PERIODIC REVIEW REPORT (2014)
AMERICAN THERMOSTAT SITE
NYSDEC SITE NO. 420006

WORK ASSIGNMENT NO. D007619-01

Prepared for:

New York State Department of Environmental Conservation
Albany, New York

Prepared by:

MACTEC Engineering and Consulting, P.C.
Portland, Maine

MACTEC: 3612112204

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Submitted by:

Jayme P. Connolly
Project Manager

Approved by:

William J. Weber, P.E.
Principal Professional

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AGC	Annual Guideline Concentrations
AT	American Thermostat Company
AWQ	Ambient Water Quality
Aztech	Aztech Technologies, Inc.
bgs	below ground surface
BOD	Basis of Design
cis-1,2-DCE	cis-1,2-dichloroethene
EC	engineering control
EW	bedrock well
GAC	granular activated carbon
gpm	gallon(s) per minute
GWETS	groundwater extraction and treatment system
IC	institutional control
LTM	long term monitoring
MACTEC	MACTEC Engineering and Consulting, P.C.
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OM&M	Operation, Maintenance and Monitoring
OU	operable unit
OW	overburden well

GLOSSARY OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

PCE	tetrachloroethene
PLC	Programmable Logic Controller
POET	point of exposure treatment system
PRR	periodic review report
RAO	Remedial Action Objective
ROD	Record of Decision
RSO	remedial systems optimization
SGC	Short-Term Guideline Concentrations
Site	American Thermostat site
SM	site management
SMP	Site Management Plan
SVI	soil vapor intrusion
TCE	trichloroethylene
µg/l	microgram(s) per liter
USEPA	United States Environmental Protection Agency
VI	vapor intrusion
VOC	volatile organic compound

EXECUTIVE SUMMARY

The American Thermostat (Site No. 420006; herein referred to as the Site) is an approximately eight acre site located in South Cairo, Town of Catskill, Greene County, NY. The Site was remediated in accordance with Record of Decision (ROD) for Operable Unit 1 (OU1) (potable water supply) (United States Environmental Protection Agency [USEPA], 1988) and OU2 (soil, sediment, surface water, groundwater, and building contamination) (USEPA, 1990). The Site includes an active groundwater extraction and treatment system (GWETS). The contaminants of concern are volatile organic compounds including tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride. Remedial goals outlined in the ROD documents for the Site are to ensure protection of groundwater from site contaminants in soil, restore groundwater to drinking water standards or until a point has been reached at which contaminant concentrations in the groundwater "level off", and reduce risk to human health and the environment. Current Site Management (SM) requirements for monitoring the performance and effectiveness of the remedial measures completed at the Site consist of operating the groundwater extraction system, routine inspection, sampling, and reporting.

The GWETS has been operational for fifteen years, and monitoring results have indicated that achieving groundwater cleanup goals in a reasonable period of time will not be possible. The exposure pathways resulting from Site contaminants being released into the environment have either been eliminated through previous and current actions (i.e., extension of the public water supply and thermal treatment of shallow contaminated soil, as well as residential point of exposure treatment systems), or are not complete (i.e., vapor intrusion). It should be noted that mitigation of the on-Site American Thermostat building may be warranted if occupancy of the currently vacant building resumes. The objective of treating groundwater "until federal and state standards for the organic contaminants have been achieved" is not realistic at this site.

As a result, the Remedial Action Objective has been redefined to focus on hydraulic containment of the source area. This is an achievable goal that is protective and cost-effective.

Based on information gathered as part of the remedial systems optimization (RSO) Investigation and the updated conceptual site model, optimization measures to the GWETS were implemented in

2013 and are continuing. By focusing on hydraulic containment of the source area and eliminating off-site deep bedrock extraction wells, the northeastern edge of the PCE plume is expected to separate from the plume and migrate towards Catskill Creek. Therefore the effectiveness of the GWETS will be increased, operating costs will decrease, groundwater will continue to be treated and its quality gradually improved with time, and on-going monitoring will evaluate migration pathways and potential receptors.

This Periodic Review Report summarizes SM activities completed at the Site from January 2014 through December 2014. The recommendations highlighted in the RSO Implementation Activities Report (MACTEC Engineering and Consulting, P.C. [MACTEC], 2013a), were detailed in a Basis of Design (BOD) Memorandum (MACTEC, 2013b; and MACTEC, 2013c). The BODs present details for improvement to the treatment facility as well as to the groundwater extraction system. The modifications have been and are being implemented in three Phases of work: Phase I consisted of demolition and removal of unnecessary treatment components (previously completed); Phase II consisted of new process improvements to the treatment systems; and Phase III includes retrofitting 13 extraction wells, decommissioning 23 extraction wells, and repurposing 7 injection wells. During this reporting period, Phase II was essentially completed and a portion of Phase III has been completed.

1.0 SITE OVERVIEW

1.1 SITE HISTORY AND DESCRIPTION

American Thermostat Company (AT) produced thermostats and used chlorinated and non-chlorinated solvents in its manufacturing from 1954 to 1985. The waste solvents were disposed on the property and/or discharged to the septic system.

In 1981, the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health sampled nearby residential wells and detected tetrachloroethene (PCE) in residential wells exceeding the federal maximum contaminant levels. Shortly thereafter, the United States Environmental Protections Agency (USEPA) took over the management of the American Thermostat site (Site) and installed a Point of Exposure Treatment System (POET) consisting of carbon filtration units on affected homeowners' wells. AT ended site operations in 1985, and in 1987 USEPA commissioned a focused Feasibility Study to evaluate an Alternative Water Supply for the affected residents. In 1988 a Record of Decision (ROD) was signed for Operable Unit 1 (OU1) that outlined extension of the existing public water supply as well as maintaining POET systems for several private wells including the communal water supply for the Country Estates trailer park, located 3000 feet northwest of the Site, in addition to three residential wells. Country Estates has two bedrock wells that provide water for tenants within the trailer park. Both wells contain site-related contaminants. USEPA conducted a Remedial Investigation for soil, surface water and groundwater at the Site. In 1990 the ROD for OU2 was issued outlining mitigation measures for the source area.

Remedial activities specified in the OU2 ROD included:

- decontamination of the manufacturing building
- cleanup of contaminated soil behind the manufacturing building
- cleanup of the contaminated sediments found in nearby Rath Pond, and
- extraction and treatment of contaminated groundwater from the shallow and deep aquifers using air-stripping and carbon adsorption.

The soil and sediment was to be excavated, thermally treated to achieve a concentration of 1 milligram per kilogram PCE, and then returned to the excavation. A summary of the soil excavation and treatment is presumably provided in a Remedial Action Report for Soil. A Freedom of Information Act request to the USEPA for the report was submitted; however, USEPA has not been able to acquire a copy of this Report from their files so the area, volume treated and effectiveness of the Low Temperature Thermal Desorption treatment has not been verified. Sampling as part of the remedial systems optimization (RSO) Implementation Activities conducted in 2012 showed that contaminant concentrations in the treated soil area and Rath Pond sediments were minimal compared to previous levels, which suggests excavation and treatment did occur to some extent however, the source material beneath the building remains.

The treatment of groundwater was accomplished by the installation of a groundwater extraction and treatment system (GWETS) consisting of 14 open-hole bedrock wells, 16 screened overburden extraction wells, 14 open-hole bedrock re-injection wells and 3 re-injection trenches. Each extraction well is constructed so that it will produce between 3 and 5 gallons per minute. Well pumps are activated by high-low switches; none of the pumps are variable speed and none are equipped with flow metering. Most of the bedrock extraction wells were residential bedrock wells (no longer in use) located within the footprint of the existing plume. To satisfy water yield or injection tests, some wells were deepened up to 340 feet. The overburden extraction wells were installed to a depth of 30 feet. None of the overburden extraction wells produce sufficient water to permit the pumps to operate continuously; in all cases, the pumps cycle.

The re-infiltration galleries, which were constructed in the till for a combined total length of 535 feet, could not sufficiently handle the volume of effluent due to the poor permeability of the soil, and their use was eventually discontinued. Bedrock re-injection wells were located within the footprint of the groundwater plume. The bedrock re-injection wells also proved ineffective at handling the volume of effluent due to the relatively low transmissivity of the bedrock aquifer, and injection into the bedrock aquifer was subsequently terminated; however the open-hole bedrock re-injection wells were never abandoned. Currently, GWETS effluent discharges to a surface drainage swale on the eastern side of the Site that eventually leads to Catskill Creek. Besides the GWETS, the groundwater remedial measure includes off-site treatment of the communal water supply for the Country Estates trailer park (now maintained and operated by its owner), and

individual wellhead treatment of three residential wells with granular activated carbon (GAC). Water supplies at these locations are routinely monitored for potential site-related contaminants.

The ROD for OU2 stated that: "The groundwater treatment will continue until federal and state standards for the organic contaminants have been achieved in the groundwater throughout the contaminated plume area or until a point has been reached at which contaminant concentrations in the groundwater 'level off'. At that point, the remedy will be reevaluated for its effectiveness". It was assumed in the OU2 ROD that the selected remedial alternative for groundwater would take up to 30 years to achieve cleanup levels (5 micrograms per liter [µg/L] for PCE).

The GWETS became fully operational in 1998 and the USEPA conducted 5-year reviews in 2003 and 2008. In 2008, following 10 years of Site management (SM) by the USEPA, the Site was transferred to NYSDEC. NYSDEC completed a Periodic Review Report (PRR) in 2010. This review indicated that monitoring of plume concentrations was primarily conducted at active extraction wells, and concentrations of site contaminants appear to be steady and/or slightly trending downward in the plume area. However, in the source area, concentrations remain elevated (above 1,000 ug/L) and declining at even a slower rate indicating that concentrations may be sustained by the presence of a residual contaminant source. It appeared that groundwater treatment had reached a point at which contaminant concentrations had more or less 'leveled off' and the remedial action should be reevaluated for its effectiveness.

In the winter 2012, the vapor intrusion (VI) pathway within the plume boundaries was evaluated (MACTEC Engineering and Consulting, P.C. [MACTEC], 2012a). Soil VI (SVI) Sampling indicated potential migration pathway of vapors to the Site manufacturing building and the adjacent Hook property. A sump cover was installed by the property owner to reduce potential exposure to vapors.

In the spring/summer 2012, MACTEC conducted an RSO Implementation field investigation to:

- evaluate remedy performance relative to remedial goals
- identify potential changes to the remedy to enhance effectiveness, reduce costs, and shorten time to closure
- verify site conceptual model and closure strategy;
- identify problem areas and recommend improvements, and
- evaluate progress in reaching closure.

Results of the RSO Implementation activities were submitted to the NYSDEC in 2013, leading to numerous recommendations for improvement regarding the groundwater remedy; these recommendations are provided in the RSO Implementation Activities Report (MACTEC, 2013a). Specific to the GWETS, a Basis of Design (BOD) memorandum (MACTEC, 2013b) was prepared following the RSO Implementation Activities Report to define modifications that should be made to the groundwater treatment system for a more streamlined system to lower operating costs and improve effectiveness.

Beginning in early 2013, implementation of Phase I (interior treatment plant component demolition) of the BOD recommendations commenced. By the Fall of 2013, Phase 2 was essentially completed which included the majority of upgrades to the treatment process. In 2014, Phase 3 activities including retrofitting existing extraction wells, decommissioning numerous extraction and injection wells and re-purposing several injection wells began. The remaining Phase 3 tasks will be completed in 2015, including installation of a new control system to allow for unattended operation.

1.2 PHYSICAL SETTING

The Site is located in a rural residential area in South Cairo, Town of Catskill, Greene County, New York, approximately 30 miles southwest of Albany and five miles west of the Village of Catskill. The approximately eight-acre site is bordered by Routes 23B and Route 23 on the north and south, respectively, by a residential property on the west, and by New York State (NYS)-owned property on the east (see Figure 1.1). The Site contains the former American Thermostat building and the water treatment plant constructed for the implementation of the groundwater remedy.

