	9.0	M	0.050	0.19
Tetryl	0.14	U Q UJ	0.076	0.23

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	95		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW173**

Lab Sample ID: 280-61925-7
Client Matrix: Water

Date Sampled: 10/27/2014 1440
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	518.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0835			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	0.14	U	0.085	0.39
HMX	1.5	J M J	0.084	0.39

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW173**

Lab Sample ID: 280-61925-7

Client Matrix: Water

Date Sampled: 10/27/2014 1440

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-253153	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-250976	Initial Weight/Volume:	518.9 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/15/2014 0835			Injection Volume:	100 uL
Prep Date:	11/03/2014 1135			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	222	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW174**

Lab Sample ID: 280-61925-8
Client Matrix: Water

Date Sampled: 10/28/2014 0842
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251676	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	504 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0827			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	0.99
1,3-Dinitrobenzene	0.15	U	0.088	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.083	0.40
2,6-Dinitrotoluene	0.15	U	0.064	0.20
2-Amino-4,6-dinitrotoluene	0.15	U	0.050	0.20
2-Nitrotoluene	0.15	U	0.085	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.057	0.20
4-Nitrotoluene	0.40	U	0.20	0.99
HMX	0.15	U	0.087	0.40
Nitrobenzene	0.15	U	0.090	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-SW550**

Lab Sample ID: 280-61925-9

Client Matrix: Water

Date Sampled: 10/28/2014 0850

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251676	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	534 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0850			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.37	U	0.19	0.94
1,3-Dinitrobenzene	0.14	U	0.083	0.37
2,4,6-Trinitrotoluene	0.14	U	0.068	0.37
2,4-Dinitrotoluene	0.14	U	0.078	0.37
2,6-Dinitrotoluene	0.14	U	0.060	0.19
2-Amino-4,6-dinitrotoluene	0.14	U	0.047	0.19
2-Nitrotoluene	0.14	U	0.080	0.37
3-Nitrotoluene	0.14	U	0.078	0.37
4-Amino-2,6-dinitrotoluene	0.14	U	0.054	0.19
4-Nitrotoluene	0.37	U	0.19	0.94
HMX	0.14	U	0.082	0.37
Nitrobenzene	0.14	U	0.085	0.37
RDX	0.14	U	0.049	0.19
Tetryl	0.14	U Q UJ	0.074	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	139	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES1**

Lab Sample ID: 280-61925-10
Client Matrix: Water

Date Sampled: 10/28/2014 1030
Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251676	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	535.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0913			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	16	M	0.19	0.93
1,3-Dinitrobenzene	0.14	U	0.083	0.37
2,4,6-Trinitrotoluene	14		0.068	0.37
2,4-Dinitrotoluene	0.14	U	0.078	0.37
2,6-Dinitrotoluene	0.14	U	0.060	0.19
2-Amino-4,6-dinitrotoluene	5.9		0.047	0.19
2-Nitrotoluene	0.23	J	0.080	0.37
3-Nitrotoluene	0.14	U	0.078	0.37
4-Amino-2,6-dinitrotoluene	6.9		0.054	0.19
HMX	0.14	U	0.082	0.37
Nitrobenzene	0.14	U	0.085	0.37
Tetryl	0.14	U Q	0.074	0.22

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	146	M Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES1**

Lab Sample ID: 280-61925-10

Client Matrix: Water

Date Sampled: 10/28/2014 1030

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251993	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	535.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 2214			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
4-Nitrotoluene	0.37	U	0.19	0.93
RDX	0.14	U	0.049	0.19

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWWES1**

Lab Sample ID: 280-61925-10

Client Matrix: Water

Date Sampled: 10/28/2014 1030

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251993	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	535.2 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 2214			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99	M	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW131**

Lab Sample ID: 280-61925-11

Client Matrix: Water

Date Sampled: 10/28/2014 1035

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251676	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	524.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 0936			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	910	J	0.19	0.95
1,3-Dinitrobenzene	0.14	U	0.085	0.38
2,4,6-Trinitrotoluene	1100	J	0.069	0.38
2,6-Dinitrotoluene	0.14	U	0.061	0.19
2-Amino-4,6-dinitrotoluene	58	J	0.048	0.19
2-Nitrotoluene	160	J	0.081	0.38
4-Amino-2,6-dinitrotoluene	0.14	U	0.055	0.19
4-Nitrotoluene	0.38	U	0.19	0.95

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	301	M Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW131**

Lab Sample ID: 280-61925-11

Client Matrix: Water

Date Sampled: 10/28/2014 1035

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251993	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	524.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 2332			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
2,4-Dinitrotoluene	0.14	U	0.080	0.38
3-Nitrotoluene	0.14	U	0.079	0.38
HMX	0.14	U	0.083	0.38
Nitrobenzene	0.14	U	0.087	0.38
RDX	0.14	U	0.050	0.19
Tetryl	2.2	M J J	0.076	0.23

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW131**

Lab Sample ID: 280-61925-11

Client Matrix: Water

Date Sampled: 10/28/2014 1035

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-251993	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	524.7 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/07/2014 2332			Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	Q	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW131**

Lab Sample ID: 280-61925-11

Client Matrix: Water

Date Sampled: 10/28/2014 1035

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252324	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	524.7 mL
Dilution:	500			Final Weight/Volume:	5 mL
Analysis Date:	11/11/2014 0435	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	3000	D	95	480
2,4,6-Trinitrotoluene	3900	D	34	190
2,4-Dinitrotoluene	71	U	40	190
2,6-Dinitrotoluene	71	U	31	95
2-Amino-4,6-dinitrotoluene	78	J D	24	95
2-Nitrotoluene	71	U	41	190
3-Nitrotoluene	71	U	40	190
4-Amino-2,6-dinitrotoluene	71	U	27	95
4-Nitrotoluene	190	U	95	480
Nitrobenzene	71	U	43	190
RDX	71	U	25	95
Tetryl	71	U	38	110

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	83 - 119

Client: MWH Americas Inc

Job Number: 280-61925-1

Client Sample ID: **JP-L1-GWMW131**

Lab Sample ID: 280-61925-11

Client Matrix: Water

Date Sampled: 10/28/2014 1035

Date Received: 10/29/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252548	Instrument ID:	CHHPLC_G2_LUNA
Prep Method:	3535	Prep Batch:	280-251163	Initial Weight/Volume:	524.7 mL
Dilution:	500			Final Weight/Volume:	5 mL
Analysis Date:	11/11/2014 1357	Run Type:	DL	Injection Volume:	100 uL
Prep Date:	11/04/2014 0727			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3-Dinitrobenzene	71	U	42	190
HMX	71	U	42	190

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	0	D	83 - 119

General Chemistry

Client Sample ID: **JP-M1-GWMW646**

Lab Sample ID: 280-61925-4

Client Matrix: Water

Date Sampled: 10/27/2014 1335

Date Received: 10/29/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	120	M	mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-252863 Analysis Date: 11/13/2014 1711

General Chemistry

Client Sample ID: **JP-M1-GWMW645**

Lab Sample ID: 280-61925-5

Client Matrix: Water

Date Sampled: 10/27/2014 1330

Date Received: 10/29/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	110		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-252863 Analysis Date: 11/13/2014 1727

TestAmerica SDG 280-61932-1

(October 2014 Report 4 of 4)

Data Quality Evaluation of Analytical Data for Environmental Remediation Services

Contract No. W9124J-14-P-0142
Site-Wide Long-Term Groundwater Monitoring at Joliet Army Ammunition Plant, Wilmington, Illinois

INTRODUCTION

This Data Quality Evaluation Report presents the assessment and verification of analytical data collected from groundwater sampling conducted for site-wide long-term monitoring at the Joliet Army Ammunition Plant (JOAAP) in Wilmington, Illinois. The data evaluation was completed on the groundwater analytical data generated from samples collected on October 28 and 29, 2014 and received by the laboratory on October 30, 2014. The samples were analyzed by TestAmerica Laboratories, Inc., located in Arvada, Colorado. Results have been reported in laboratory report number 280-61932-1.

Groundwater samples were analyzed for volatile organic compounds (VOCs) using *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (SW-846) Method 8260B, semivolatile organic compounds (SVOCs) using SW-846 Method 8270D, explosives using SW-846 Method 8330B, metals using SW-846 Method 6010C, mercury using SW-846 Method 7470A, and anions (nitrate as N and sulfate) using SW-846 Method 9056A**.** Table 1 presents a cross reference of the sample information to the laboratory analytical data package.

Table 1 - Groundwater Samples

Sample ID	Date Sampled	Time Sampled	Lab Sample ID	Analysis	Matrix	Report Date
JP-M1-GWMW648	10/28/2014	1315	280-61932-1	3	water	11/24/2014
JP-M1-GWMW644	10/28/2014	1348	280-61932-2	3	water	11/24/2014
JP-M1-GWMW643	10/28/2014	1309	280-61932-3	3	water	11/24/2014
JP-M1-GWMW649	10/28/2014	1452	280-61932-4	3	water	11/24/2014
JP-M1-GWMW231	10/28/2014	1545	280-61932-5	3	water	11/24/2014
JP-M1-SW709	10/28/2014	1405	280-61932-6	3	water	11/24/2014
JP-M1-GWMW640	10/28/2014	1546	280-61932-7	3	water	11/24/2014
JP-M1-GWMW995	10/28/2014	1500	280-61932-8	3	water	11/24/2014
JP-M13-GWMW811	10/29/2014	0950	280-61932-9	1	water	11/24/2014
JP-M1-GWMW107	10/29/2014	1240	280-61932-10	3	water	11/24/2014
JP-M1-GWMW642	10/29/2014	1148	280-61932-11	3	water	11/24/2014
JP-M1-GWMW641	10/29/2014	1220	280-61932-12	3	water	11/24/2014
TRIPBLANK 102914	10/29/2014	0800	280-61932-13	2	water	11/24/2014

1. VOCs, SVOCs, explosives, metals, anions
2. VOCs
3. Sulfate

OVERVIEW

The samples were assessed based on the criteria specified in the *Final Quality Assurance Project Plan Environmental Remediation Services at Joliet Army Ammunition Plant, Will County, Illinois* (TolTest, Inc. March 2010) (QAPP), the Department of Defense (DoD) Quality Systems Manual (QSM) Version 4.2 (10/25/2010), and United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines in conjunction with the internal laboratory quality control (QC) criteria. Quality checks evaluated included holding times, sample preservation, cooler temperatures, daily tune requirements, internal standards, surrogates, laboratory control samples (LCS), method blanks, trip blank, matrix spike/matrix spike duplicate (MS/MSD) analysis, initial and continuing calibration verifications and blanks (ICV, CCV, ICB, CCB), and QC Method Reporting Limit (QC/MRL) recovery. Level III data review was completed in accordance with the QAPP.

SUMMARY

This section summarizes the data evaluation findings of the laboratory analytical data package. The tables below present the quality control check requirements, the analytes that failed the criteria, analysis flags, and the data to which the validation flags are applied. Each of the quality checks reviewed in the laboratory analytical data package are summarized under each method subheading.

EPA SW-846 Method 8260B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The percent relative standard deviations (%RSD) were less than or equal to 15% for each individual compound and less than or equal to 30% for calibration check compounds (CCC).

In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990, which meets quality control requirements.

The average response factors (RRF) for all system performance check compounds (SPCC) were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The initial calibration verification (ICV) percent differences (%Ds) were within quality control requirements of less than or equal to 20% for each individual compound.

Continuing Calibration

The continuing calibration verification (CCV) samples were run every twelve hours, consistent with the method, DoD QSM, and USEPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

The %Ds for the CCCs and the continuing calibration response factors for the SPCCs were within quality control limits. The %Ds for all compounds were within the quality control requirements of less than or equal to 20%.

Blanks

The method blank met quality control requirements of no contamination greater than one-half the reporting limit.

Trip blank results were non-detect for all compounds.

Surrogate Spikes

Surrogate percent recoveries (%R) were within quality control requirements with the following exception:

- The %Rs for surrogates 1,2-dichloroethane-d4 and toluene-d8 in sample JP-M13-GWMW811 were greater than the upper control limit. Compounds that were detected were qualified with a "J" flag.

Surrogate	%R	Acceptance Limits	Associated Compound	Associated Samples	Flag
1,2-dichloroethane-d4 toluene-d8	120% 115%	81%-118% 89%-112%	toluene	JP-M13-GWMW811	J for detects

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements with the following exceptions:

- The %Rs for chlorobenzene and naphthalene were less than the lower control limit for the MS. These compounds were not detected in the parent sample (JP-M13-GWMW811) and were qualified with a "UJ" flag.
- Numerous RPDs were greater than the 20% limit. All compounds in the associated sample were non-detect, with the exception of toluene. Therefore, only toluene was qualified with a "J" flag.

QC Sample	Compound	%R	Associated Sample	Flag
JP-M13-GWMW811MS/MSD	chlorobenzene naphthalene	81%/99% 60%/75%	JP-M13-GWMW811	UJ UJ
JP-M13-GWMW811MS/MSD	toluene	21% RPD	JP-M13-GWMW811	J

Laboratory Control Sample/Laboratory Control Sample Duplicate

The %Rs for the LCS and LCSD were within quality control limits. The RPDs were within quality control limits.

Internal Standards

The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

The quality control/method reporting limit check (QC/MRL) is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method; however, the quarterly check may not be required at this time. The data are not affected.

EPA SW-846 Method 8270D

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Tuning Requirements

Instrument tuning requirements were met and within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The %RSDs were less than or equal to 15% for each individual compound and less than or equal to 30% for CCCs.

In cases where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r2) were greater than or equal to 0.990.

The RRFs for all SPCCs were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Ds were within quality control requirements of less than or equal to 20% for each individual compound.

Continuing Calibration

The CCV samples were run every twelve hours consistent with the method, DoD QSM, and USEPA National Functional Guidelines. The project QAPP requires the CCV to be run every ten samples.

The %Ds for all compounds were within the quality control requirements of less than or equal to 20%.

The continuing calibration response factors for SPCCs were within quality control limits.

The %Ds for the CCCs met the quality control requirements.

Blanks

The method blank met quality control requirements of no contamination greater than one-half the reporting limit.

Surrogate Spikes

Surrogate %Rs were within quality control requirements.

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements with the following exceptions:

- The %Rs for 3,3'-dichlorobenzidine and 4-nitroaniline were less than the lower control limit for the MS. These compounds were not detected in the parent sample (JP-M13-GWMW811) and were qualified with a "UJ" flag.
- The %Rs for several compounds were less than the lower control limit for the MSD. These compounds were not detected in the parent sample (JP-M13-GWMW811) and were qualified with a "UJ" flag.
- Numerous RPDs were greater than the 20% limit. All compounds in the associated sample were non-detect. Therefore, no data were qualified.

QC Sample	Compound	%R	Associated Sample	Flag
JP-M13-GWMW811MS/MSD	3,3'-dichlorobenzidine	17%/31%	JP-M13-GWMW811	UJ (all non-detects)
	4-nitroaniline	64%/72%		
	1,2-diphenylhydrazine	86%/47%		
	2,4,5-trichlorophenol	94%/51%		
	4-bromophenyl phenyl ether	89%/40%		
	4-chlorophenyl phenyl ether	87%/42%		
	anthracene	85%/45%		
	benzo(a)anthracene	89%/42%		
	benzo(a)pyrene	87%/41%		
	benzo(b)fluoranthene	94%/42%		
	benzo(g,h,i)perylene	91%/41%		
	benzo(k)fluoranthene	88%/44%		
	bis(2-ethylhexyl)phthalate	100%/49%		
	butyl benzyl phthalate	99%/44%		
	chrysene	88%/45%		
	dibenz(a,h)anthracene	95%/46%		
	dibenzofuran	86%/49%		
	di-n-butyl phthalate	95%/43%		
	di-n-octyl phthalate	94%/48%		
	fluoranthene	90%/41%		
	fluorene	88%/47%		
	hexachlorobenzene	88%/39%		
	indeno(1,2,3-cd)pyrene	90%/42%		
	pentachlorophenol	96%/18%		
	phenanthrene	88%/42%		
	pyrene	89%/40%		

Laboratory Control Sample

The %Rs for the LCS were within quality control limits.

Internal Standards

The internal standard areas and retention times were within quality control limits.

Quality Control/Method Reporting Limit Check

The QC/MRL is required to be performed quarterly at a minimum in accordance with the DoD QSM. The QC/MRL was not reported for this method; however, the quarterly check may not be required at this time. The data are not affected.

EPA SW-846 Method 8330B

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration requirements were met. The %RSDs were within quality control requirements for both columns.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Ds were within quality control requirements on both columns.

Continuing Calibration

The CCV %Ds for all compounds were within the quality control requirements of less than or equal to 15% on both columns.

Blanks

Method blank analysis met quality control requirements of no detected contamination greater than one-half the reporting limit.

Surrogate Spikes

Surrogate %Rs were within quality control requirements.

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements. The RPDs were within quality control requirements with the exception of tetryl. Data were not qualified for this.

Laboratory Control Sample

The %Rs for the LCS were within quality control limits with the following exception:

- The %R for tetryl was less than the lower control limit in the LCS. The laboratory has stated that the recovery for tetryl was within the laboratory's historical limits and therefore re-extraction and/or reanalysis was not performed. Tetryl was not detected in the associated sample; therefore, tetryl was qualified with a "UJ" flag.

QC Sample	Compound	%R	Associated Sample	Flag
LCS 280-251385/2-A	tetryl	51%	JP-M13-GWMW811	UJ

Sample Analysis

Sample analysis met method requirements for secondary column confirmation and dilutions. The retention times were within the quality control requirements. The RPDs between the primary and secondary columns were within the quality control limit of less than or equal to 40% in samples.

EPA SW-846 Method 6010C

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibrations were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements with the following exceptions:

- Sodium was detected in the method blank at a concentration less than one-half the reporting limit. The associated sample had a concentration of sodium that was three orders of magnitude greater than in the method blank; therefore, sodium was not qualified.
- Magnesium and vanadium were detected in continuing calibration blanks (CCBs) at concentrations less than one-half the reporting limit. Vanadium was detected in sample JP-M13-GWMW811 at a concentration comparable to that in the CCB. Vanadium was qualified with a "B" flag in this sample. Magnesium was detected in the associated sample at a concentration more than ten times that in the CCB; therefore, the result was not qualified.
- Sodium was detected in a CCB at a concentration less than one-half the reporting limit. The associated sample had a concentration of sodium that was three orders of magnitude greater than in the CCB; therefore, sodium was not qualified.

Compound	QC Sample	Concentration	Associated Samples	Concentration	Flag
Vanadium	CCB 280-253266/46	1.15 J ug/L	JP-M13-GWMW811	3.1 J ug/L	B

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements with the following exceptions:

- The %R for aluminum in the MS and MSD was greater than the upper control limit. Aluminum was detected in the parent sample (JP-M13-GWMW811) and was qualified with a "J" flag.
- The %R for calcium in the MS was greater than the upper control limit. Calcium was detected in the parent sample (JP-M13-GWMW811) and was qualified with a "J" flag.
- The %R for sodium in the MS was greater than the upper control limit. Sodium was detected in the parent sample at more than four times the spiked amount. Therefore, sodium was not qualified.

The RPDs were within quality control requirements.

QC Sample	Compound	%R	Associated Sample	Flag
JP-M13-GWMW811MS/MSD	aluminum calcium	133%/133% 115%/111%	JP-M13-GWMW811	J J

Laboratory Control Sample

The %Rs for the LCS were within quality control requirements.

CRQL Check Standard

The CRQL check standard met quality control requirements.

The serial dilution was not calculable for most metals (Ag, Al, As, Ba, Be, Cd, Co, Cr, Cu, Fe, K, Mn, Ni, Pb, Sb, Se, Tl, V, and Zn). The reported calculated %Ds were within quality control requirements for Ca, Mg, and Na. The post digestion spike analysis was performed.

The post digestion spike was within quality control requirements with the exception that sodium was recovered below the lower control limit. Sodium was qualified as "J" for sample JP-M13-GWMW811.

QC Sample	Compound	%R	Associated Sample	Flag
Post Digestion Spike	sodium	78%	JP-M13-GWMW811	J

Interelement Check Standard

The interference check standard (ICS-A and ICS-AB) met quality control requirements with the exception that chromium and manganese were detected at a level greater than the LOD for analytical batch 280-253266 and cadmium was detected at a level greater than the LOD for analytical batch 280-253386. The case narrative indicates that the laboratory believes the solution contains trace impurities of these elements and that the results are not due to matrix interference. The results are consistent with those found by the manufacturer of the solution. The associated sample results were not qualified.