The topography within the vicinity of the Site is characterized by the gently rolling foothills of the Catskill Mountains, which are deeply incised by stream channels. The Site is located on a slight ridge overlooking Catskill Creek Valley. Immediately west of the facility is a small valley which includes Tributary B, a tributary of Catskill Creek. East of the facility is Tributary A, which also flows into Catskill Creek, located approximately a quarter mile to the east of the Site.

Regionally, the bedrock within Greene County consists of interbedded shales and sandstones of Devonian age, known as the Catskill Formation. The Catskill Formation is made up of four distinct bedrock groups. From oldest to youngest, these groups are Hamilton, Genesee, Sonya, and West Falls. The Site lies within the Hamilton Group. In the vicinity of the Site, the bedrock is at an average depth of 28 to 30 feet below the ground surface (bgs); however, in the vicinity of the former manufacturing building, bedrock is approximately 100 feet bgs. The overburden overlying the bedrock is primarily glacially-derived soils.

A groundwater investigation as part of the RSO Implementation activities indicated that there is limited hydraulic connection between the overburden and bedrock at the Site. Overburden groundwater is perched and slowly drains laterally toward low lying areas, and vertically into the bedrock aquifer. Bedrock groundwater level fluctuations recorded during the RSO Implementation activities were compared to barometric fluctuations over the same time period. The resulting relationship between water level fluctuation and barometric fluctuation indicated that the bedrock aquifer is likely semi-confined.

The area surrounding the Site is characterized as rural-residential. There are a few full-time residences, vacation homes, and several small businesses in the vicinity of the Site. The American Thermostat Corporation was the only manufacturing facility in the area.

Approximately 5,000 people live within a 3-mile radius of the Site in low-density residential areas. Until a public water supply line was installed to protect the public from exposure to contaminated groundwater, all homes within ½ mile of the Site used private wells. At present, various residences and businesses within the immediate vicinity of the Site property receive water from the municipal water supply of the Village of Catskill. However, while a municipal water supply was provided, property owners were not required to connect to the system. Therefore the need for GAC systems remains in three private residential wells and the trailer park within the limits of the groundwater plume.

Catskill Creek is classified as a trout stream and has considerable recreational value to local and visiting fishermen. The Creek is also an auxiliary water supply for the Village of Catskill.

1.3 CLEANUP GOALS AND REMEDIAL PROGRESS

Based on the ROD, groundwater treatment will continue until "federal and state standards for the organic contaminants have been achieved in the groundwater throughout the contaminated plume area or until a point has been reached at which contaminants concentrations in the groundwater 'level off'. At that point, the remedy will be reevaluated for its effectiveness". Based on the results of the RSO activities, the remedial objective has been modified by the NYSDEC to be limited to source control and (onsite) hydraulic containment of grossly contaminated groundwater.

Currently, hydraulic containment is now accomplished through the use of six bedrock extraction wells and seven overburden wells. Previous offsite extraction wells maintained the shape and direction of the plume against the natural groundwater flow path towards Catskill Creek. The RSO investigation findings predicted eliminating the off-site deep bedrock extraction wells would separate the northeastern edge of the PCE plume from the plume and migrate towards Catskill Creek. As a result a small portion of the offsite plume will be drawn into the Country Estates wells where it will be treated via the existing treatment system that is in place, and the remainder of the plume will begin to slowly move toward Catskill Creek where it will eventually discharge. Monitoring the migration and/or degradation of the plume is accomplished with the long term monitoring (LTM) program.

2.0 EVALUATION OF REMEDY PERFORMANCE, EFFECTIVENESS AND PROTECTIVENESS

The SM Plan (SMP) for the AT Site includes an institutional controls/engineering controls (ICs/ECs) Plan, Operation and Maintenance (O&M) Plan, LTM Plan, and associated reporting (MACTEC, 2012b). SM requirements are summarized in Table 2.1. The contents of Table 2.1 is a combination of the requirements specified in the SMP and those being implemented as part of the RSO Implementation recommendations (MACTEC, 2013a). The SMP is currently being updated to reflect the numerous changes being implemented at the Site. Table 2.2 summarizes the LTM and System Performance Sampling conducted in 2014.

2.1 INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS

IC/ECs provide added measures of protection for potentially exposed receptors over and above natural attenuation mechanisms and source area remedial measures. Engineering controls off-site consist of restrictions directing potentially affected residential groundwater supplies through GAC units. These ECs are monitored through the collection and analysis of samples following water supply treatment through the GAC units for three individual residential supply wells. On-site, institutional controls consist of a restriction of groundwater use and well installation, and engineered controls consist of the GWETS and site perimeter fence. Some off-site groundwater is also captured by the GWETS to confine the plume extent and migration and recover contaminant mass.

The RSO Implementation field activities in 2012 identified surface and subsurface soil PCE contamination at the Site that exceeds the ROD cleanup goal of 1 milligram per kilogram. Surface soil contamination was identified immediately adjacent to the former manufacturing building (MACTEC, 2013a). The SMP includes a soil excavation plan controlling exposure to contaminants during excavation of soil, thereby establishing an IC for soil at American Thermostat (MACTEC, 2012b).

The former manufacturing building is now being used to store vintage cars slated for restoration. The building owner is not permitted to excavate soil on the property without permission of the

NYSDEC. If the owner uses the building for other than storage (current use), vapor mitigation will be necessary to address exposure to SVI.

2.1.1 Site Controls and Evaluation

Requirements for the Site controls are presented on Table 2.1. Effectiveness of the groundwater remedial measures is directly related to monitoring and maintenance of the groundwater residential well GAC units, and maintenance and monitoring of treatment processes related to the GWETS. Progress of the groundwater remediation is tracked through the LTM program, interpretation of plume extent, and evaluation of trends in concentration over time. During the reporting period, these controls were in place and effective. Observations regarding each of these components are discussed in the following subsections.

2.1.2 GWETS

Operating parameters for the GWETS include monitoring volume treated (gallons), flow rate and flow per reporting period (approximately monthly) and total volatile organic compounds (VOCs) extracted from groundwater. These quantities are summarized on Tables 2.3 and 2.4. During the reporting period, the treatment plant processed approximately 10,306,785 million gallons of groundwater at an average flow rate of about 20.9 gallons per minute (gpm), and removed approximately 197 pounds of total VOCs. A summary of GWETS performance monitoring results for 2014 are summarized in the tables and charts provided in Appendix A.

In 2013 modifications to the treatment process were made (BOD Memorandum MACTEC, 2013b). The implementation of these modifications were begun in 2013 and continued through 2014. Improvements implemented during 2014 by NYSDEC's contractor (Aztech Technologies, Inc [Aztech]) include:

a) Dismantling off-line extraction wells (23).
b) Re-developing extraction wells that remain on-line (13).
c) Pulling old wires, installing new wires, and/or installing new conduit at on-line locations (13)
d) Installing hardware components (struts, above ground enclosures, new road boxes) for retrofitting on-line extraction wells (13)

e) Repurposing 7 injection wells for monitoring purposes

Completion of the extraction well retrofit and Programmable Logic Controller (PLC) to replace all existing process controls by NYSDEC's Contractor (Aztech) is scheduled for completion in 2015.

2.1.3 Residential GAC Treatment Systems

While municipal water is supplied through the town distribution system to many houses in the area, three households located within the plume are equipped with wellhead protection via small ultraviolet and GAC treatment trains. Sampling and reporting are conducted on a quarterly basis.

2.2 O&M PLAN

The remedial measures in place require routine inspection, sampling, and maintenance to provide effective remediation and reduction of exposure to site-related contaminants. O&M procedures and requirements are presented in the SMP (MACTEC, 2012b). Although the O&M Plan is somewhat outdated in the current SMP, the SMP is being revised to incorporate the numerous changes implemented at the Site over the last two years. The following subsections describe requirements and compliance with the O&M Plan with respect to the GWETS, and individual residential GAC units.

2.2.1 GWETS

The O&M Plan describes procedures to be followed for routine operation and emergencies or shut-downs (planned or otherwise) of the GWETS. The O&M Plan contains standard operating procedures for the maintenance and operation of all treatment system components as well as forms for documenting daily operations, inspections, and recording operating parameters and instrument readings (see Table 2.1). Monthly progress reports are generated to summarize GWETS system operation and to present operational data to the NYSDEC (MACTEC, 2014a-l; MACTEC, 2015).

A total of 13 extraction wells currently remain active and include 6 bedrock wells (EWs) and 7 overburden wells (OWs):

- EW-2, EW-5, EW-6, EW-7, EW-9, EW-16
- OW-2, OW-3, OW-5, OW-7, OW-13, OW-14, OW-16

During this reporting period, approximately 900 hours were reported as downtime. The GWETS was shut down periodically in 2014 for Phase 2 and Phase 3 improvements. The larger blocks of shut down time occurred in January (9 days) for air stripper repairs, October (6 days) for extraction well upgrades, and November (6 days) for an influent pipe repair. Down time represented approximately 10 percent of total available operating time.

During this reporting period, approximately 10,306,785 million gallons of extracted groundwater were processed with an average flow rate of approximately 20.1 gpm, and approximately 197 pounds of total VOCs were removed (Tables 2.2 and 2.3). The influent and effluent VOC samples are collected and analyzed monthly, so mass removal is an approximation.

As of 2013, the NYSDEC started using the Ambient Water Quality (AWQ) Standards and Guidance (NYSDEC, 1998) for comparison to the treated groundwater being discharged to the swale. These limitations are applicable at the point of discharge at the end of the force main which leads to the unnamed Tributary A (a Class C surface water body). Air discharge limits for the Site are based on meeting the requirements in the NYSDEC Division of Air Resources DAR-1 Annual Guideline Concentrations (AGC)/ Short-Term Guideline Concentrations (SGC) guidance tables which require ground-level ambient air concentrations at the property boundary and beyond to not exceed AGC and SGC.

Performance monitoring results are summarized in Table 2.5. As shown, effluent iron concentrations were observed to exceed the AWQ criterion for several months during 2014; however, air discharge criteria were met and nearly all influent VOCs were removed by the air stripper in 2014. Treated groundwater effluent is discharged to a drainage swale which ultimately leads to Catskill Creek. With the exception of one detection of PCE and sporadic detections of iron, the treated effluent met surface discharge limits during the reporting period. Completing upgrades to the extraction system and wells are believed to address this issue.

2.2.2 Residential GAC Treatment Systems

Maintenance and monitoring of the three residential wellhead protection systems (Klinke, Kubler, and Viella) is performed on a quarterly basis. Results are summarized in Table 2.6. As shown, cis-1,2-Dichloroethene (cis-1,2-DCE) was detected above the reporting limit (but below the NYS Class GA groundwater standard) at one residential system during the last quarterly sampling in October 2014. As a result, carbon filter change out occurred during the reporting period.

2.3 LONG TERM MONITORING

The LTM program includes collecting samples at the active extraction wells and monitoring wells for plume delineation. Table 2.2 summarizes the LTM sampling conducted in 2014. Figure 2.1 shows locations of monitoring points, and Appendix B-1 presents the laboratory results.

The SMP currently indicates that semiannual groundwater sampling in April and October is required; however, based on recommendations presented in the BOD, sampling frequency for 2014 was reduced to annual sampling (MACTEC, 2013c). Sampling occurred in December 2014 when the majority of active bedrock extraction wells were operating. Active extraction wells that were not operating at the time of sampling include EW-7, OW-5, OW-13, and OW-16; therefore, samples were not collected from these wells.

Table 2.7 summarizes LTM results observed at concentrations exceeding Class GA groundwater standards. The principal compounds detected during 2014 are PCE, trichloroethene (TCE), cis-1,2-DCE and vinyl chloride. The highest concentration of PCE in bedrock was detected in EW-16 (4,400 µg/l) along with TCE at 2,000 µg/l. OW-14 contained the highest concentration of PCE (9,300 µg/l) detected in the overburden wells. Laboratory results for all collected samples will be provided to NYSDEC in EDD format for loading into EQuIS.

The distribution of PCE in bedrock groundwater is shown on Figure 2.2. PCE was not detected at location CE-2 with the December round of sampling. As predicted, the plume does seem to be changing shape, separating, and shifting toward Catskill Creek, likely as a result of the discontinuance of offsite extraction wells. The leading edge of the bedrock groundwater plume, as

evidenced by PCE detected at EW-13, is interpreted to be beyond the influence of the on-site extraction system and will continue to migrate towards Catskill Creek.

Time series plots of PCE in select wells were constructed to evaluate the long-term effectiveness of the modified extraction well network (Appendix B-2). Overburden extraction well OW-14 and bedrock extraction well EW-16 were selected to monitor the on-site changes in groundwater quality at these two wells, both have shown consistently high concentrations of PCE over their sampling history. Monitoring well M-5 was selected as a measure of the northeastward progression of the plume that, as shown in Figure 2.2, is separating from the core of the plume. Although PCE concentration in groundwater at location M-5 during December 2014 was not detected, cis-1, 2-DCE was observed demonstrating degradation of PCE. Country Estates primary supply well, CE-2, will also be tracked in time-series to evaluate the distal end (i.e., northwest tip) of the plume as the offsite body of the plume continues to flow toward the northeast and eventual discharge in Catskill Creek.

Water level measurements collected during the December 2014 LTM event are provided on Table 2.8. Due to extraction well modifications underway and the number of wells off-line throughout 2014, a representative potentiometric surface map for bedrock groundwater was not generated for this PRR. Future PRRs will include this map to represent potentiometric surface for bedrock under pumping conditions to evaluate hydraulic control of the on-site plume.

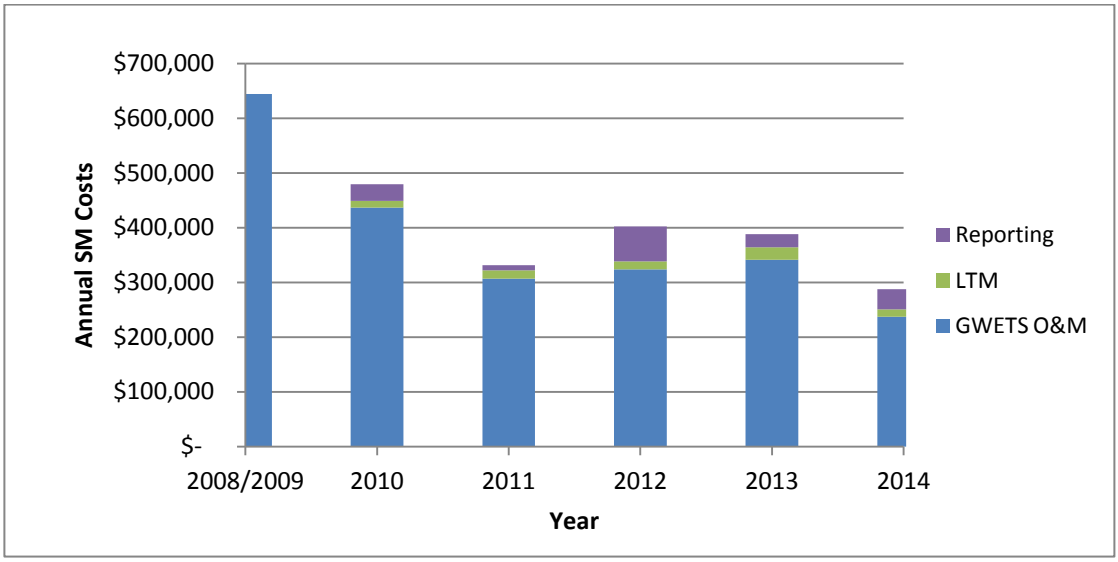
3.0 COST CONTROL SUMMARY

A cost summary for the reporting period is provided below by task. As shown, the majority of SM costs for the reporting period were incurred for operation and maintenance of the GWETS.

Task 2 (GWETS OM&M)[a]	
Labor	$175,569
Lodging, Travel, and MI&E	$15,570
Shipping	$296
Waste Disposal	$1,752
Phone/Internet	$2,630
Plowing	$2,138
Supplies & Equipment	$3,162
Electricity*	$17,853
Propane*	$10,088
Water*	$274
Laboratory Services*	8,015
	$237,347
Task 3 (LTM)	
Labor	$11,848
Lodging, Travel, and MI&E	$953
Shipping	$129
Supplies & Equipment	$727
	$13,657
Task 4 (Reporting)	
Labor	$30,473
Task 5 (SMP updates)	
Labor	$6,340
Task 6 (GWETS Modifications)	
Labor	$39,969
Lodging, Travel, and MI&E	$2,896
	$42,865
Annual Total:	$333,682

NOTES:
[a] includes residential GAC system Operation, Maintenance & Monitoring (OM&M)
*NYSDEC direct expense

Since the NYSDEC has assumed responsibility for the Site, annual OM&M costs have decreased by an average of 55 percent. Optimization measures to reduce the overall operating expenses have been and will continue to be implemented in an effort to provide further cost savings at the Site.



Notes:

GWETS O&M includes Country Estates and residential GAC system O&M, as applicable.

2008/2009: Costs as of 10/1/2008

2010: Reporting includes preparation of 2008/2009 PRR.

2012: O&M includes preparation of detailed design drawings for GWTS improvements; Reporting includes preparation of SMP and 2001/2011 PRR.

2013: O&M does not include preparation of detailed design drawings for GWTS improvements or implementation of RSO improvements. LTM includes conducting hydraulic effectiveness monitoring and EW-9 step test.

2014: Reporting includes 2014 PRR and drafting SMP update. O&M does not include GWETS Modifications.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The Remedial Action Objective (RAO) was redefined in 2013 to focus on hydraulic containment of the source area. During the 2014 reporting period progress was made toward completion of Phase II and III upgrades. Completion of the site improvements will result in an achievable goal that is protective and cost-effective. The following recommendations reflect the redefined RAO.

4.1 INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS

The current ICs/ECs are adequate to achieve the objectives for protection of human health and the environment based on current Site use. A soil vapor exposure pathway exists at the former manufacturing building; however, the building is currently used only for storage purposes. Therefore, mitigation would be necessary to address exposure to SVI should the building be occupied.

Water effluent concentrations of site-related VOCs do not currently exceed the surface water discharge criteria. GAC systems on three residential wells continue to provide adequate protection from site-related contaminants of concern.

4.2 O&M PLAN

The O&M Plan (a component of the SMP) will be updated in 2015 to reflect the changes made to the GWETS. As a result of the system modification, once fully implemented a reduction in OM&M operator level of effort and supplies will result in 2015.

4.3 GROUNDWATER MONITORING PROGRAM

The groundwater monitoring program conducted in 2014 provided adequate data for monitoring plume migration and performance monitoring for the remedial measures in place. LTM sampling will be reduced from annual to every 15-months, resulting in the next LTM sampling event to be conducted in March 2016. Changes in concentration resulting from the implemented changes to the extraction well array will continue to be monitored using a modified list of wells as presented in

this report. The SMP will be updated in 2015 to reflect the current network of wells that are being monitored for plume migration and system performance.

4.4 PHASE II AND III UPGRADE ACTIVITIES

Phase II activities were nearly completed in 2014. Final plant component modifications, installation of the PLC, and well upgrades are scheduled by the NYSDEC contractor for completion in 2015.

4.5 SMP

The SMP will be modified in 2015 to reflect the various changes and revisions implemented at the Site during 2013, 2014, and 2015.

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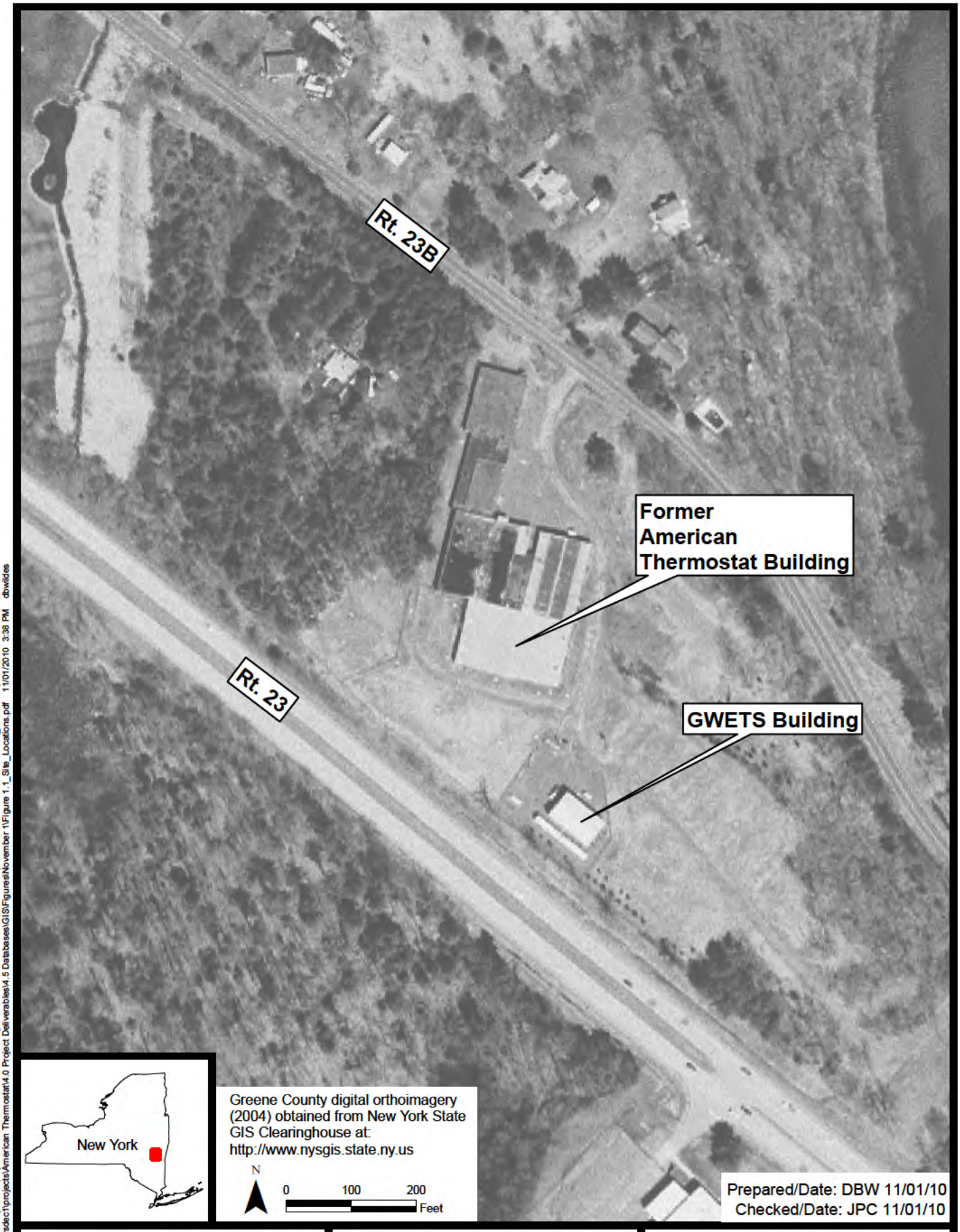
FIGURES