EPA SW-846 Method 7470A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration %Rs were within quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met method quality control requirements.

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements. The RPD was within quality control requirements.

Laboratory Control Sample

The %R for the LCS was within quality control requirements.

EPA SW-846 Method 9056A

Holding Time/Sample Preservation

Holding time requirements were met and cooler temperatures were within quality control requirements.

Initial Calibration

Initial calibration met quality control requirements.

Second Source Calibration Verification (Initial Calibration Verification)

The ICV %Rs were within quality control requirements.

Continuing Calibration

Continuing calibration %Rs were within quality control requirements.

Blanks

The initial, method, and continuing calibration blanks met quality control requirements of no detected contamination greater than one-half the reporting limit.

Matrix Spike/Matrix Spike Duplicate

The %Rs for the MS and MSD samples were within quality control requirements. The RPDs were within quality control requirements.

Laboratory Control Sample/Laboratory Control Sample Duplicate

The %Rs for the LCS and LCSD were within quality control requirements. The RPDs were within quality control requirements.

Quality Control/Method Reporting Limit Check

The MRL results met quality control requirements.

All other acceptance criteria were met for the general chemistry data as reported.

Summary

Based on the data validation presented herein, and the QC requirements as specified in the project QAPP and guidance documents, data is considered usable as qualified and noted above.

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-251774	Instrument ID:	VMS_G2
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G2_7651.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	11/06/2014 2226			Final Weight/Volume:	20 mL
Prep Date:	11/06/2014 2226				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U Q	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U Q	0.32	1.0
1,1-Dichloroethane	0.40	U	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U Q	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U Q	0.13	1.0
1,2-Dichloropropane	0.40	U Q	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U Q	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U Q	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U Q	1.0	5.0
Acetone	6.4	U	1.9	10
Benzene	0.20	U Q	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U Q	0.17	1.0
Bromoform	0.40	U Q	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U Q	0.19	2.0
Chlorobenzene	0.20	U J Q UJ	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.20	U	0.15	1.0
cis-1,3-Dichloropropene	0.20	U Q	0.16	1.0
Dibromochloromethane	0.40	U Q	0.17	1.0
Dibromomethane	0.40	U Q	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U Q	0.16	1.0
Ethylene Dibromide	0.40	U Q	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-251774	Instrument ID:	VMS_G2
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G2_7651.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	11/06/2014 2226			Final Weight/Volume:	20 mL
Prep Date:	11/06/2014 2226				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U Q	0.34	2.0
Naphthalene	0.80	U J UJ	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U Q	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U Q	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U Q	0.20	1.0
Toluene	0.22	J Q J	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U Q	0.19	1.0
Trichloroethene	0.20	U Q	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	120	Q	81 - 118
4-Bromofluorobenzene (Surr)	108		85 - 114
Dibromofluoromethane (Surr)	114		80 - 119
Toluene-d8 (Surr)	115	Q	89 - 112

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **TRIPBLANK102914**

Lab Sample ID: 280-61932-13

Client Matrix: Water

Date Sampled: 10/29/2014 0800

Date Received: 10/30/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-251774	Instrument ID:	VMS_G2
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G2_7654.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	11/06/2014 2326			Final Weight/Volume:	20 mL
Prep Date:	11/06/2014 2326				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,1,1,2-Tetrachloroethane	0.40	U	0.17	1.0
1,1,1-Trichloroethane	0.20	U	0.16	1.0
1,1,2,2-Tetrachloroethane	0.40	U	0.20	1.0
1,1,2-Trichloroethane	0.40	U	0.32	1.0
1,1-Dichloroethane	0.40	U	0.16	1.0
1,1-Dichloroethene	0.40	U	0.14	1.0
1,1-Dichloropropene	0.40	U	0.15	1.0
1,2,3-Trichlorobenzene	0.40	U	0.18	1.0
1,2,3-Trichloropropane	0.80	U	0.77	3.0
1,2,4-Trichlorobenzene	0.80	U	0.32	1.0
1,2,4-Trimethylbenzene	0.20	U	0.14	1.0
1,2-Dibromo-3-Chloropropane	1.6	U	0.81	5.0
1,2-Dichlorobenzene	0.20	U	0.13	1.0
1,2-Dichloroethane	0.40	U	0.13	1.0
1,2-Dichloropropane	0.40	U	0.13	1.0
1,3,5-Trimethylbenzene	0.40	U	0.14	1.0
1,3-Dichlorobenzene	0.20	U	0.16	1.0
1,3-Dichloropropane	0.40	U	0.15	1.0
1,4-Dichlorobenzene	0.40	U	0.16	1.0
2,2-Dichloropropane	0.40	U	0.20	1.0
2-Butanone (MEK)	3.2	U	1.8	6.0
2-Chlorotoluene	0.40	U	0.17	1.0
2-Hexanone	3.2	U	1.4	5.0
4-Chlorotoluene	0.40	U	0.17	1.0
4-Isopropyltoluene	0.40	U	0.17	1.0
4-Methyl-2-pentanone (MIBK)	3.2	U	1.0	5.0
Acetone	6.4	U	1.9	10
Benzene	0.20	U	0.16	1.0
Bromobenzene	0.20	U	0.17	1.0
Bromochloromethane	0.40	U	0.10	1.0
Bromodichloromethane	0.20	U	0.17	1.0
Bromoform	0.40	U	0.19	1.0
Bromomethane	0.40	U	0.21	2.0
Carbon disulfide	0.80	U	0.45	2.0
Carbon tetrachloride	0.40	U	0.19	2.0
Chlorobenzene	0.20	U	0.17	1.0
Chloroethane	1.6	U	0.41	2.0
Chloroform	0.20	U	0.16	1.0
Chloromethane	0.80	U	0.30	2.0
cis-1,2-Dichloroethene	0.20	U	0.15	1.0
cis-1,3-Dichloropropene	0.20	U	0.16	1.0
Dibromochloromethane	0.40	U	0.17	1.0
Dibromomethane	0.40	U	0.17	1.0
Dichlorodifluoromethane	0.80	U	0.31	2.0
Ethylbenzene	0.20	U	0.16	1.0
Ethylene Dibromide	0.40	U	0.18	1.0

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **TRIPBLANK102914**

Lab Sample ID: 280-61932-13

Client Matrix: Water

Date Sampled: 10/29/2014 0800

Date Received: 10/30/2014 0930

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-251774	Instrument ID:	VMS_G2
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	G2_7654.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	11/06/2014 2326			Final Weight/Volume:	20 mL
Prep Date:	11/06/2014 2326				

Analyte	Result (ug/L)	Qualifier	DL	LOQ
Hexachlorobutadiene	0.40	U	0.36	1.0
Isopropylbenzene	0.40	U	0.19	1.0
Methyl tert-butyl ether	0.40	U	0.25	5.0
Methylene Chloride	0.80	U	0.32	5.0
m-Xylene & p-Xylene	0.80	U	0.34	2.0
Naphthalene	0.80	U	0.22	1.0
n-Butylbenzene	0.40	U	0.32	1.0
N-Propylbenzene	0.20	U	0.16	1.0
o-Xylene	0.40	U	0.19	1.0
sec-Butylbenzene	0.40	U	0.17	1.0
Styrene	0.40	U	0.17	1.0
tert-Butylbenzene	0.40	U	0.16	1.0
Tetrachloroethene	0.40	U	0.20	1.0
Toluene	0.40	U	0.17	1.0
trans-1,2-Dichloroethene	0.20	U	0.15	1.0
trans-1,3-Dichloropropene	0.40	U	0.19	1.0
Trichloroethene	0.20	U	0.16	1.0
Trichlorofluoromethane	0.80	U	0.29	2.0
Vinyl acetate	1.6	U	0.94	3.0
Vinyl chloride	0.40	U	0.10	1.5
Xylenes, Total	1.6	U	0.19	2.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		81 - 118
4-Bromofluorobenzene (Surr)	100		85 - 114
Dibromofluoromethane (Surr)	101		80 - 119
Toluene-d8 (Surr)	98		89 - 112

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-251243	Lab File ID:	G6_15022.D
Dilution:	1.0			Initial Weight/Volume:	1045.5 mL
Analysis Date:	11/11/2014 2115			Final Weight/Volume:	1 mL
Prep Date:	11/04/2014 1320			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier		DL	LOQ
1,2,4-Trichlorobenzene	0.96	U J		0.27	9.6
1,2-Dichlorobenzene	0.96	U		0.22	9.6
1,2-Diphenylhydrazine	0.96	U J	UJ	0.22	9.6
1,3-Dichlorobenzene	0.96	U		0.29	9.6
1,4-Dichlorobenzene	0.96	U		0.31	9.6
2,2'-oxybis[1-chloropropane]	0.96	U		0.27	9.6
2,4,5-Trichlorophenol	0.96	U J	UJ	0.43	19
2,4,6-Trichlorophenol	0.96	U J		0.28	19
2,4-Dichlorophenol	1.9	U J		0.61	9.6
2,4-Dimethylphenol	3.8	U		0.55	9.6
2,4-Dinitrophenol	19	U J		9.6	77
2,4-Dinitrotoluene	3.8	U		1.6	19
2,6-Dinitrotoluene	3.8	U		1.8	19
2-Chloronaphthalene	0.96	U J		0.25	9.6
2-Chlorophenol	3.8	U		1.9	9.6
2-Methylnaphthalene	0.96	U J		0.28	9.6
2-Methylphenol	3.8	U		0.94	9.6
2-Nitroaniline	3.8	U		1.7	48
2-Nitrophenol	0.96	U		0.37	19
3 & 4 Methylphenol	0.96	U		0.24	19
3,3'-Dichlorobenzidine	9.6	U J	UJ	1.9	48
3-Nitroaniline	1.9	U J		1.9	48
4,6-Dinitro-2-methylphenol	9.6	U		3.8	77
4-Bromophenyl phenyl ether	0.96	U J	UJ	0.41	9.6
4-Chloro-3-methylphenol	4.8	U		2.3	19
4-Chloroaniline	4.8	U J		2.0	24
4-Chlorophenyl phenyl ether	3.8	U J	UJ	1.6	9.6
4-Nitroaniline	3.8	U J	UJ	1.9	48
4-Nitrophenol	9.6	U		1.2	48
Acenaphthene	0.96	U J		0.27	9.6
Acenaphthylene	0.96	U J		0.47	9.6
Anthracene	0.96	U J	UJ	0.40	9.6
Benzidine	96	U		48	190
Benzo[a]anthracene	0.96	U J	UJ	0.33	9.6
Benzo[a]pyrene	0.96	U J		0.30	9.6
Benzo[b]fluoranthene	0.96	U J		0.51	9.6
Benzo[g,h,i]perylene	0.96	U J		0.48	9.6
Benzo[k]fluoranthene	0.96	U J		0.44	9.6
Benzoic acid	48	U		9.6	77
Benzyl alcohol	0.96	U		0.22	24
Bis(2-chloroethoxy)methane	3.8	U		0.93	9.6
Bis(2-chloroethyl)ether	0.96	U		0.39	19
Bis(2-ethylhexyl) phthalate	0.96	U J	UJ	0.54	9.6
Butyl benzyl phthalate	3.8	U J		0.96	19
Carbazole	0.96	U J		0.41	9.6
Chrysene	0.96	U J	UJ	0.52	9.6