PERIODIC REVIEW REPORT
AMERICAN THERMOSTAT
SOUTH CAIRO, NEW YORK

MACTEC

Site Location
PROJECT 3612112204
FIGURE 1.1

Document: P:\Projects\nysdec1\projects\American Thermostat\4.0 Project Deliverables\4.5 Databases\GIS\MapDocuments\AmericanThermostat_SiteLocMap.mxd
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KLINKE
KUBLER
VIELLA
R-1
CE-2
CE-1
EW-14
M-5
SPEENBURGH
EW-13
M-6
R-6
IW-14
R-18
EW-15
M-4
EW-11
EW-12
R-19
M-14
IW-12
EW-10
M-12
R-11
M-7
R-12
M-10
IW-11
EW-8
IW-10
IW-8
IW-9
EW-9
I-30
M-8
EW-16
EW-6
MW-02
WB-1A
MUELLER
M-3
EW-3
IW-1
IW-6

EW-7
OW-1
IW-5
EW-4
OW-2
IW-3
OW-4
OW-3
EW-2
OW-6
OW-5
OW-7
OW-12
OW-11
OW-8
OW-9
OW-10
IW-2
OW-15
OW-13
IW-4
EW-5
OW-14
OW-16

Inset Scale:
0 75 150
Feet

Legend

- Monitoring Well
- Residential Well with Point of Entry Treament System
- Overburden Extraction Well
- Bedrock Extraction Well
- Decommissioned Well

N
0 200 400
Feet

Greene County digital orthoimagery (2009) obtained from New York State GIS Clearinghouse at: http://www.nysgis.state.ny.us

Prepared/Date: BRP 04/02/14
Checked/Date: RHA 04/02/14

PERIODIC REVIEW REPORT
AMERICAN THERMOSTAT SITE (420006)
SOUTH CAIRO, NEW YORK

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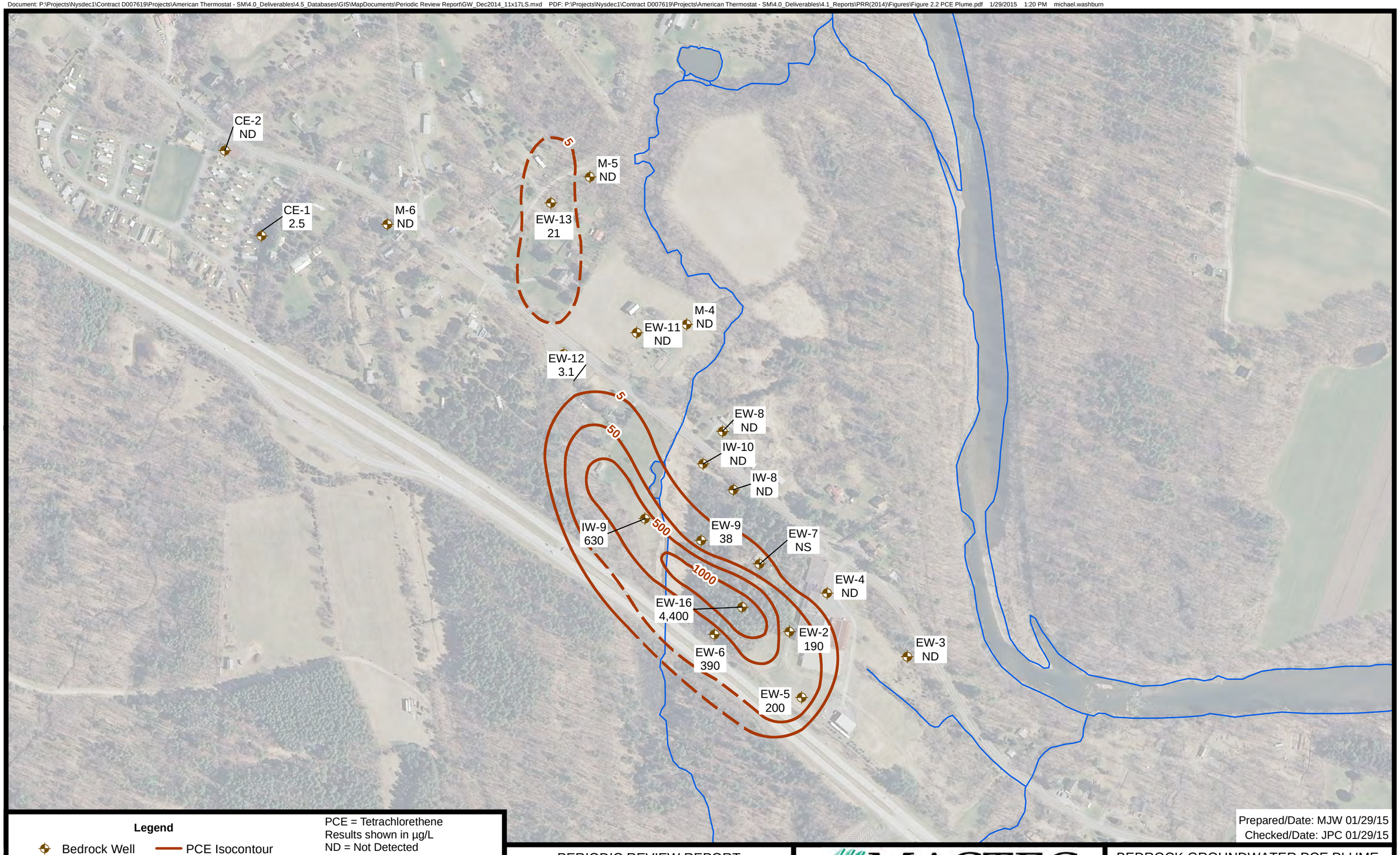
MONITORING LOCATIONS

Project 3612112204 Figure 2.1



PERIODIC REVIEW REPORT
AMERICAN THERMOSTAT
SOUTH CAIRO, NEW YORK

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BEDROCK GROUNDWATER PCE PLUME
DECEMBER 2014
Project 3612112204 Figure 2.2

TABLES

Table 2.1: Site Management Requirements

Component	Action	Required Frequency	Comments/Recommendations
Groundwater Extraction and Treatment			
GWETS Operation - Daily Checklist	Inspection	Weekly (currently being conducted approx 3 days/week as plant operator visits site)	Check water treatment operation: flow rates, chemical usage, meter readings, system components.
Well Vaults, pumps and motors, Pneumatic traps	Inspection	Weekly	Check vaults for water buildup and component function. Inspect pumps and motors for excessive noise, heat, leakage. Drain condensate from traps.
Control panel, heaters, septic holding tank	Inspection	Weekly	Check function of all control panel indicating lights. Check level of septic holding tank. In cold weather verify pilot light operation of heaters.
Temporary Hazardous Waste Storage Unit	Inspection	Weekly	Check container condition, container markings and accumulation point.
Safety equipment, vault sump pumps, plant lighting	Inspection	Monthly	Inspect safety equipment (ladders, eyewash, fire extinguishers, etc.). Verify operation of vault sump pumps. Inspect plant lighting for proper operation.
Site Security	Inspection	Monthly	Check treatment building door locks, fencing, and site perimeter fence for defects.
Air stripper	Inspection	Annually	Perform cleaning of air stripper unit trays and sump.
Plant heaters	Inspection	Annually	Have subcontractor perform maintenance on treatment plant heaters.
Ground Water Monitoring System	Inspection	15-month sampling interval	Repair to well pads/installation of locks needed at various site wells to maintain integrity and security.
System Performance Monitoring			
Influent equalization tanks.	Influent water sampling	Monthly	Grab samples collected to evaluate and monitor GWETS system performance.
Air stripper effluent air/water	Air stripper effluent water and air sampling	Monthly	Grab samples collected to evaluate and monitor GWETS system performance.
Environmental Monitoring			
Ground Water Monitoring Program			
POET system sampling at Viella, Kubler and Klinke (See Table 2.2)	Residential water supply sampling	Quarterly	Grab samples collected to evaluate and monitor water supply and carbon filter integrity. Revised to quarterly frequency in 2010 per NYSDEC/NYSDOH concurrence.
Refer to Table 2.2	Groundwater sampling of 31 wells	15-month sampling interval	Grab samples collected from 31 locations; including 3 residential wells, 2 public supply wells, monitoring wells, former and active bedrock and overburden extraction wells, and former injection wells.

Table 2.2: Long Term Monitoring and System Performance Sampling - 2014

Sample Locations	Well Depth (ft)	Sample Description	Sample Depth (ft)	VOC	Water Level
Monitoring Wells					
M-4	200	PDB	130	Annual	Bi-annual
M-5	200	grab	composite	Annual	Bi-annual
M-6	100	grab	composite	Annual	Bi-annual
Mueller	114	grab	composite	Annual	Bi-annual
CE-1 BEF	535	Before filters	composite	Annual	Bi-annual
CE-2 BEF	287	Before filters	composite	Annual	Bi-annual
Former Bedrock Extraction Wells					
EW-3	295	PDB	275	Annual	Bi-annual
EW-4	322	PDB	302	Annual	Bi-annual
EW-8	318	PDB	200	Annual	Bi-annual
EW-11	172.2	PDB	117	Annual	Bi-annual
EW-12	270.5	PDB	115	Annual	Bi-annual
EW-13	360	PDB	200	Annual	Bi-annual
Former Injection Wells					
IW-8	391.8	PDB	339	Annual	Bi-annual
IW-9	358.1	PDB	333	Annual	Bi-annual
IW-10	176.3	PDB	40	Annual	Bi-annual
Active Bedrock Extraction Wells					
EW-2	322	grab	composite	Annual	Bi-annual
EW-5*	301.5	PDB	150	Annual	Bi-annual
EW-6	325	grab	composite	Annual	Bi-annual
EW-7	227	grab	composite	Annual	Bi-annual
EW-9	365	grab	composite	Annual	Bi-annual
EW-16	417	grab	composite	Annual	Bi-annual
Active Overburden Extraction Wells					
OW-2	30	grab	composite	Annual	Bi-annual
OW-3	25	grab	composite	Annual	Bi-annual
OW-5	30	grab	composite	Annual	Bi-annual
OW-7	25	grab	composite	Annual	Bi-annual
OW-13	29.5	grab	composite	Annual	Bi-annual
OW-14	30	grab	composite	Annual	Bi-annual
OW-16	30	grab	composite	Annual	Bi-annual
Residential Wells					
VIELLA BEF	300	Before filters	composite	Quarterly	
VIELLA BET	300	Between filters	composite	Quarterly	
KUBLER BEF	300	Before filters	composite	Quarterly	Bi-annual
KUBLER BET	300	Between filters	composite	Quarterly	
KLINKE BEF	240	Before filters	composite	Quarterly	
KLINKE BET	240	Between filters	composite	Quarterly	

System Performance Monitoring				VOC	Metals	TDS/TSS
PS-INFLUENT		Influent		monthly	monthly	monthly
PS-AS-EFFLUENT		Air stripper effluent water		monthly	----	----
PS-AS-DISCHARGE		Air stripper effluent air		monthly	----	----

EW-5* = will be online in 2015
VOCs = Volatile Organic Compounds by method 8260
**VOCs by method TO-14 (air)
Metals = Total metals by method 6010
TDS = Total dissolved solids
TSS = Total suspended solids
CE-1 = Country Estates Well #1
CE-2 = Country Estates Well #2

Table 2.3: Treatment Plant Monthly Throughput

Month	Calendar Year (Gallons)																
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
January	-	2,327,342	2,188,662	3,154,385	2,643,561	3,112,140	1,452,060	1,969,101	1,850,648	1,860,431	1,621,909	2,009,299	1,715,140	1,660,400	1,617,600	1,287,600	605,868
February	-	1,946,464	1,828,969	3,202,253	2,400,906	2,640,103	1,323,679	1,627,579	1,724,943	1,484,866	1,661,136	1,973,492	1,562,130	1,608,200	1,592,100	1,165,900	537,554
March	-	1,570,828	2,782,069	3,397,280	2,581,039	3,032,627	1,433,444	1,505,083	1,726,705	1,797,869	1,872,515	2,109,251	2,144,107	1,677,100	1,545,800	1,213,400	828,412
April	-	1,986,297	2,625,243	3,325,592	3,015,136	2,956,081	1,621,998	1,888,648	1,860,726	1,651,491	1,922,613	2,164,940	1,972,606	1,807,700	976,300	1,213,400	1,311,895
May	-	1,876,550	2,689,205	3,507,403	2,827,722	2,279,599	1,511,813	1,679,210	2,038,414	1,595,631	1,496,402	2,086,536	1,692,254	1,869,800	1,050,200	1,024,000	1,181,124
June	-	1,810,328	2,515,671	3,241,052	3,087,176	2,817,292	1,378,343	1,635,094	2,225,379	1,567,880	1,519,804	2,069,749	1,657,835	1,617,700	655,200	560,000	1,036,409
July	-	1,880,672	2,845,066	2,846,350	3,109,504	2,828,580	1,829,427	1,679,658	1,700,523	1,656,624	1,344,964	2,413,904	1,710,898	1,626,100	435,000	-	1,101,365
August	1,845,307	2,865,086	2,656,221	3,323,930	2,969,001	2,862,294	2,488,132	1,675,021	1,505,840	1,680,981	2,366,862	1,461,639	1,814,591	1,676,400	1,572,000	368,300	968,790
September	2,326,580	2,849,292	2,790,754	3,116,812	2,826,453	2,805,159	2,214,838	1,668,387	1,573,918	1,559,100	2,053,268	1,572,872	1,502,900	1,764,200	1,098,900	282,600	516,422
October	2,000,099	2,967,620	3,191,008	3,172,179	3,126,848	2,889,540	2,016,922	1,048,462	2,365,602	1,624,903	2,649,688	1,962,537	1,736,300	1,646,400	1,363,800	1,133,000	771,419
November	1,387,734	2,840,040	2,906,470	2,668,748	3,151,070	2,703,444	2,147,628	1,753,165	2,542,691	1,628,116	2,172,569	1,782,527	1,505,900	1,806,000	1,223,500	1,240,188	643,451
December	1,515,814	2,996,042	3,089,535	2,676,774	3,043,354	1,743,574	2,218,612	1,804,582	1,570,319	1,779,807	2,466,153	2,171,560	1,799,400	1,966,500	1,351,200	950,031	804,076
Total for Calendar Year	9,075,534	27,916,561	32,108,873	37,632,758	34,781,770	32,670,433	21,636,896	19,933,990	22,685,708	19,887,699	23,147,883	23,778,306	20,814,061	20,726,500	14,481,600	10,438,419	10,306,785
Cumulative Total Throughput	9,075,534	36,992,095	69,100,968	106,733,726	141,515,496	174,185,929	195,822,825	215,756,815	238,442,523	258,330,222	281,478,105	305,256,411	326,070,472	346,796,972	361,278,572	371,716,991	382,023,776

Note:
Plant modifications resulted in plant shut down during the month of July 2013.

Table 2.4: Total VOCs in Extracted Groundwater (lbs)

Month	Calendar Year																
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
January	-	26.547	57.54	42.672	28.117	38.179	29.749	39.406	33.807	32.255	23.890	22.972	18.965	18.200	18.455	21.813	7.483
February	-	49.301	47.21	42.605	26.007	37.345	31.262	33.006	28.487	19.820	24.329	18.528	19.424	15.900	18.601	27.900	11.007
March	-	43.653	62.34	50.466	28.325	43.763	39.237	20.536	27.235	28.815	33.988	20.016	30.648	35.500	17.996	30.227	25.057
April	-	39.195	58.72	44.072	43.405	44.775	42.029	21.829	28.960	34.400	30.646	20.958	23.623	26.300	18.845	18.733	18.064
May	-	26.740	43.74	54.385	42.536	34.148	34.569	29.639	40.240	19.761	22.666	23.794	15.111	25.100	23.970	18.629	26.121
June	-	30.986	50.03	45.548	44.777	45.541	32.553	23.565	44.068	18.688	14.655	19.364	13.900	22.900	5.361	13.062	15.612
July	-	23.904	40.78	34.740	40.495	32.693	32.137	24.313	13.113	20.233	11.835	25.282	12.000	19.500	27.464	-	12.960
August	104.719	47.342	41.47	41.207	38.492	42.041	31.562	14.295	14.138	16.364	24.690	15.771	9.767	19.800	39.570	20.000	40.262
September	24.464	38.997	33.93	29.549	37.269	51.853	26.930	17.543	24.368	15.827	21.762	14.767	13.702	24.955	12.839	10.441	6.982
October	42.447	63.240	34.55	71.511	36.924	49.313	36.012	15.225	40.066	15.752	24.788	16.869	21.800	22.464	29.193	17.114	8.948
November	26.596	58.068	42.71	23.909	42.338	35.082	26.830	31.756	40.442	20.156	24.114	19.863	18.030	19.819	23.936	18.526	13.961
December	34.952	66.933	49.90	27.912	42.795	34.424	34.253	31.339	23.086	21.882	25.265	26.499	30.390	22.483	16.971	14.100	10.706
Total for Calendar Year (lbs)	233	515	563	509	451	489	397	302	358	264	283	245	227	273	253	211	197
Cumulative Total VOCs (lbs)	233	748	1,311	1,820	2,271	2,760	3,157	3,460	3,818	4,082	4,364	4,609	4,836	5,109	5,363	5,573	5,770

Note:
Total VOCs in Extracted Groundwater = Average of GWETS Influent Total VOCs Concentrations per month multiplied by the Monthly Flow Rate and the Monthly System Operating Duration.
Values are in pounds (lbs).
July 2013 - system down for plant modifications.

Table 2.5: System Performance Sampling Results

			Parameter		1,2-DCE (total)	PCE	TCE	Vinyl Chloride	Barium	Iron	Total Dissolved Solids
			ACG		1,984,204	31,505	15,748	3,465			
			GA Std		5	5	5	2	NS	NS	500 mg/l
			AWQ Criteria		-	1	40	-		300	
Location	**Matrix**	**Date**	**Field Sample ID**	**Units**							mg/L
PS-Influent	L	1/6/2014	PS-INFLUENT	ug/l	**330**	**990**	**150**	**20** U	30.2	68.4	313
PS-Influent	L	2/3/2014	PS-AS-INFLUENT	ug/l	**580**	**1,300**	**570**	**2.6**	37.9	50 U	365
PS-Influent	L	3/18/2014	PS-INFLUENT	ug/l	**640**	**2,500**	**480**	**3.5**	60.2	**1,320**	361
PS-Influent	L	4/7/2014	PS-AS-INFLUENT	ug/l	**360**	**950**	**340**	**20** U	46.7	294	344
PS-Influent	L	5/5/2014	PS-INFLUENT	ug/l	**490**	**1,700**	**460**	**20** U	44.4	**350**	359
PS-Influent	L	6/9/2014	PS-INFLUENT	ug/l	**490**	**920**	**390**	**4.1**	63.4	**1,030**	363
PS-Influent	L	7/7/2014	PS-INFLUENT	ug/l	**420**	**700**	**290**	**10** U	45.9	131	368
PS-Influent	L	8/5/2014	PS-INFLUENT	ug/l	**720**	**3,300**	**960**	**9.9 J**	71.9	**754**	324
PS-Influent	L	9/4/2014	PS- INFLUENT	ug/l	**450**	**840**	**330**	**20** U	68	**2,010**	367
PS-Influent	L	10/15/2014	PS-INFLUENT	ug/l	**440**	**610**	**340**	**10** U	42.9	85.2	335
PS-Influent	L	11/3/2014	PS-AS INFLUENT	ug/l	**410**	**1,800**	**380**	**20** U	40.1	50 U	364
PS-Influent	L	12/1/2014	PS-INFLUENT	ug/l	**400**	**1,100**	**120**	**5.5**	52.1	50 U	349
Air Stripper Eff	L	1/6/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	36.1	66.5	358
Air Stripper Eff	L	1/27/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	43.7	58.9	348
Air Stripper Eff	L	2/3/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	37.5	50 U	367
Air Stripper Eff	L	2/19/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	71.3	**597**	403
Air Stripper Eff	L	3/18/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	56.5	**546**	394
Air Stripper Eff	L	4/7/2014	PS-AS-EFFLUENT	ug/l	2 U	0.38 J	1 U	1 U	46.2	**321**	353
Air Stripper Eff	L	5/5/2014	PS-AS-EFFLUENT	ug/l	2 U	0.36 J	1 U	1 U	46.6	287	348
Air Stripper Eff	L	6/9/2014	PS-AS-EFFLUENT	ug/l	2 U	0.46 J	1 U	1 U	64.8	**1,580**	383
Air Stripper Eff	L	7/7/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	43.6	243	371
Air Stripper Eff	L	8/5/2014	PS-AS-EFFLUENT	ug/l	2 U	**2.6**	0.48 J	1 U	56.1	**1,190**	320
Air Stripper Eff	L	9/4/2014	PS-AS EFFLUENT	ug/l	2 U	0.74 J	1 U	1 U	70.9	**1,870**	385
Air Stripper Eff	L	10/15/2014	PS-AS EFFLUENT	ug/l	2 U	1 U	1 U	1 U	48.3	157	375
Air Stripper Eff	L	11/3/2014	PS-AS EFFLUENT	ug/l	2 U	1 U	1 U	1 U	42.7	53.4	368
Air Stripper Eff	L	12/1/2014	PS-AS-EFFLUENT	ug/l	2 U	1 U	1 U	1 U	52	**553**	348
Air Stripper Eff	G	1/6/2014	PS-AS-DISCHARGE	ug/m3	2,500	7,800	1,800	21 U			
Air Stripper Eff	G	1/27/2014	PS-AS-DISCHARGE	ug/m3	400	1,000	360	2.5 U			
Air Stripper Eff	G	2/3/2014	PS-AS-DISCHARGE	ug/m3	250	670	240	1.5 U			
Air Stripper Eff	G	2/19/2014	PS-AS-DISCHARGE	ug/m3	3,800	12,000	4,200	31 U			
Air Stripper Eff	G	3/18/2014	PS-AS-DISCHARGE	ug/m3	4,000	12,000	3,800	33 U			
Air Stripper Eff	G	4/7/2014	PS-AS-DISCHARGE	ug/m3	1,500	4,200	1,400	14			
Air Stripper Eff	G	5/5/2014	PS-AS-DISCHARGE	ug/m3	1,600	5,100	1,500	18 U			
Air Stripper Eff	G	6/9/2014	PS-AS-DISCHARGE	ug/m3	2,500	5,300	2,000	20			
Air Stripper Eff	G	7/7/2014	PS-AS-DISCHARGE	ug/m3	1,500	3,900	1,200	16			
Air Stripper Eff	G	8/5/2014	PS-AS-DISCHARGE	ug/m3	2,100	4,900	1,800	27			
Air Stripper Eff	G	9/4/2014	PS-AS-DISCHARGE	ug/m3	3,200	5,900	2,300	26			
Air Stripper Eff	G	10/15/2014	PS-AS DISCHARGE	ug/m3	3,000	3,700	2,000	32			
Air Stripper Eff	G	12/1/2014	PS-AS DISCHARGE	ug/m3	1,300	3,900	340	15			
Air Stripper Eff	G	11/3/2014	PS-AS DISCHARGE	ug/m3	1,900	5,100	1,600	22			