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Method:	8270D	Analysis Batch:	280-252526	Instrument ID:	SMS_G6
Prep Method:	3520C	Prep Batch:	280-251243	Lab File ID:	G6_15022.D
Dilution:	1.0			Initial Weight/Volume:	1045.5 mL
Analysis Date:	11/11/2014 2115			Final Weight/Volume:	1 mL
Prep Date:	11/04/2014 1320			Injection Volume:	0.5 uL

Analyte	Result (ug/L)	Qualifier		DL	LOQ
Dibenz(a,h)anthracene	0.96	U J	UJ	0.49	9.6
Dibenzofuran	0.96	U J	↓	0.28	9.6
Diethyl phthalate	0.96	U		0.36	19
Dimethyl phthalate	0.96	U		0.20	19
Di-n-butyl phthalate	3.8	U J	UJ	1.1	19
Di-n-octyl phthalate	0.96	U J		0.33	19
Fluoranthene	0.96	U J		0.19	19
Fluorene	0.96	U J		0.30	9.6
Hexachlorobenzene	0.96	U J	↓	0.63	9.6
Hexachlorobutadiene	9.6	U J		3.2	29
Hexachloroethane	3.8	U J		2.0	9.6
Indeno[1,2,3-cd]pyrene	0.96	U J	UJ	0.62	9.6
Isophorone	0.96	U		0.20	9.6
Naphthalene	0.96	U		0.28	9.6
Nitrobenzene	1.9	U		0.77	19
N-Nitrosodimethylamine	0.96	U		0.28	9.6
N-Nitrosodi-n-propylamine	0.96	U		0.33	19
N-Nitrosodiphenylamine	0.96	U J		0.42	9.6
Pentachlorophenol	38	U J	UJ	19	77
Phenanthrene	0.96	U J	↓	0.25	9.6
Phenol	4.8	U		1.9	9.6
Pyrene	0.96	U J	UJ	0.35	9.6

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4,6-Tribromophenol (Surr)	87		43 - 140
2-Fluorobiphenyl	75		44 - 119
2-Fluorophenol (Surr)	78		19 - 119
Nitrobenzene-d5 (Surr)	77		44 - 120
Phenol-d5 (Surr)	80		10 - 115
Terphenyl-d14 (Surr)	55		50 - 134

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	280-252465	Instrument ID:	CHHPLCX4_C18
Prep Method:	3535	Prep Batch:	280-251385	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	5 mL
Analysis Date:	11/12/2014 1206			Injection Volume:	100 uL
Prep Date:	11/05/2014 1335			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	DL	LOQ
1,3,5-Trinitrobenzene	0.40	U	0.20	1.0
1,3-Dinitrobenzene	0.15	U	0.089	0.40
2,4,6-Trinitrotoluene	0.15	U	0.072	0.40
2,4-Dinitrotoluene	0.15	U	0.084	0.40
2,6-Dinitrotoluene	0.15	U	0.065	0.20
2-Amino-4,6-dinitrotoluene	0.15	U	0.051	0.20
2-Nitrotoluene	0.15	U	0.086	0.40
3-Nitrotoluene	0.15	U	0.083	0.40
4-Amino-2,6-dinitrotoluene	0.15	U	0.058	0.20
4-Nitrotoluene	0.40	U	0.20	1.0
HMX	0.15	U	0.088	0.40
Nitrobenzene	0.15	U	0.091	0.40
RDX	0.15	U	0.052	0.20
Tetryl	0.15	U J Q UJ	0.079	0.24

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	111		83 - 119

Client: MWH Americas Inc

Job Number: 280-61932-1

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9
Client Matrix: Water

Date Sampled: 10/29/2014 0950
Date Received: 10/30/2014 0930

6010C Metals (ICP)-Dissolved

Analysis Method:	6010C	Analysis Batch:	280-253266	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-251710	Lab File ID:	26C111414.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/14/2014 2226			Final Weight/Volume:	50 mL
Prep Date:	11/07/2014 1430				

Analyte	Result (mg/L)	Qualifier		DL	LOQ
Aluminum	0.44	J	J	0.018	0.30
Barium	0.077			0.00058	0.010
Beryllium	0.00050	U		0.00047	0.0015
Calcium	150	J	J	0.035	1.0
Chromium	0.0023	J Q		0.00066	0.015
Cobalt	0.0018	J		0.0012	0.015
Copper	0.0058	J		0.0014	0.015
Magnesium	86			0.011	0.50
Manganese	0.11	Q		0.00025	0.010
Nickel	0.010	J		0.0013	0.040
Potassium	12			0.24	3.0
Vanadium	0.0031	J	B	0.0011	0.015
Zinc	0.011	J		0.0045	0.15

Analysis Method:	6010C	Analysis Batch:	280-253386	Instrument ID:	MT_026
Prep Method:	3005A	Prep Batch:	280-251710	Lab File ID:	26a111614.asc
Dilution:	1.0			Initial Weight/Volume:	50 mL
Analysis Date:	11/16/2014 1545			Final Weight/Volume:	50 mL
Prep Date:	11/07/2014 1430				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Antimony	0.0033	J	0.0031	0.020
Arsenic	0.012	U	0.0044	0.025
Cadmium	0.00086	J Q	0.00045	0.0050
Iron	1.0		0.022	0.10
Lead	0.0050	U	0.0026	0.015
Selenium	0.012	U	0.0049	0.022
Silver	0.0020	U	0.00093	0.015
Sodium	260	J	J 0.092	5.0
Thallium	0.012	U	0.0049	0.040

7470A Mercury (CVAA)-Dissolved

Analysis Method:	7470A	Analysis Batch:	280-251374	Instrument ID:	MT_034
Prep Method:	7470A	Prep Batch:	280-250902	Lab File ID:	141104bb.txt
Dilution:	1.0			Initial Weight/Volume:	30 mL
Analysis Date:	11/04/2014 1638			Final Weight/Volume:	30 mL
Prep Date:	11/04/2014 1100				

Analyte	Result (mg/L)	Qualifier	DL	LOQ
Mercury	0.000080	U	0.000027	0.00020

General Chemistry

Client Sample ID: **JP-M1-GWMW648**

Lab Sample ID: 280-61932-1

Client Matrix: Water

Date Sampled: 10/28/2014 1315

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	32		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 1418

Client: MWH Americas Inc

Job Number: 280-61932-1

General Chemistry

Client Sample ID: **JP-M1-GWMW644**

Lab Sample ID: 280-61932-2

Client Matrix: Water

Date Sampled: 10/28/2014 1348

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	180		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 1436

General Chemistry

Client Sample ID: **JP-M1-GWMW643**

Lab Sample ID: 280-61932-3

Client Matrix: Water

Date Sampled: 10/28/2014 1309

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	75		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 1454

General Chemistry

Client Sample ID: **JP-M1-GWMW649**

Lab Sample ID: 280-61932-4

Client Matrix: Water

Date Sampled: 10/28/2014 1452

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	150		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 1511

General Chemistry

Client Sample ID: **JP-M1-GWMW231**

Lab Sample ID: 280-61932-5

Client Matrix: Water

Date Sampled: 10/28/2014 1545

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	35000	D	mg/L	120	2500	500	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 2244

Client: MWH Americas Inc

Job Number: 280-61932-1

General Chemistry

Client Sample ID: **JP-M1-SW709**

Lab Sample ID: 280-61932-6

Client Matrix: Water

Date Sampled: 10/28/2014 1405

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	68		mg/L	0.23	5.0	1.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 1623

Client: MWH Americas Inc

Job Number: 280-61932-1

General Chemistry

Client Sample ID: **JP-M1-GWMW640**

Lab Sample ID: 280-61932-7

Client Matrix: Water

Date Sampled: 10/28/2014 1546

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	6300	D	mg/L	23	500	100	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 2302

General Chemistry

Client Sample ID: **JP-M1-GWMW995**

Lab Sample ID: 280-61932-8

Client Matrix: Water

Date Sampled: 10/28/2014 1500

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	30000	D	mg/L	120	2500	500	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 2319

General Chemistry

Client Sample ID: **JP-M13-GWMW811**

Lab Sample ID: 280-61932-9

Client Matrix: Water

Date Sampled: 10/29/2014 0950

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Nitrate as N	1.0	U	mg/L	0.42	5.0	10	9056A
Analysis Batch: 280-250467	Analysis Date: 10/31/2014 0520						
Sulfate	260	D	mg/L	2.3	50	10	9056A
Analysis Batch: 280-250468	Analysis Date: 10/31/2014 0520						

General Chemistry

Client Sample ID: **JP-M1-GWMW107**

Lab Sample ID: 280-61932-10

Client Matrix: Water

Date Sampled: 10/29/2014 1240

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	16000	D	mg/L	120	2500	500	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 2337

General Chemistry

Client Sample ID: **JP-M1-GWMW642**

Lab Sample ID: 280-61932-11

Client Matrix: Water

Date Sampled: 10/29/2014 1148

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	420	D	mg/L	1.2	25	5.0	9056A

Analysis Batch: 280-253097 Analysis Date: 11/14/2014 2355

General Chemistry

Client Sample ID: **JP-M1-GWMW641**

Lab Sample ID: 280-61932-12

Client Matrix: Water

Date Sampled: 10/29/2014 1220

Date Received: 10/30/2014 0930

Analyte	Result	Qual	Units	DL	LOQ	Dil	Method
Sulfate	690	D	mg/L	2.3	50	10	9056A

Analysis Batch: 280-253097 Analysis Date: 11/15/2014 0048

B2 - DATA USABILITY REPORT

Former Joliet Army Ammunition Plant
Will County, Illinois

Appendix B2
Data Usability Report
Groundwater and Surface Water Sampling – October 2014

Long-Term Monitoring for Multiple Groundwater Sites

Prepared For:
U.S. Army Environmental Command

Firm Fixed Price Contract
W9124J-14-P-0142

MWH

DATA USABILITY REPORT

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1 Summary of Qualified Results

CRS/crs/BTZ
P:\JOLIET 2014\2014 Semi-annual GW Monitoring Report\Final\Appendix B - Data Reports\Appendix B2 - Data Usability Report\Individual Files\Appendix B2 October 2014 - TOC.docx
10506045 DET-1

ACRONYMS AND ABBREVIATIONS

%D	percent difference
%R	percent recovery
CCB	continuing calibration blank
CCV	continuing calibration verification
GC/MS	gas chromatography/mass spectroscopy
ICAL	initial calibration
ICB	initial calibration blank
ICS	interference check sample
ICV	initial calibration verification
J	estimated value
JOAAP	Joliet Army Ammunition Plant
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MD	matrix duplicate (metals)
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
MWH	MWH Americas, Inc.
ORP	oxidation/reduction potential
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
R	analytical result is unusable
RPD	relative percent difference
SDG	sample delivery group
SVOCs	semivolatile organic compounds
TAL	target analyte list
Test America	Test America Laboratories, Inc.
U	analyte analyzed for but not detected
UJ	analyte is not detected estimated quantitation limit
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

APPENDIX B2

DATA USABILITY REPORT

1.0 INTRODUCTION

The following data usability summary discusses quality assurance/quality control (QA/QC) outliers for each analyte group per sampling round and summarizes the Data Evaluation Reports presented in Appendix B1. Data qualifiers were added to results and imported into the Joliet Army Ammunition Plant (JOAAP) database. Data qualifiers used in the validation process may include the following:

- U – Not detected. This validation qualifier was added if there was blank contamination and the sample concentration was less than five times the blank concentration (ten times for common organic contaminants methylene chloride, acetone, and phthalates)
- J – Estimated value. This validation qualifier was added if the reported concentration is estimated.
- UJ – Not detected, estimated quantitation limit. This validation qualifier was added if the analyte was not detected and QA/QC parameters were not met.
- R – Unusable data. This validation qualifier was added if the QA/QC parameters were not met and were extremely low (i.e. less than 10% recovery for laboratory control samples (LCS) or surrogate recoveries)
- B – Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.

Test America Laboratories, Inc. (Test America) located at 4955 Yarrow Street, Arvada, Colorado performed the analyses of groundwater and surface water samples collected in October 2014 at the JOAAP located in Wilmington, Illinois. Groundwater was collected from seven sites (L1, L2, L3, L14, M1, M6, M7, M8, M11, M13, and Other Areas) and analyzed for the following parameters in October 2014:

- VOCs were analyzed by SW846 Method 8260B at Site M13 Landfill.
- SVOCs were analyzed by SW846 Method 8270C at Site M13 Landfill.
- Explosives were analyzed by SW846 Method 8330B at Sites L1, L2, L3, L14, MFG, and M13 Landfill.
- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Sites L3 Landfill and M13 Landfill.
- Sulfate was analyzed by USEPA Method 9056A at Sites M1, M8, and M13 Landfill.
- Nitrate was analyzed by USEPA Method 9056A at Site M13 Landfill.

Surface water was collected from three sites at JOAAP and analyzed for the following parameters:

- Explosives were analyzed by SW846 Method 8330B at Site L1 and Site L3 Landfill.
- TAL metals were analyzed by SW846 Methods 6010B and 7470A at Site L3 Landfill.
- Sulfate was analyzed by USEPA Method 9056A at Site M1.

Field parameters are not discussed in this data usability report, but were recorded by field personnel with a water quality meter at the time of sample collection and included:

- pH, temperature, specific conductivity, dissolved oxygen, turbidity, and oxidation/reduction potential (ORP)

The following summarizes the sample delivery group (SDG) and corresponding data quality evaluation report:

Sample Delivery Group	Data Validation Report	Associated Samples
280-61566-1	JOAAP Data Quality Evaluation Report - October 2014 Report 1 of 4	JP-M8-GWMW330 JP-M13-GWMW809 JP-M13-GWMW808 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW999 TRIP BLANK 102114
280-61741-1	JOAAP Data Quality Evaluation Report - October 2014 Report 2 of 4	JP-L3-GWMW412 JP-L3-GWMW631 JP-L3-GWMW996 JP-L3-SW004 JP-L3-GWMW410 JP-L3-GWMW630 JP-L3-GWMW633 JP-M6-GWMW212R JP-M6-GWMW652 JP-M6-GWMW313 JP-M6-GWMW998 JP-M6-GWMW654 JP-M7-GWMW124R JP-M6-GWMW318 JP-M6-GWMW162R JP-M6-GWMW319 JP-M6-GWMW123R JP-L3-GWMW997 JP-L3-SW777 JP-L3-SW558

Sample Delivery Group	Data Validation Report	Associated Samples
		JP-L3-SW557
280-61925-1	JOAAP Data Quality Evaluation Report - October 2014 Report 3 of 4	JP-M6-GWMW117 JP-OA-GWMW118 JP-OA-GWMW119 JP-M1-GWMW646 JP-M1-GWMW645 JP-L1-GWWES3 JP-L1-GWMW173 JP-L1-GWMW174 JP-L1-SW550 JP-L1-GWWES1 JP-L1-GWMW131
280-61932-1	JOAAP Data Quality Evaluation Report - October 2014 Report 4 of 4	JP-M1-GWMW648 JP-M1-GWMW644 JP-M1-GWMW643 JP-M1-GWMW649 JP-M1-GWMW231 JP-M1-SW709 JP-M1-GWMW640 JP-M1-GWMW995 JP-M13-GWMW811 JP-M1-GWMW107 JP-M1-GWMW642 JP-M1-GWMW641 TRIPBLANK 102914

2.0 LABORATORY QA/QC ELEMENTS

MWH Americas, Inc. (MWH) performed the equivalent of USEPA Level III validation on 100% of the data and Level IV on 10% of the data using the JOAAP Quality Assurance Project Plan (QAPP) for Long Term Monitoring, a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, and the Department of Defense Quality Systems Manual for Environmental Laboratories validation guidelines, as appropriate. QAPP Worksheets #34, #35, and #36 describe the verification process and QAPP Worksheet #37 describes the data usability assessment.

Data were evaluated for precision, accuracy, representativeness, comparability, and completeness based on results of the following QA/QC samples and parameters, where applicable:

- Sample preservation
- Sample holding times
- Surrogate spikes (organics)
- Laboratory control sample (LCS/LCSD)
- Matrix spike/matrix spike duplicate (MS/MSD)
- Matrix duplicate (MD) for metals
- Laboratory duplicate samples
- Gas chromatography/mass spectroscopy (GC/MS) tunes (organics)
- Internal standards (organics)
- Initial calibration (ICAL) standards
- Initial calibration verification (ICV) standards
- Continuing calibration verification (CCV) standards
- Interference check samples (ICSs) (metals)
- Trip blanks (VOCs)
- Serial dilution (metals)
- Method blanks
- Initial calibration blanks (ICBs)
- Continuing calibration blanks (CCBs)

The following field QA/QC samples were collected and analyzed:

- One field duplicate per 10 field samples collected
- One MS/MSD (extra sample volume) per 20 field samples collected

- Trip blanks included with each cooler containing VOC samples

Samples were stored in coolers on wet ice, picked-up from JOAAP by Test America and transported to their University Park, Illinois lab, then shipped to the analytical laboratory in Arvada (Denver), Colorado under chain-of-custody documentation.

3.0 EVALUATION OF MEASUREMENT QUALITY OBJECTIVES

For each analytical method, laboratory QA/QC results were compared to the established acceptance limits. Refer to the associated Data Quality Evaluation Reports presented in Appendix B1 for analysis of the below criteria for each individual SDG and associated samples. The parameters reviewed by method within each Data Quality Evaluation Report for each SDG each are outlined as follows.

Precision was quantitatively evaluated by reviewing the relative percent differences (RPDs) for the following QA/QC samples:

- MS/MSDs
- Matrix duplicate (metals)
- LCS/LCSDs
- Laboratory duplicate samples
- Serial dilution (metals)
- Field duplicate samples

Accuracy was quantitatively evaluated by comparing the percent recovery (%R) or percent difference (%D) for the following QA/QC samples or parameters:

- Surrogate spikes (VOCs and SVOCs)
- Internal standards (VOCs and SVOCs)
- ICVs
- CCVs
- MS/MSDs
- LCSs
- ICSs (metals)

Refer to Worksheet #12 (Method Performance Criteria Table) and Worksheet #28 (QC Samples Table) for QC samples analyzed and criteria limits.

Representativeness was evaluated through a review of the following QA/QC elements:

- Sample preservation
- Sample holding times
- Compliance with sample collection, handling, and analysis methods specified in the Work Plan

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to representativeness.

Comparability was qualitatively evaluated through a review of the following QA/QC elements:

- Sample collection and handling procedures
- Sample preparation, analysis, and quantitation procedures
- Units of measure

Refer to QAPP Worksheets # 21 through # 27 for evaluation criteria related to comparability. Comparability was acceptable for the October 2014 sampling events.

No samples were rejected as a result of not meeting one or more of the above criteria as presented in the Data Quality Evaluation Reports in Appendix C1.

3.1 COMPLETENESS

Completeness was calculated by dividing the number of acceptable sample results by the total number of scheduled sample results. All scheduled and planned samples were collected and analyzed. The completeness goal for holding times was 100%. Completeness goals for holding times were met for all analytes in the October 2014 sampling round.

The laboratory completeness goal for the number of acceptable sample results compared to the total sample results is 100%. Only results qualified "R" as unusable were considered unacceptable sample results for calculating laboratory completeness. Sample results qualified "J" as estimated, "U" as not detected, or "UJ" as not detected estimated quantitation limit were considered quantitative and acceptable.