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

Table 2.6: Residential Treatment System Results

Location	Sample Date	Description	1,2-Dichloroethene (total)	Cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride
Parameter								
Units			ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
GA			5	5	5	5	5	2
KLINKE	1/6/2014	Between Filters	1.9 J	1.9	1 U	1 U	1 U	1 U
KLINKE	4/8/2014	Between Filters	0.81 J	0.81 J	1 U	1 U	1 U	1 U
KLINKE	7/9/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
KLINKE	10/14/2014	Between Filters	2	2	1 U	1 U	1 U	1 U
VIELLA	1/7/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
VIELLA	4/7/2014	Between Filters	2 U	1 U	1 U	0.56 J	1 U	1 U
VIELLA	7/7/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
VIELLA	10/13/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
KUBLER	1/6/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
KUBLER	4/7/2014	Between Filters	2 U	1 U	1 U	0.98 J	1 U	1 U
KUBLER	7/7/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U
KUBLER	10/14/2014	Between Filters	2 U	1 U	1 U	1 U	1 U	1 U

Table 2.7: Environmental Monitoring Results Above NYS Standards

Location	Sample Date	Sample ID	Parameter	1,2-Dichloroethene (total)	Cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl chloride
			Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
			GA	5	5	5	5	5	2
CE-1	12/18/2014	CE-1		2 U	1 U	1 U	2.5	0.57 J	1 U
CE-2	12/18/2014	CE-2		2 U	1 U	1 U	1 U	1 U	1 U
EW-11	12/17/2014	EW-11		1.1 J	1.1	1 U	1 U	1 U	1 U
EW-12	12/17/2014	EW-12		2 U	1 U	1 U	3.1	0.53 J	1 U
EW-13	12/17/2014	EW-13		**12**	**12**	1 U	**21**	3.5	1 U
EW-16	12/18/2014	EW-16		**1400**	**1400**	**8** U	**4400**	**2000**	**14**
EW-2	12/15/2014	EW-2		**260**	**260**	5 U	**190**	**54**	**15**
EW-3	12/17/2014	EW-3		**30**	**30**	1 U	1 U	1 U	**6.1**
EW-4	12/17/2014	EW-4		**16**	**13**	2.8	1 U	1 U	1 U
EW-5	12/17/2014	EW-5		**45**	**45**	4 U	**200**	**18**	**4** U
EW-6	12/18/2014	EW-6		**300**	**300**	**8** U	**390**	**120**	**8** U
EW-7	Not Sampled	EW-7		Not Sampled					
EW-8	12/17/2014	EW-8		2.8	2.8	1 U	1 U	1 U	1 U
EW-9	12/15/2014	EW-9		**200**	**200**	3.6 J	**38**	**20**	**4** U
IW-10	12/17/2014	IW-10		**7**	**7**	1 U	1 U	1 U	1 U
IW-8	12/17/2014	IW-8		2 U	1 U	1 U	1 U	1 U	1 U
IW-9	12/17/2014	IW-9		**1000**	**1000**	**25** U	**630**	**540**	**25** U
M-4	12/17/2014	M-4		2 U	1 U	1 U	1 U	1 U	1 U
M-5	12/16/2014	M-5		**34**	**34**	1 U	1 U	0.69 J	1 U
M-6	12/16/2014	M-6		2 U	1 U	1 U	1 U	1 U	1 U
MUELLER	12/16/2014	MUELLER		2 U	1 U	1 U	1 U	1 U	1 U
OW-14	12/15/2014	OW-14		**810**	**810**	**100** U	**9300**	**810**	**100** U
OW-2	12/15/2014	OW-2		**66**	**66**	20 U	**1100**	**23**	20 U
OW-3	12/15/2014	OW-3		**120** J	**120**	80 U	**5100**	**110**	80 U
OW-7	12/18/2014	OW-7		**30**	**30**	1 U	**74**	**13**	1 U

Table 2.8: Groundwater Level Measurements

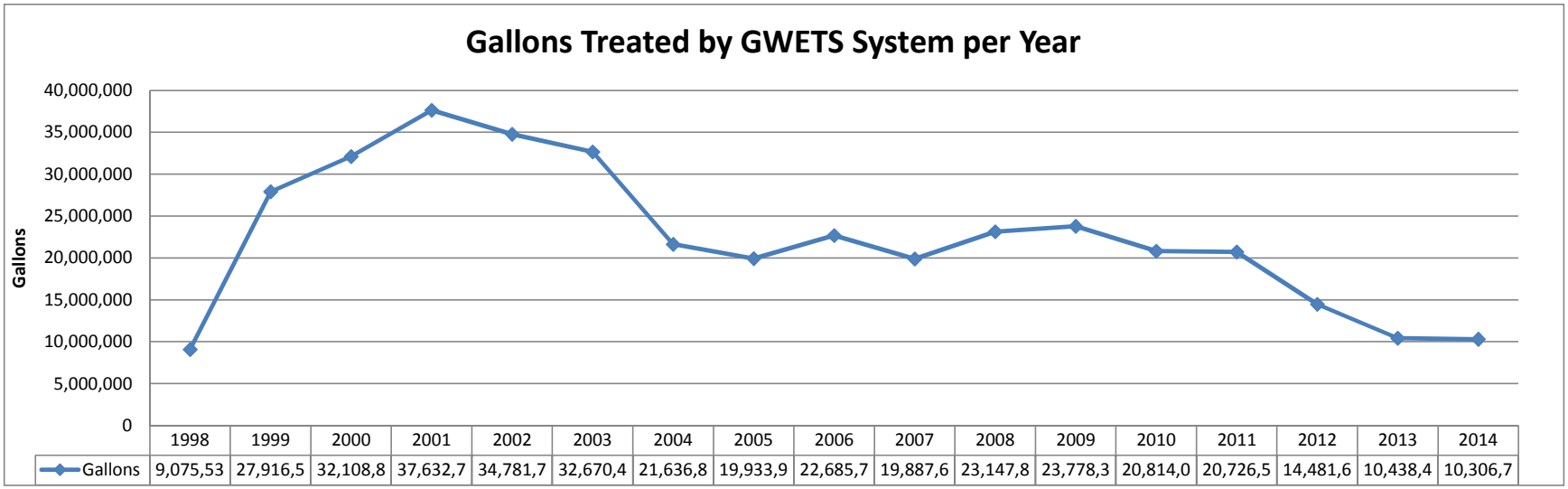
Well Location	MACTEC level survey (Fall 2013)	Lu Engineers 2012 surveyed MP elevation (ft msl)	Well Depth (ft)	April 17, 2013 pumping DTW from MP (ft)	April 17, 2013 pumping water elevation (ft msl)	October 15-16, 2013 pumping DTW from MP (ft)	October 15, 2013 pumping DTW measured above transducer (ft)	October 15-16, 2013 pumping water elevation (ft msl)	December 15-18, 2014 pumping DTW from MP (ft)	December 15-18, 2014 pumping DTW measured above transducer (ft)	December 15-18, 2014 pumping water elevation (ft msl)
EW-2		254.69	322.00	278.4	-23.71		8.4	62.78		21.3	75.68
EW-3		260.55	295.00	111.39	149.16	111.48		149.07	105.85		154.70
EW-4		256.43	322.00	107.9	148.53	108		148.43	102.5		153.93
EW-5		259.19	301.50	111.87	147.32	111.5		147.69	106.15		153.04
EW-6		242.31	325.00	277.6	-35.29		198.9	141.74		206.8	149.64
EW-7		251.10	227.00	142.6	108.50		5.3	47.05		NM	NM
EW-8	223.93*	223.93	318.00	84	139.93	85.12		138.81	78.95		144.98
EW-9		237.17	365.00	92	145.17		231	139.79		233.5	142.29
EW-11		232.10	172.20	63.25	168.85	68.42		163.68	62.7		169.40
EW-12		233.56	270.50	62.35	171.21	68.1		165.46	37.3		196.26
EW-13		217.83	360.00	51.15	166.68	55.08		162.75	47.95		169.88
EW-15[a] (IW-13)		236.37	275.00	88.3	148.07	NM			NM		NM
EW-16		248.66	417.00	NM			291.6	138.29		68	-81.82
IW-8		240.39	391.80	81.93	158.46	87.34		153.05	46.28		194.11
IW-9		225.42	358.10	76.6	148.82	76.78		148.64	71.25		154.17
IW-10		234.31	176.30	5.15	229.16	7.97		226.34	5.03		229.28
M-4	232.19*	232.19	200.00	64.83	167.36	68.93		163.26	63.3		168.89
M-5		213.88	200.00	NM		48.27		165.61	42.55		171.33
M-6	248.31*	248.31	100.00	29.78	218.53	36.14		212.17	25.76		222.55
MUELLER		183.25	114.00	17.49	165.76	21.6		161.65	15.96		167.29
OW-2		256.38	30.00	21.2	235.18		2.3	234.60		3.7	236.00
OW-3		256.19	25.00	15.6	240.59		3.2	238.43		4.7	239.93
OW-5		257.68	30.00	19	238.68		4.8	249.27		NM	NM
OW-7		254.03	25.00	18.6	235.43		2.1	231.01		3.8	232.71
OW-13		259.49	29.50	18	241.49		2.9	240.27		NM	NM
OW-14		260.66	30.00	16.35	244.31		1.6	235.14		3.74	237.28
OW-16	260.06*	260.06	30.00	20	240.06		15.4	254.39		NM	NM

Notes
DTW = Depth to Water
ft = feet
MP = measuring point
msl - mean sea level
NM = Not Measured
a=EW-15 is now IW-13
*well elevations surveyed by AMEC using level in Fall 2013 tying into known elevation
OW-2 = active extraction well - DTW measured via transducer

APPENDIX A

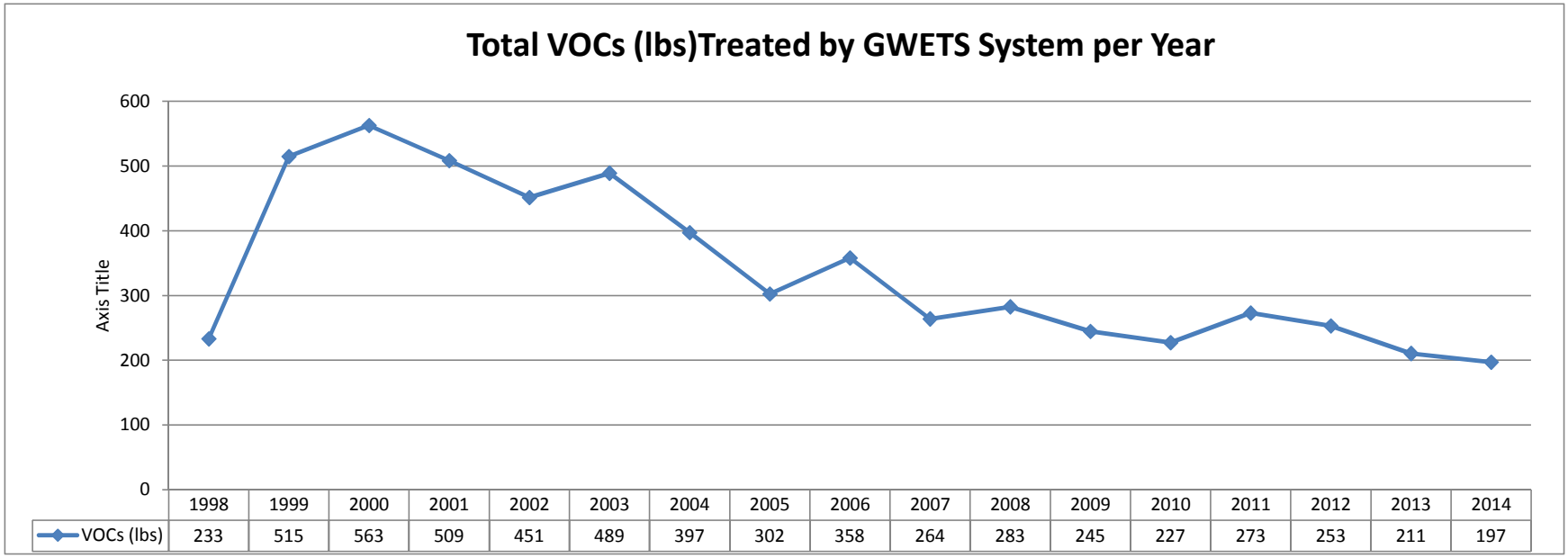
GWETS COMPONENT PERFORMANCE

Chart A-1



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Gallons	9,075,53	27,916,5	32,108,8	37,632,7	34,781,7	32,670,4	21,636,8	19,933,9	22,685,7	19,887,6	23,147,8	23,778,3	20,814,0	20,726,5	14,481,6	10,438,4	10,306,7