No analytes were qualified "R" as unusable for the October 2014 sampling round. Completeness and usability was 100% for October 2014.

Refer to QAPP Worksheet #37 for the data usability criteria.

3.2 SENSITIVITY

Sensitivity was evaluated by comparing method reporting limits (MRLs) with appropriate criteria. In samples not requiring dilutions, adequate sensitivity was demonstrated with MRLs equal to or less than the associated criteria. Refer to QAPP Worksheet #15 the Reference Limits and Evaluation Table for compound specific MRLs, method detection limits, and project action limits.

3.3 TRACEABILITY

Traceability was evaluated by reviewing field documentation, chain-of-custody documentation, and analytical reports. Each sample was found to be traceable from collection through analysis.

3.4 DATA QUALIFIERS

Refer to Tables 3-1 through 3-5 of the 2014 Semi-annual Groundwater Monitoring Report for summaries of groundwater and surface water data. Refer to Appendix B1 for data evaluation reports associated with each SDG. Table 1 of Appendix B2 provides a summary of all qualified data.

3.5 CONCLUSIONS

As discussed in Section 3.1, completeness goals were met for the October 2014 analytical data. The data complies with contract requirements. The estimated data qualified “J” or “UJ” and blank qualified data qualified “U” which does not meet QA criteria are considered usable and do not negatively impact the project objectives. There were no biases or trends observed in this dataset.

4.0 REFERENCES

DoD, 2006. *Quality Systems Manual for Environmental Laboratories, Final Version 3*, DoD Environmental Data Quality Workgroup. January 2006.

MWH, 2010. *Final Quality Assurance Project Plan (QAPP) JOAAP Environmental Remediation*, MWH America's Inc. (MWH), March 2010.

USEPA, 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods Third Edition*. November 1986.

USEPA, 2008. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. June 2008.

USEPA, 2010. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*. January 2010.

APPENDIX B2
TABLE 1

Summary of Qualified Results
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
October 2014							
VOCs	Method Blank		Acetone	2.84 ug/L	JP-M13-GWMW809 JP-M13-GWMW808 JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW999 TRIP BLANK 102114	280-61566-1	B
Explosives	Surrogate Spike		1,2-dinitrobenzene - Affecting compounds 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene	423% (83%-119%)	JP-M13-GWMW362	280-61566-1	J for Detects
Explosives	Surrogate Spike		1,2-dinitrobenzene - Affecting compounds 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene	414% (83%-119%)	JP-M13-GWMW999	280-61566-1	J for Detects
Explosives	LCS 280-249777/2-A LCSD 280-249777/3-A		2-amino-4,6-dinitrotoluene tetryl	78%/81% 60%/52%	JP-M13-GWMW809 JP-M13-GWMW808 JP-M13-GWMW806 JP-M13-GWMW807 JP-M13-GWMW126R JP-M13-GWMW362 JP-M13-GWMW999	280-61566-1	J (all detects) UJ (all non-detects)
Metals	Blanks		Arsenic	4.67 J ug/L/ 4.61 J ug/L	JP-M13-GWMW808 JP-M13-GWMW806	280-61566-1	B
Metals	QC - Post Digestion Spike		Calcium	70% R	JP-M13-GWMW999	280-61566-1	J
Nitrate	Holding Time		Collection Date and Time 10/20/14 1647 10/20/14 1653	Analyze Date and Time 10/22/14 2015 10/22/14 2127	JP-M13-GWMW809 JP-M13-GWMW808	280-61566-1	J
Sulfate	MS/MSD		Sulfate	112%/114%	JP-M13-GWMW809	280-61566-1	J
Explosives	Surrogate Spike		1,3-dinitrobenzene	1,2-dinitrobenzene - 4750% (83%-119%)	JP-M6-GWMW212R/DL	280-61741-1	J for detects
Explosives	Surrogate Spike		2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	1,2-dinitrobenzene - 4745% (83%-119%)	JP-M6-GWMW212R/DL	280-61741-1	J for detects

APPENDIX B2
TABLE 1

Summary of Qualified Results
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
Explosives	Surrogate Spike		1,3-dinitrobenzene 2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	1,2-dinitrobenzene - 2555% (83%-119%)	JP-M6-GWMW652	280-61741-1	J for detects
Explosives	Surrogate Spike		2,4,6-trinitrotoluene 2,4-dinitrotoluene 2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 3-nitrotoluene 4-amino-2,6-dinitrotoluene 4-nitrotoluene nitrobenzene	1,2-dinitrobenzene - 2654% (83%-119%) 1,2-dinitrobenzene - 2051% (83%-119%)	JP-M6-GWMW998/DL	280-61741-1	J for detects
Explosives	Surrogate Spike		1,3-dinitrobenzene RDX	1,2-dinitrobenzene - 294% (83%-119%)	JP-M6-GWMW318	280-61741-1	J for detects
Explosives	Surrogate Spike		2-amino-4,6-dinitrotoluene	1,2-dinitrobenzene - 1787% (83%-119%)	JP-M6-GWMW319	280-61741-1	J for detects
Explosives	Surrogate Spike		1,3,5-trinitrobenzene 1,3-dinitrobenzene nitrobenzene	1,2-dinitrobenzene - 63% (83%-119%)	JP-M6-GWMW319	280-61741-1	UJ UJ J
Explosives	MS/MSD		2-nitrotoluene	61%/57% %R	JP-L3-GWMW630	280-61741-1	UJ
Explossives	LCS 280-249777/2-A/LCSD 280-249777/3-A		2-amino-4,6-dinitrotoluene tetryl	78%/81% 60%/52%	JP-M7-GWMW124R JP-M6-GWMW318 JP-M6-GWMW162R JP-M6-GWMW319 JP-M6-GWMW123R JP-L3-GWMW997 JP-L3-SW777 JP-L3-SW558	280-61741-1	J (all detects) UJ (all non-detects)
Explossives	LCS 280-250003/2-A/LCSD 280-250003/3-A		tetryl	54%/66%	JP-M6-GWMW212R JP-M6-GWMW652 JP-M6-GWMW313 JP-M6-GWMW998 JP-M6-GWMW654	280-61741-1	J (all detects) UJ (all non-detects)

APPENDIX B2
TABLE 1

Summary of Qualified Results
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
Explossives	LCS 280-250250/2-A		tetryl	53%	JP-L3-GWMW412 JP-L3-GWMW631 JP-L3-GWMW996 JP-L3-SW004 JP-L3-GWMW410 JP-L3-GWMW630 JP-L3-GWMW633 JP-L3-SW557	280-61741-1	J (all detects) UJ (all non-detects)
Explosives	% RPD	10/30/2014	1,3-dinitrobenzene nitrobenzene	78.90% 95.60%	JP-M6-GWMW212R	280-61741-1	J J
Explosives	% RPD	10/30/2014	4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	55.70% 71.60%	JP-M6-GWMW652	280-61741-1	J J
Explosives	% RPD	10/30/2014	4-nitrotoluene	51.70%	JP-M6-GWMW313	280-61741-1	J
Explosives	% RPD	10/30/2014	1,3-dinitrobenzene 4-amino-2,6-dinitrotoluene 2-amino-4,6-dinitrotoluene	76.20% 50.40% 44.40%	JP-M6-GWMW998	280-61741-1	J J J
Explosives	% RPD	11/5/2014	1,3-dinitrobenzene RDX	190.10% 137.20%	JP-M6-GWMW318	280-61741-1	J J
Explosives	% RPD	11/5/2014	2-amino-4,6-dinitrotoluene nitrobenzene	157.50% 194.40%	JP-M6-GWMW319	280-61741-1	J J
Metals	Post Digestion Spike		Iron Lead Potassium Selenium Silver Sodium	129% 125% 131% 124% 7% 128%	JP-L3-GWMW630	280-61741-1	J UJ J UJ UJ J
Explosives	1,2-dinitrobenzene 83%-119%		HMX	222%	JP-L1-GWMW173	280-61925-1	J for detects
Explosives	1,2-dinitrobenzene 83%-119%		1,3,5-trinitrobenzene 2,4,6-trinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene 4-amino-2,6-dinitrotoluene	146%	JP-L1-GWWES1	280-61925-1	J for detects
Explosives	1,2-dinitrobenzene 83%-119%		1,3,5-trinitrobenzene 2,4,6-trinitrotoluene 2-amino-4,6-dinitrotoluene 2-nitrotoluene	301%	JP-L1-GWMW131	280-61925-1	J for detects
Explosives	LCS 280-250976/2-A/LCSD 280-250976/3-A		tetryl	52%/59%	JP-M6-GWMW117 JP-OA-GWMW118 JP-OA-GWMW119 JP-L1-GWWES3 JP-L1-GWMW173	280-61925-1	UJ (all non-detects)

APPENDIX B2
TABLE 1

Summary of Qualified Results
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
Explosives	LCS 280-251163/2-A		tetryl	47%	JP-L1-GWMW174 JP-L1-SW550 JP-L1-GWWES1 JP-L1-GWMW131	280-61925-1	J (all detects) UJ (all non-detects)
Explosives	% RPD	11/13/2014	HMX	89.80%	JP-L1-GWMW173	280-61925-1	J
Explosives	% RPD	11/7/2014	2-nitrotoluene	192.20%	JP-L1-GWWES1	280-61925-1	J
Explosives	% RPD	11/7/2014	tetryl 2-amino-4,6-dinitrotoluene 2-nitrotoluene	132.20% 136.50% 177.40%	JP-L1-GWMW131	280-61925-1	J J J
VOCs VOCs	1,2-dichloroethane-d4 81%-118% toluene-d8 89%-112%		toluene	120% 115%	JP-M13-GWMW811	280-61932-1	J for detects
VOCs	JP-M13-GWMW811MS/MS		chlorobenzene naphthalene	81%/99% 60%/75%	JP-M13-GWMW811	280-61932-1	UJ UJ
VOCs	JP-M13-GWMW811MS/MSD		toluene	21% RPD	JP-M13-GWMW811	280-61932-1	J

APPENDIX B2
TABLE 1

Summary of Qualified Results
2014 Semi-annual Groundwater Monitoring Report
Joliet Army Ammunition Plant
Will County, Illinois

Analysis	Failed Criteria	Date	Compound	Result	Associated Samples	SDG	Flag
SVOCs	JP-M13-GWMW811MS/MSD		3,3'-dichlorobenzidine	17%/31%	JP-M13-GWMW811	280-61932-1	UJ (all non-detects)
			4-nitroaniline	64%/72%			
			1,2-diphenylhydrazine	86%/47%			
			2,4,5-trichlorophenol	94%/51%			
			4-bromophenyl phenyl ether	89%/40%			
			4-chlorophenyl phenyl ether	87%/42%			
			anthracene	85%/45%			
			benzo(a)anthracene	89%/42%			
			benzo(a)pyrene	87%/41%			
			benzo(b)fluoranthene	94%/42%			
			benzo(g,h,i)perylene	91%/41%			
			benzo(k)fluoranthene	88%/44%			
			bis(2-ethylhexyl)phthalate	100%/49%			
			butyl benzyl phthalate	99%/44%			
			chrysene	88%/45%			
			dibenz(a,h)anthracene	95%/46%			
			dibenzofuran	86%/49%			
			di-n-butyl phthalate	95%/43%			
			di-n-octyl phthalate	94%/48%			
			fluoranthene	90%/41%			
			fluorene	88%/47%			
			hexachlorobenzene	88%/39%			
			indeno(1,2,3-cd)pyrene	90%/42%			
			pentachlorophenol	96%/18%			
			phenanthrene	88%/42%			
			pyrene	89%/40%			
Explosives	LCS 280-251385/2-A		tetryl	51%	JP-M13-GWMW811	280-61932-1	UJ
Metals	Blank - CCB 280-253266/46		Vanadium 1.15 J ug/L	JP-M13-GWMW811	3.1 J ug/L	280-61932-1	B
Metals	JP-M13-GWMW811MS/MSD		aluminum	133%/133%	JP-M13-GWMW811	280-61932-1	J
			calcium	115%/111%			J
Metals	Post Digestion Spike		sodium	78%	JP-M13-GWMW811	280-61932-1	J

Notes:

B – Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample

CCV = continuing calibration verification

HMX = high melting explosive

J = estimated concentration

mg/L = miligrams per liter

MS/MSD = matrix spike / matrix spike duplicate

RDX = royal demolition explosive

RPD = relative percent difference

SDG = sample delivery group

SVOCs = semi-volatile organic compounds

tetryl = methyl-2,4,6-trinitrophenylnitramine

U = not detected

UJ = not detected, estimated detection limit

VOCs = volatile organic compounds

APPENDIX C

MONITORING WELL INSTALLATION DOCUMENTATION

MWH

FIELD BORING LOG

Facility/Project Name	JOAAP	**Boring No.**	MW811
Location	Site M13	**Project No.**	10506045

Drilling Company	Horizon Construction and Exploration, Inc.	Universal Transverse Mercator (UTM), Zone 16	
Driller's Name	Adam Sweet	North North American Datum 1983 (NAD83) in Feet	
Drill Rig	B-57	Northing	Easting
Drill Method	HSA / Split Spoon	15034212.197	1323111.899
	8 1/4" Hollow Stem Auger / 6 1/2"		
	Sample		Borehole Diameter
Water Level: NA	Hammer Torque: 140 lbs. / 30 inches		at Screen: 6 1/2"

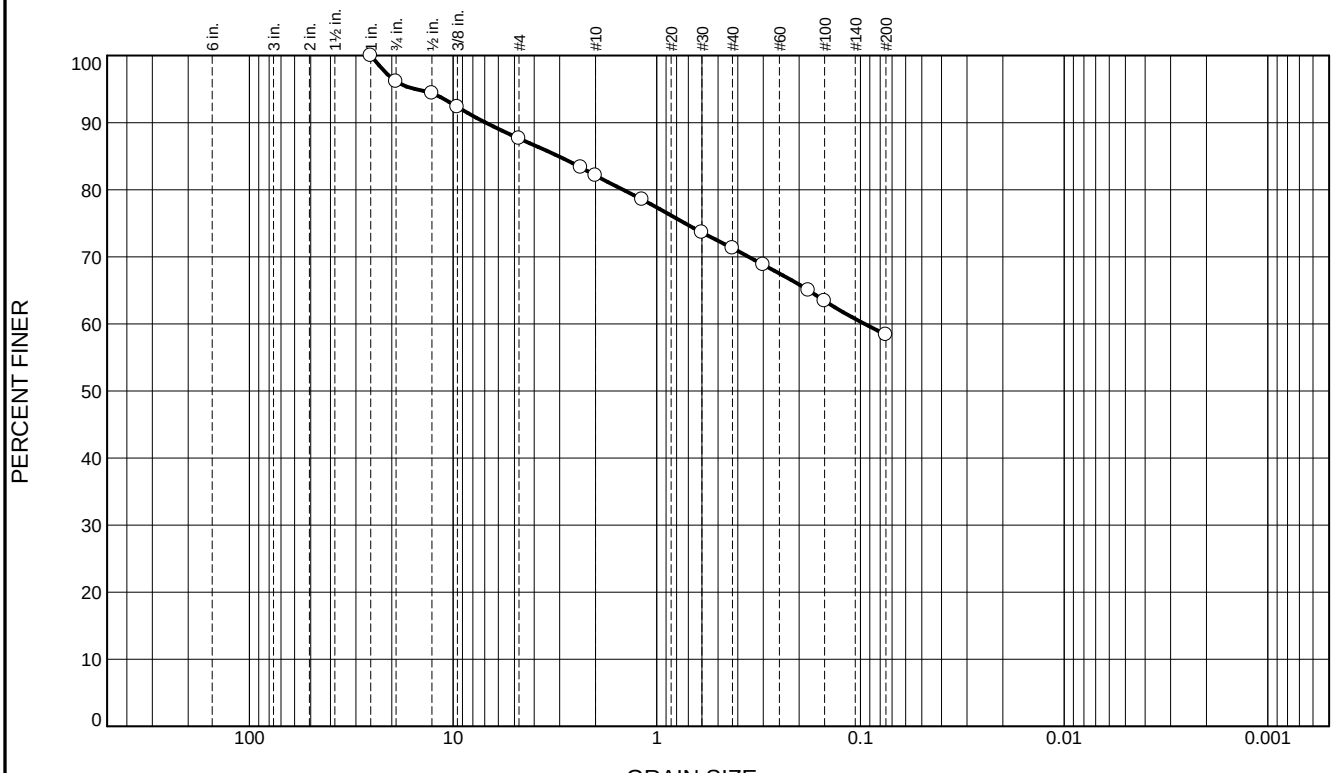
Logger: Christopher R. Swan (MWH) Editor: Jeff Ramsby, P.G. (MWH)

Start Date: 1/21/14 End Date: 1/22/14

Sample No.	Moisture	Blows on Sampler 0/6	Blows on Sampler 6/12	Sample Recovery	N Value	VISUAL CLASSIFICATION	Penetrometer (Tons/sq. ft.)	PID	% Gravel-Sand-Fines	Remarks
			2.00			1' - 3' Silty clay (ML) with trace sand, 7.5 YR 2.5/2 very dark brown, soft, moist, Significant organics and trace sand and gravel.	--		5	
1		3	3	38%	6		--	300	5	PID due to organics
		4	3				--		5	no VOCs suspected
2		1	2	75%	3		--	700	10	PID due to organics
		3	2			3' - 7' Silty clay (CL) with trace sand, 10 YR 2/1 black, soft, moist, high organics.	--		10	no VOCs suspected
3		3	5	54%	8		--	450	10	PID due to organics
		5	3				--		10	no VOCs suspected
4		3	4	100%	7		--	75	10	PID due to organics
		4	2			7' - 11' Silty clay (CL) with significant organic material, 2.5 YR 2.5/1 black, soft, moist, some gravel and gray mottling. Increasing gravel with depth.	--		10	no VOCs suspected
5		2	2	83%	4		--	20	10	PID due to organics
		3	2				--		15	no VOCs suspected
6		2	2	88%	4		--	0	20	
		2	2				--		80	
7		2	9	92%	11	11' - 13' Silty clay (CL) with gravel, 5 Y 4/1 dark gray, medium stiff, moist, with some sand and gravel (1/4-2").	--	0	90	
		20	3				--		90	
8		6	12	50%	18		--	0	90	
		11	>50			13' - 16' Sandy gravel with silt, 10YR 4/4 dark yellowish brown, clasts rounded, loose, dry, weak cementation.	--		90	
9		>50	>50	15%	NA		--	0		Landfill Debris
		>50	>50				--			Landfill Debris
10		>50	>50	15%	NA	16' - 20' Landfill debris encountered. Borehole relocated twice before breaking through debris after switching to 4 1/4" augers.	--	0	90	Landfill Debris
		2	2				--		90	
11		2	2	100%	4		--	0	90	
		3	3			20' - 22.5' Sand with some silt (GM), 10 YR 5/3 brown, loose, moist to wet at 22, weak cementation, with fine cobbles.	--		30	
12		3	4	100%	7		--	0	10	
		3	6				--		10	
13		6	7	100%	13		--	0	10	
		4	6			22.5' - 24" Sandy clay (SM), 10YR 4/1 dark gray, molist, stiff, high plasticity.	--		10	
14		20	-	100%	NA		--	0	10	
		6	6			22.5' - 24" Sandy clay (SM), 10YR 4/1 dark gray, moist, stiff, high plasticity.	--		15	
15		7	6	20%	13		--	0	15	
						24' - 30' Sandy clay (SM), 10YR 4/1 dark gray, dry, very stiff, high plasticity.				
						30' - 30.5' Bedrock				

L:\Groups\Forms\Field.xls

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.9	8.5	5.5	10.8	12.9	58.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	96.1		
1/2	94.4		
3/8	92.3		
#4	87.6		
#8	83.3		
#10	82.1		
#16	78.5		
#30	73.6		
#40	71.3		
#50	68.8		
#80	65.0		
#100	63.4		
#200	58.4		

* (no specification provided)

Material Description

Gray Silty Clay to Clayey Silt, Some Sand and Gravel (Visual classification only)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.9154 D_{85}= 3.0382 D_{60}= 0.0954
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL-ML/CL AASHTO=

Remarks

Sample Number: JP-M13-MW811-25-29

Date: 11/7/14

CGC,Inc.