Chart A-2


Total VOCs (lbs)Treated by GWETS System per Year
Axis Title
600
500
400
300
200
100
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
VOCs (lbs) 233 515 563 509 451 489 397 302 358 264 283 245 227 273 253 211 197

Appendix A: GWETS Component Performance

		Loc Name	Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff	
		Field Sample Date	1/6/2014		1/27/2014		2/3/2014		2/19/2014		3/18/2014		4/7/2014	
		Lab Sample Delivery Group	480-52875-1		480-53875-1		480-54185-1		480-54956-1		480-56269-1		480-57562-1	
		Field Sample ID	PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT	
		Qc Code	FS		FS		FS		FS		FS		FS	
Method	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW8260C	1,1,1-Trichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2-Trichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloroethene (total)	ug/l	2	U	2	U	2	U	2	U	2	U	2	U
SW8260C	2-Hexanone	ug/l	5	U	5	U	5	U	5	U	5	U	5	U
SW8260C	Acetone	ug/l	10	U	3.4	J	10	U	10	U	10	U	3.2	J
SW8260C	Carbon disulfide	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Carbon tetrachloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Chloroform	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Chloromethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Methylene chloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Tetrachloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	0.38	J
SW8260C	Toluene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	trans-1,2-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Trichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Vinyl chloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW6010C	Aluminum	ug/l	200	U	200	U	200	U	753		705		465	
SW6010C	Arsenic	ug/l	6	U	6	U	6	U	6	U	6	U	6	U
SW6010C	Barium	ug/l	36.1		43.7		37.5		71.3		56.5		46.2	
SW6010C	Cadmium	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW6010C	Chromium	ug/l	4	U	4	U	4	U	4	U	4	U	4	U
SW6010C	Copper	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Iron	ug/l	66.5		58.9		50	U	597		546		321	
SW6010C	Lead	ug/l	3	U	3	U	3	U	3	U	3	U	3	U
SW6010C	Manganese	ug/l	50		59.5		42.1		52.4		91.2		50.1	
SW6010C	Nickel	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Zinc	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW7470A	Mercury	ug/l	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
SM2540C	Total Dissolved Solids	mg/l	358		348		367		403		394		353	
SM2540D	Total Suspended Solids	mg/l	4	U	4	U	4	U	4	U	4.8		4	U

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

Appendix A: GWETS Component Performance

		Loc Name	Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff		Air Stripper Eff	
		Field Sample Date	5/5/2014		6/9/2014		7/7/2014		8/5/2014		9/4/2014		10/15/2014	
		Lab Sample Delivery Group	480-59277-1		480-61566-1		480-63529-1		480-64971-1		480-66734-1		480-69442-1	
		Field Sample ID	PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS-EFFLUENT		PS-AS EFFLUENT		PS-AS EFFLUENT	
		Qc Code	FS		FS		FS		FS		FS		FS	
Method	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW8260C	1,1,1-Trichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2-Trichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,1-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloroethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloroethene (total)	ug/l	2	U	2	U	2	U	2	U	2	U	2	U
SW8260C	2-Hexanone	ug/l	5	U	5	U	5	U	5	U	5	U	5	U
SW8260C	Acetone	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW8260C	Carbon disulfide	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Carbon tetrachloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Chloroform	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Chloromethane	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Methylene chloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Tetrachloroethene	ug/l	0.36	J	0.46	J	1	U	2.6		0.74	J	1	U
SW8260C	Toluene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	trans-1,2-Dichloroethene	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW8260C	Trichloroethene	ug/l	1	U	1	U	1	U	0.48	J	1	U	1	U
SW8260C	Vinyl chloride	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW6010C	Aluminum	ug/l	402		1750		244		1030		2090		200	U
SW6010C	Arsenic	ug/l	6.1		6	U	6	U	6	U	6.2		6	U
SW6010C	Barium	ug/l	46.6		64.8		43.6		56.1		70.9		48.3	
SW6010C	Cadmium	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW6010C	Chromium	ug/l	4	U	4.4		4	U	4	U	4.4		4	U
SW6010C	Copper	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Iron	ug/l	287		1580		243		1190		1870		157	
SW6010C	Lead	ug/l	3	U	3	U	3	U	4.5		7		3	U
SW6010C	Manganese	ug/l	45.8		144		62.3		47.4		276		137	
SW6010C	Nickel	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Zinc	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW7470A	Mercury	ug/l	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
SM2540C	Total Dissolved Solids	mg/l	348		383		371		320		385		375	
SM2540D	Total Suspended Solids	mg/l	4	U	4	U	4	U	17.6		4	U	4	U

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

Appendix A: GWETS Component Performance

	Loc Name	Air Stripper Eff	Air Stripper Eff	PS-Influent	PS-Influent	PS-Influent	PS-Influent
	Field Sample Date	11/3/2014	12/1/2014	1/6/2014	2/3/2014	3/18/2014	4/7/2014
	Lab Sample Delivery Group	480-70634-1	480-72265-1	480-52875-1	480-54185-1	480-56269-1	480-57562-1
	Field Sample ID	PS-AS EFFLUENT	PS-AS-EFFLUENT	PS-INFLUENT	PS-AS-INFLUENT	PS-INFLUENT	PS-AS-INFLUENT
	Qc Code	FS	FS	FS	FS	FS	FS
Method	**Parameter**	**Units**	Result Qualifier	Final Result Final Qualifie	Result Qualifier	Result Qualifier	Result Qualifier	Result Qualifier
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	20 U	1.1	1	20 U
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	2 U	330	580	640	360
SW8260C	2-Hexanone	ug/l	5 U	5 U	100 U	5 U	5 U	100 U
SW8260C	Acetone	ug/l	10 U	10 U	200 U	10 U	10 U	200 U
SW8260C	Carbon disulfide	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	Chloroform	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	Chloromethane	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	1 U	330	580	640	360
SW8260C	Methylene chloride	ug/l	1 U	1 U	29	1 U	1 U	20 U
SW8260C	Tetrachloroethene	ug/l	1 U	1 U	990	1300	2500	950
SW8260C	Toluene	ug/l	1 U	1 U	20 U	1 U	1 U	20 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	20 U	5.1	4.5	20 U
SW8260C	Trichloroethene	ug/l	1 U	1 U	150	570	480	340
SW8260C	Vinyl chloride	ug/l	1 U	1 U	20 U	2.6	3.5	20 U
SW6010C	Aluminum	ug/l	200 U	405	200 U	200 U	1730	477
SW6010C	Arsenic	ug/l	6 U	6 U	6 U	6 U	6 U	6 U
SW6010C	Barium	ug/l	42.7	52	30.2	37.9	60.2	46.7
SW6010C	Cadmium	ug/l	1 U	1 U	1 U	1 U	1 U	1 U
SW6010C	Chromium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U
SW6010C	Copper	ug/l	10 U	10 U	10 U	10 U	10 U	10 U
SW6010C	Iron	ug/l	53.4	553	68.4	50 U	1320	294
SW6010C	Lead	ug/l	3 U	3 U	3 U	3 U	3 U	3 U
SW6010C	Manganese	ug/l	50.9	79.3	24.2	42.2	69.4	42.3
SW6010C	Nickel	ug/l	10 U	10 U	10 U	10 U	10 U	10 U
SW6010C	Zinc	ug/l	10 U	14.9	10 U	10 U	12.2	10 U
SW7470A	Mercury	ug/l	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
SM2540C	Total Dissolved Solids	mg/l	368	348	313	365	361	344
SM2540D	Total Suspended Solids	mg/l	4 U	14.4	4 U	4 U	64.4	4

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

Appendix A: GWETS Component Performance

	Loc Name	PS-Influent		PS-Influent		PS-Influent		PS-Influent		PS-Influent		PS-Influent	
	Field Sample Date	5/5/2014		6/9/2014		7/7/2014		8/5/2014		9/4/2014		10/15/2014	
	Lab Sample Delivery Group	480-59277-1		480-61566-1		480-63529-1		480-64971-1		480-66734-1		480-69442-1	
	Field Sample ID	PS-INFLUENT		PS-INFLUENT		PS-INFLUENT		PS-INFLUENT		PS- INFLUENT		PS-INFLUENT	
	Qc Code	FS		FS		FS		FS		FS		FS	
Method	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW8260C	1,1,1-Trichloroethane	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	1,1,2-Trichloroethane	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	1,1-Dichloroethene	ug/l	20	U	0.94	J	10	U	10	U	20	U	10	U
SW8260C	1,2-Dichloroethane	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	1,2-Dichloroethene (total)	ug/l	490		490		420		720		450		440	
SW8260C	2-Hexanone	ug/l	100	U	5	U	50	U	50	U	100	U	50	U
SW8260C	Acetone	ug/l	200	U	10	U	100	U	100	U	200	U	100	U
SW8260C	Carbon disulfide	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	Carbon tetrachloride	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	Chloroform	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	Chloromethane	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	Cis-1,2-Dichloroethene	ug/l	490		490		420		720		450		440	
SW8260C	Methylene chloride	ug/l	20	U	1	U	10	U	5.4	J	20	U	10	U
SW8260C	Tetrachloroethene	ug/l	1700		920		700		3300		840		610	
SW8260C	Toluene	ug/l	20	U	1	U	10	U	10	U	20	U	10	U
SW8260C	trans-1,2-Dichloroethene	ug/l	20	U	5.3		10	U	10	U	20	U	10	U
SW8260C	Trichloroethene	ug/l	460		390		290		960		330		340	
SW8260C	Vinyl chloride	ug/l	20	U	4.1		10	U	9.9	J	20	U	10	U
SW6010C	Aluminum	ug/l	379		1850		200	U	431		2210		200	U
SW6010C	Arsenic	ug/l	6	U	6	U	6	U	6	U	6	U	6	U
SW6010C	Barium	ug/l	44.4		63.4		45.9		71.9		68		42.9	
SW6010C	Cadmium	ug/l	1	U	1	U	1	U	1	U	1	U	1	U
SW6010C	Chromium	ug/l	4	U	4	U	4	U	4	U	7		4	U
SW6010C	Copper	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Iron	ug/l	350		1030		131		754		2010		85.2	
SW6010C	Lead	ug/l	3	U	3	U	3	U	3.5		6.2		3	U
SW6010C	Manganese	ug/l	42.9		51.7		45.9		103		71.2		56.8	
SW6010C	Nickel	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW6010C	Zinc	ug/l	10	U	10	U	10	U	10	U	10	U	10	U
SW7470A	Mercury	ug/l	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
SM2540C	Total Dissolved Solids	mg/l	359		363		368		324		367		335	
SM2540D	Total Suspended Solids	mg/l	4	U	4	U	4	U	29.6		4	U	4	U

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

Appendix A: GWETS Component Performance

		Loc Name	PS-Influent		PS-Influent	
		Field Sample Date	11/3/2014		12/1/2014	
		Lab Sample Delivery Group	480-70634-1		480-72265-1	
		Field Sample ID	PS-AS INFLUENT		PS-INFLUENT	
		Qc Code	FS		FS	
Method	**Parameter**	**Units**	Result	Qualifier	Final Result	Final Qualifier
SW8260C	1,1,1-Trichloroethane	ug/l	20	U	1	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	20	U	1	U
SW8260C	1,1,2-Trichloroethane	ug/l	20	U	1	U
SW8260C	1,1-Dichloroethene	ug/l	20	U	0.94	J
SW8260C	1,2-Dichloroethane	ug/l	20	U	1	U
SW8260C	1,2-Dichloroethene (total)	ug/l	410		400	
SW8260C	2-Hexanone	ug/l	100	U	5	U
SW8260C	Acetone	ug/l	200	U	10	U
SW8260C	Carbon disulfide	ug/l	20	U	1	U
SW8260C	Carbon tetrachloride	ug/l	20	U	1	U
SW8260C	Chloroform	ug/l	20	U	1	U
SW8260C	Chloromethane	ug/l	20	U	1	U
SW8260C	Cis-1,2-Dichloroethene	ug/l	410		400	
SW8260C	Methylene chloride	ug/l	10	J	1	U
SW8260C	Tetrachloroethene	ug/l	1800		1100	
SW8260C	Toluene	ug/l	20	U	1	U
SW8260C	trans-1,2-Dichloroethene	ug/l	20	U	4.2	
SW8260C	Trichloroethene	ug/l	380		120	
SW8260C	Vinyl chloride	ug/l	20	U	5.5	
SW6010C	Aluminum	ug/l	200	U	200	U
SW6010C	Arsenic	ug/l	6	U	6	U
SW6010C	Barium	ug/l	40.1		52.1	
SW6010C	Cadmium	ug/l	1	U	1	U
SW6010C	Chromium	ug/l	4	U	4	U
SW6010C	Copper	ug/l	10	U	10	U
SW6010C	Iron	ug/l	50	U	50	U
SW6010C	Lead	ug/l	3	U	3	U
SW6010C	Manganese	ug/l	41.1		94.6	
SW6010C	Nickel	ug/l	10	U	10	U
SW6010C	Zinc	ug/l	10	U	10	U
SW7470A	Mercury	ug/l	0.12	U	0.12	U
SM2540C	Total Dissolved Solids	mg/l	364		349	
SM2540D	Total Suspended Solids	mg/l	4	U	4	U

Notes:
ug/l = Micrograms per liter
mg/l = Milligrams per liter
FS = Field Sample
FD = Field Duplicate

APPENDIX B

ANALYTICAL RESULTS

APPENDIX B-1

2014 GROUNDWATER MONITORING RESULTS

Appendix B-1
2014 Groundwater Results

		Location	CE-1	CE-2	EW-11	EW-12	EW-13	EW-16
		Field Sample ID	CE-1	CE-2	EW-11	EW-12	EW-13	EW-16
		Field Sample Date	12/18/2014	12/18/2014	12/17/2014	12/17/2014	12/17/2014	12/18/2014
		Lab Sample Delivery Group	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1
		Qc Code	FS	FS	FS	FS	FS	FS
Method	**Parameter**	**Units**						
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	1 U	1 U	1 U	2.8 J
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	2 U	1.1 J	2 U	12	1400
SW8260C	2-Hexanone	ug/l	5 U	5 U	5 U	5 U	5 U	40 U
SW8260C	Acetone	ug/l	10 U	10 U	32	14	14	80 U
SW8260C	Carbon disulfide	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	Chloroform	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	Chloromethane	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	1 U	1.1	1 U	12	1400
SW8260C	Methylene chloride	ug/l	1 U	1 U	1 U	1 U	1 U	14
SW8260C	Tetrachloroethene	ug/l	2.5	1 U	1 U	3.1	21	4400
SW8260C	Toluene	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U	1 U	8 U
SW8260C	Trichloroethene	ug/l	0.57 J	1 U	1 U	0.53 J	3.5	2000
SW8260C	Vinyl chloride	ug/l	1 U	1 U	1 U	1 U	1 U	14

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	EW-2	EW-3	EW-4	EW-5	EW-6	EW-8
		Field Sample ID	EW-2	EW-3	EW-4	EW-5	EW-6	EW-8
		Field Sample Date	12/15/2014	12/17/2014	12/17/2014	12/17/2014	12/18/2014	12/17/2014
		Lab Sample Delivery Group	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1
		Qc Code	FS	FS	FS	FS	FS	FS
Method	**Parameter**	**Units**						
SW8260C	1,1,1-Trichloroethane	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	260	30	16	45	300	2.8
SW8260C	2-Hexanone	ug/l	25 U	5 U	5 U	20 U	40 U	5 U
SW8260C	Acetone	ug/l	50 U	14	15	18 J	80 U	14
SW8260C	Carbon disulfide	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	Carbon tetrachloride	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	Chloroform	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	Chloromethane	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	260	30	13	45	300	2.8
SW8260C	Methylene chloride	ug/l	5 U	1 U	1 U	4.8	8 U	1 U
SW8260C	Tetrachloroethene	ug/l	190	1 U	1 U	200	390	1 U
SW8260C	Toluene	ug/l	5 U	1 U	1 U	4 U	8 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	5 U	1 U	2.8	4 U	8 U	1 U
SW8260C	Trichloroethene	ug/l	54	1 U	1 U	18	120	1 U
SW8260C	Vinyl chloride	ug/l	15	6.1	1 U	4 U	8 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	EW-9	IW-10	IW-8	IW-9	M-4	M-5
		Field Sample ID	EW-9	IW-10	IW-8	IW-9	M-4	M-5
		Field Sample Date	12/15/2014	12/17/2014	12/17/2014	12/17/2014	12/17/2014	12/16/2014
		Lab Sample Delivery Group	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1
		Qc Code	FS	FS	FS	FS	FS	FS
Method	**Parameter**	**Units**						
SW8260C	1,1,1-Trichloroethane	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	200	7	2 U	1000	2 U	34
SW8260C	2-Hexanone	ug/l	20 U	5 U	5 U	130 U	5 U	5 U
SW8260C	Acetone	ug/l	40 U	14	14	250 U	15	10 U
SW8260C	Carbon disulfide	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	Carbon tetrachloride	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	Chloroform	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	Chloromethane	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	200	7	1 U	1000	1 U	34
SW8260C	Methylene chloride	ug/l	7	1 U	1 U	25 U	1 U	1 U
SW8260C	Tetrachloroethene	ug/l	38	1 U	1 U	630	1 U	1 U
SW8260C	Toluene	ug/l	4 U	1 U	1 U	25 U	1 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	3.6 J	1 U	1 U	25 U	1 U	1 U
SW8260C	Trichloroethene	ug/l	20	1 U	1 U	540	1 U	0.69 J
SW8260C	Vinyl chloride	ug/l	4 U	1 U	1 U	25 U	1 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	M-6	MUELLER	OW-14	OW-2	OW-3	OW-7
		Field Sample ID	M-6	MUELLER	OW-14	OW-2	OW-3	OW-7
		Field Sample Date	12/16/2014	12/16/2014	12/15/2014	12/15/2014	12/15/2014	12/18/2014
		Lab Sample Delivery Group	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1	480-73326-1
		Qc Code	FS	FS	FS	FS	FS	FS
Method	**Parameter**	**Units**						
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	2 U	810	66	120 J	30
SW8260C	2-Hexanone	ug/l	5 U	5 U	500 U	100 U	400 U	5 U
SW8260C	Acetone	ug/l	10 U	10 U	1000 U	200 U	800 U	10 U
SW8260C	Carbon disulfide	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	Chloroform	ug/l	0.53 J	1 U	100 U	20 U	80 U	1 U
SW8260C	Chloromethane	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	1 U	810	66	120	30
SW8260C	Methylene chloride	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	Tetrachloroethene	ug/l	1 U	1 U	9300	1100	5100	74
SW8260C	Toluene	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	100 U	20 U	80 U	1 U
SW8260C	Trichloroethene	ug/l	1 U	1 U	810	23	110	13
SW8260C	Vinyl chloride	ug/l	1 U	1 U	100 U	20 U	80 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	KLINKE	KLINKE	KLINKE	KLINKE
		Field Sample ID	KLINKE	KLINKE BET	KLINKE BET	KLINKE-BET
		Field Sample Date	7/9/2014	4/8/2014	10/14/2014	1/6/2014
		Lab Sample Delivery Group	480-63529-1	480-57559-1	480-69442-1	480-52873-1
		Qc Code	FS	FS	FS	FS
Method	**Parameter**	**Units**				
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	0.81 J	2	1.9 J
SW8260C	2-Hexanone	ug/l	5 U	5 U	5 U	5 U
SW8260C	Acetone	ug/l	10 U	10 U	10 U	10 U
SW8260C	Carbon disulfide	ug/l	1 U	1 U	1 U	1 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloroform	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloromethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	0.81 J	2	1.9
SW8260C	Methylene chloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Tetrachloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Toluene	ug/l	1 U	1 U	1 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Trichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Vinyl chloride	ug/l	1 U	1 U	1 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	KUBLER	KUBLER	KUBLER	KUBLER
		Field Sample ID	KUBLER BET	KUBLER BET	KUBLER BET	KUBLER-BET
		Field Sample Date	4/7/2014	7/7/2014	10/14/2014	1/6/2014
		Lab Sample Delivery Group	480-57559-1	480-63529-1	480-69442-1	480-52873-1
		Qc Code	FS	FS	FS	FS
Method	**Parameter**	**Units**				
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	2 U	2 U	2 U
SW8260C	2-Hexanone	ug/l	5 U	5 U	5 U	5 U
SW8260C	Acetone	ug/l	10 U	10 U	10 U	10 U
SW8260C	Carbon disulfide	ug/l	1 U	1 U	1 U	1 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloroform	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloromethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Methylene chloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Tetrachloroethene	ug/l	0.98 J	1 U	1 U	1 U
SW8260C	Toluene	ug/l	1 U	1 U	1 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Trichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Vinyl chloride	ug/l	1 U	1 U	1 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

Appendix B-1
2014 Groundwater Results

		Location	VIELLA	VIELLA	VIELLA	VIELLA
		Field Sample ID	VIELLA	VIELLA	VIELLA BET	VIELLA-BET
		Field Sample Date	4/7/2014	7/7/2014	10/13/2014	1/7/2014
		Lab Sample Delivery Group	480-57559-1	480-63529-1	480-69442-1	480-52873-1
		Qc Code	FS	FS	FS	FS
Method	**Parameter**	**Units**				
SW8260C	1,1,1-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1,2-Trichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,1-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	1,2-Dichloroethene (total)	ug/l	2 U	2 U	2 U	2 U
SW8260C	2-Hexanone	ug/l	5 U	5 U	5 U	5 U
SW8260C	Acetone	ug/l	10 U	10 U	10 U	10 U
SW8260C	Carbon disulfide	ug/l	0.37 J	1.1	0.48 J	1 U
SW8260C	Carbon tetrachloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloroform	ug/l	1 U	1 U	1 U	1 U
SW8260C	Chloromethane	ug/l	1 U	1 U	1 U	1 U
SW8260C	Cis-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Methylene chloride	ug/l	1 U	1 U	1 U	1 U
SW8260C	Tetrachloroethene	ug/l	0.56 J	1 U	1 U	1 U
SW8260C	Toluene	ug/l	1 U	1 U	1 U	1 U
SW8260C	trans-1,2-Dichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Trichloroethene	ug/l	1 U	1 U	1 U	1 U
SW8260C	Vinyl chloride	ug/l	1 U	1 U	1 U	1 U

Notes:
ug/l = Micrograms per liter
FS = Field Sample
FD = Field Duplicate
U = Non-detect at the listed reporting limit
J = Result is estimated

APPENDIX B-2

TIME-SERIES GRAPHS

Appendix B-2: Time-Series Graphs