Client: Montgomery Watson Harza
Project: JOAAP
#10506045
Project No: C14470 **Figure**

Tested By: DRW **Checked By:** DAS

WELL CONSTRUCTION DETAILS AND ABANDONMENT FORM

FIELD REPRESENTATIVE: C. Swan

DRILLING CONTRACTOR: Horizon C&E

DRILLING TECHNIQUE: HSA

AUGER SIZE AND TYPE:

BOREHOLE IDENTIFICATION: MW811

BOREHOLE DIAMETER: 4 1/4 inch

WELL IDENTIFICATION: MW811

WELL CONSTRUCTION START DATE: 10/21/14

WELL CONSTRUCTION COMPLETE DATE: 10/22/14

SCREEN MATERIAL: Sch 40 PVC

SCREEN DIAMETER: 2"

STRATUM-SCREENED INTERVAL (FT): 20-30

CASING MATERIAL: PVC

CASING DIAMETER: 2"

TYPE OF FILTER PACK: ANSI/NSF61

GRADIATION:

AMOUNT OF FILTER PACK USED: 200 lb

TYPE OF BENTONITE: Wyoming Bentonite

AMOUNT BENTONITE USED: 300 lbs

TYPE OF CEMENT: NA - except well pad

AMOUNT CEMENT USED: 100 lbs

GROUT MATERIALS USED: N/A

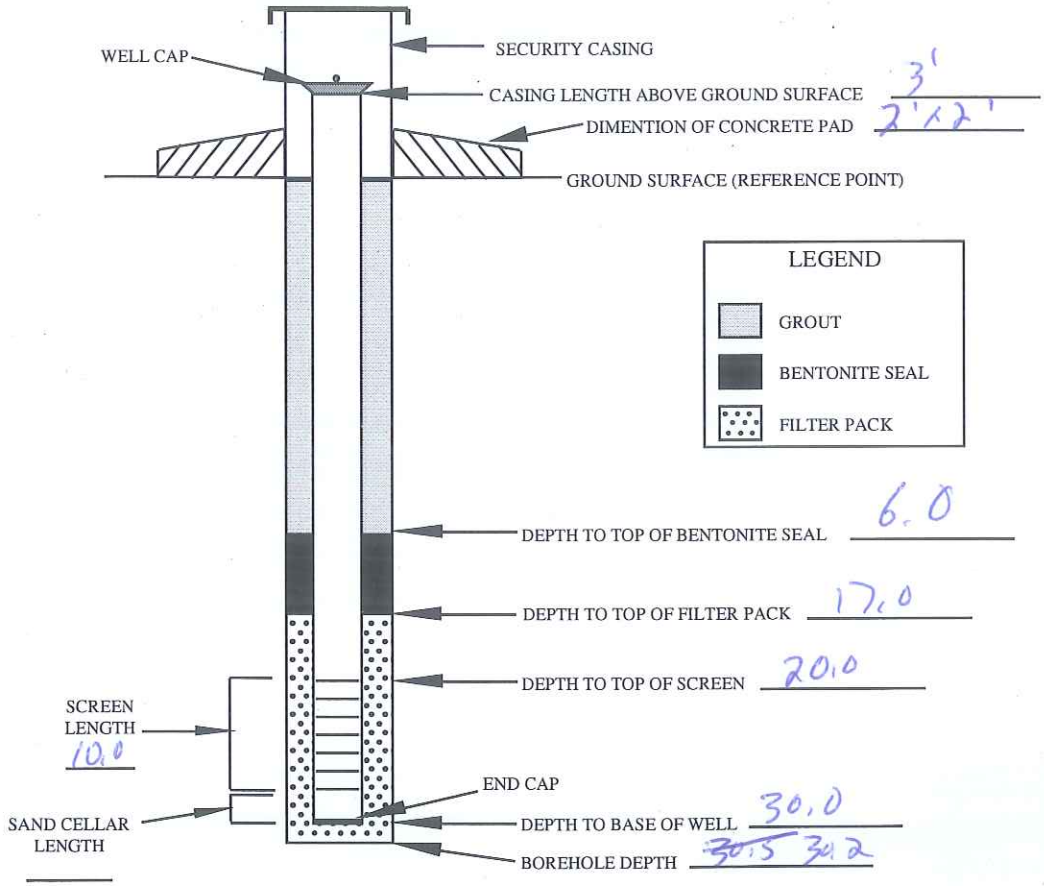
DIMENSIONS OF SECURITY CASING: 4" x 4" x 7'

TYPE OF WELL CAP: 2" water tight

TYPE OF END CAP: Painted PVC - 3"

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



NOT TO SCALE

INSTALLED BY: C. Swan

INSTALLATION OBSERVED BY: C. Swan

DISCREPANCIES: Horizon Construction and Exploration

AFCEE FORM WAA.11

WELL DEVELOPMENT RECORD

WELL/PIEZOMETER ID MW811
SHEET 1 of 1

PROJECT NAME: JOAAP PROJECT NO. : 10506045 DATE: 10/22/14

LOCATION: M13 DATE INSTALLED: 10/21/14

TOTAL DEPTH (FTOC) 30.0 CASING DIAMETER 2"

METHODS OF DEVELOPMENT

☐ Swabbing ☒ Bailing ☐ Pumping ☐ Describe Surge & Purge w/ Bailer

Equipment decontaminated prior to development ☐ Yes ☐ NO

Describe Yes - Alconox Rinse

PARAMETERS

pH ✓ Conductivity ✓ mS/m Turbidity ✓ NTU Temp ✓ ^{0}C Dissolved Oxygen ✓ mg/L ORP ✓ mV

CASING VOLUME INFORMATION:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

PURGING INFORMATION:

Measured Well Depth (B) _____ ft.

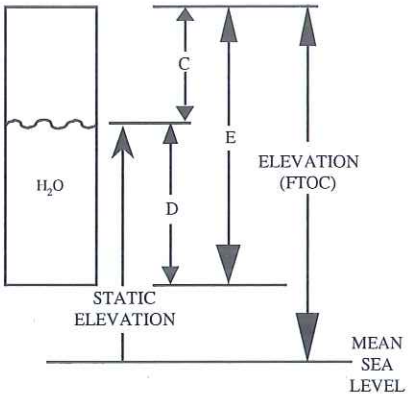
Measured Water Level Depth (C) ____ ft.

Length of Static Water Column (D) _____ - _____ = _____ ft.
(B) (C)

Casing Water Volume (E) + _____ x _____ = _____ gal
(A) (D)

Total Purge Volume = _____ (gal)

* Well would Bail Dry



	Time	Water Level (FTOC)	pH	Conductivity (m S/m)	Turbidity NTU	DO (mg/L)	Temperature F or C	ORP (mv)	Volume Removed (gal)	Comments
	~~0934~~	~~Surge~~								
10/21/14	1755	29.22								
10/22/14	0838	21.22								
	Surge									
	0948	25.42	8.47	3.73	7999	12.33	~~25.42~~ 12.78	65	3	
	Surge									
	0959	29.48	8.58	3.48	7999	12.74	12.78	39	6	0.1 ft/min recharge
	1040	24.37								
		Surge								
	1053	30.60	8.83	3.07	7999	14.49	12.74	76	11	

Development Complete.

AFCEE FORM WD.11 Well Dry.

WELL/BOREHOLE ABANDONMENT

Project Name JOAAP Project No. 10506045

LOCATION	FACILITY NAME
County Will	Original Well Owner (If Known) US Army
___ 1/4 of ___ 1/4 of Sec. ___ ; T ___ N; R. ___ ☐ E ☐ W	Present Well Owner US Army
(If applicable) ___ Gov't Lot ___ Grid Number	Street or Route Site M13
Grid Location ___ ft ☐ N ☐ S, ___ ft. ☐ E ☐ W	City, State, Zip Code JOAAP, Will County
Civil Town Name	Facility Well No. and/or Name (If Applicable) AEHA15
Street Address of Well	Reason for Abandonment Not Useful
City, Village	Date of Abandonment 10/22/14

CONSTRUCTION DETAILS	ABANDONMENT PROCEDURE
Original Well/Borehole Construction Completed on (Date) ___	Depth to Water (Feet) ___
☒ Monitoring Well ☐ Water Well ☐ Drillhole ☐ Borehole	Pump & Piping Removed? ☐ Yes ☐ No ☒ Not Applicable
Construction Report Available? ☐ Yes ☐ No	Liner(s) Removed? ☐ Yes ☐ No ☒ Not Applicable
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (Specify) ___	Screen Removed? ☐ Yes ☒ No ☐ Not Applicable
Formation Type: ☒ Unconsolidated Formation ☐ Bedrock	Casing Left in Place? ☒ Yes ☐ No
Total Well Depth (ft.) 36.5 (From groundsurface) Casing Diameter (ins.) 2"	If No, Explain ___
Screened Interval: From 36.5 to unknown	Was Casing Cut Off Below Surface? ☒ Yes ☐ No
Casing Depth (ft.) unknown	Did Sealing Material Rise to Surface? ☒ Yes ☐ No
Condition of Casing good	Did Material Settle After 24 Hours? ☐ Yes ☒ No
Was Well Annular Space Grouted? ☐ Yes ☐ No ☒ Unknown If Yes, To What Depth? ___ Feet	If Yes, Was Hole Retopped? ☐ Yes ☒ No
	Required Method of Placing Sealing Material: ☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped ☐ Dump Bailer ☐ Other (Explain)
	Sealing Materials: ☐ Neat Cement Grout ☐ Sand-Cement (Concrete) Grout ☐ Concrete ☐ Clay-Sand Slurry ☐ Bentonite-Sand Slurry ☒ Chipped Bentonite
	For monitoring wells and monitoring well boreholes only: ☐ Bentonite Pellets ☐ Granular Bentonite ☐ Bentonite-Cement Grout

Sealing Material Used	From (Ft.)	To (Ft.)	No. Yards, Sacks Sealant or Volume	Mix Ratio
Bentonite Chips	Surface	36.5	~50 lbs	N/A

Comments: Cut off greater than 2' BGS ~~then~~ after slowly chipped up to surface

Name of Person or Firm Doing Sealing Work: Chris Swan - MWH	
Signature of Person Doing Work	Date Signed 10/22/14
Street or Route 175 W. Jackson Blvd. Suite 1500	Telephone Number (312) 831-3000
City, State, Zip Code Chicago, IL 60604	

Drilling Contractor Horizon Construction + Exploration

Driller's Name Adam Sweet