MULTI-PHASE EXTRACTION SYSTEM

AAFES RETAIL FUEL FACILITY
BUILDING 200
U.S. ARMY GARRISON FORT HAMILTON
BROOKLYN, NEW YORK

ANNUAL OPERATIONS REPORT
(July 1, 2009 through June 30, 2010)

FINAL
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PREPARED FOR

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Fort Hamilton – List of Acronyms

DTW – Depth to Water
DTP – Depth to Product
GW - Groundwater
In Hg – Inches of Mercury
In wc – Inches Of Water Column
L - Liter
LEL – Lower Explosive Limit
L/M – Liters Per Minute
LOC – Level Of Concern
MDL – Method Detection Limit
MW – Monitoring Well
MPE – Multi Phase Extraction
N/A – Not Applicable
ND – Not Detected
NMT – No Measurement Taken
O&M – Operations and Maintenance
OWS – Oil / Water Separator
PID – Photoionization Detector
PPB-V – Parts Per Billion By Volume
PPM-V – Parts Per Million By Volume
PSI – Pounds Per Square Inch
RDL – Reporting Detection Limit
SAA – Same as Above
TPH – Total Petroleum Hydrocarbon
SVOC – Semi Volatile Organic Compound
UG/L – Micrograms Per Liter
UG/M3 – Micrograms Per Cubic Meter
VOC – Volatile Organic Compound

SECTION 1

EQUIPMENT AND SUB COMPONENTS

(Extraction Wells & Piping)

(Process and Treatment Unit)

(Thermal Oxidation Unit)

OPERATIONAL REVIEW

(How the system operates)

EQUIPMENT EVALUATION

(Equipment Status)

(Equipment Evaluations)

(Recommendations)

Pursuant to The Corrective Action Plan for Spill Number 9802727 and the Stipulation Agreement between the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Army signed in November 2007, the US Army Garrison at Ft. Hamilton funded the US Army Corps of Engineers to remediate a discharge of petroleum which occurred on August 1, 1997 at the Ft. Hamilton AAFES station (Bldg 200). A Multi-Phase Extraction (MPE) system was installed in 2008/2009 and began operation in July 2009. The Remedial Action Work Plan for this effort (Plexus, 2007) specifies that an annual report be prepared and submitted to NYSDEC by the Army. This report comprises the second annual report for the Bldg 200 MPE system operation.

This 2nd annual report is intended to summarize:

- the degree to which the MPE was able to operate during the reporting period,
- contaminants of concern (petroleum products)
- hydrocarbon constituents within vapor emissions
- the monitoring, troubleshooting, and system modifications that were required to keep it operating, and the system's operational reliability and effectiveness.

It also discusses the compliance of the system with the effluent limits for air and water established by the NYSDEC and NYCDEP, respectively. Finally, it describes the degree to which the operation of the system has remediated the site during the reporting period. This report summarizes some operational information that has been provided in the quarterly reports, and more detail of some issues can be found in those quarterly reports.

The Ft. Hamilton MPE System, located at 200 General Lee Avenue in Fort Hamilton, NY (See Figure 1), currently consists of three basic components and their sub-components: (See Figure 2)

1. **Extraction Wells / Piping**

    - Underground extraction header and piping
    - MPE – 1 through MPE – 7 and MW-5

2. **Process and Treatment Section**

    (1) Extraction Blower
    (1) Extraction Blower Motor
    (1) Knock out tank
    (1) Moisture Separator tank
    (1) Oil Water Separator Holding Tank
    (1) Redux 390 Injection System
    (1) Oil Water Separator Unit
    (1) Oil Water Separator Pump
    (1) Air Stripper Unit
    (1) Air Stripper Pump
    (1) Air Stripper Blower
    (2) Filter Bag Housings

(1) Liquid Carbon
(1) Trident Water Flow Meter
(2) Vapor Carbon Units
(1) Air Compressor
(1) Electrical Power and Controls

3. **Thermal Oxidation Unit (Demobilized)**

How the System operates:

The extraction blower located in the treatment unit creates a vacuum within the extraction wells and piping, thereby extracting air (when in vapor phase mode) or air and water (when in dual phase mode) and transports them to the treatment unit for processing. Extracted water is separated from the air stream in the knockout tank where it drains by gravity to the moisture separator tank. This water is discharged into the oil water separator (OWS) holding tank via air charged actuators. The holding tank drains into the OWS by gravity, where the LNAPL floats on the tank's surface and is skimmed off by a stationary skimmer. The "product" is ultimately stored in an attached 55 gallon drum. The "product-free" water travels under a baffle and over an effluent weir, to the effluent holding section of the tank where it is treated with sequesterant (Redux 390). The sequesterant treated water is pumped from the effluent section of the tank into the top of the air stripping unit. As the water travels down the unit through a series of weirs, air blowing up from the bottom of the unit strips off volatile and semi – volatile compounds. The off – gas of this process is discharged to the atmosphere via the unit's air discharge pipe. The water travels down to the unit's reservoir (bottom of unit) and is automatically pumped through two parallel filter bag housings (for final solids removal) and two liquid carbon drums (for final polishing). Once through these drums, the flow is metered and discharged into the NYCDEP sewer system. Currently, the contaminate air stream that is separated in the knock out tank is discharged to the vapor carbon units. The contaminants are adsorbed onto the carbon and the contaminant-free air stream is discharged to the atmosphere via the unit's discharge stack. During Year 1 of system operations, the off gas was thermally destroyed in a thermal oxidation unit. As per Shaw recommendations in the Annual Operations Report for Year 1, the thermal oxidation unit was shut down and the vapor carbon units were proved out for more efficient operations. On December 14, 2010, the thermal oxidation unit was demobilized off-site.

EXTRACTION WELLS AND PIPING

Extraction Header / Piping

Vacuum measured at various MPE wells continue to be slightly lower, yet close to readings measured at the knock out tank. All exposed extraction well intersect piping is secure and displays no signs of leakage; however, as in the past, there have been occurrences of water entering the treatment unit during periods the system was in the vapor mode. This indicates that the integrity of the underground piping is compromised. Currently, the system is extracting adequately and there have been no signs that the problem is getting worse or impacting the effectiveness of the system.

***Evaluation**:* Infiltration water that has entered the treatment system has not significantly impacted the discharge capacity. Based on the historically low concentrations of VOC's in the outer monitoring wells

and approval from Jonathon Kolleeny of the New York State Department of Environmental Conservation (NYSDEC), specific extraction wells have been strategically shut down to further concentrate on LNAPL removal in MW-1, the only well still displaying LNAPL. Extraction at MPE-1, MPE-3, MPE-4, MPE-5, MPE-6 and MPE-7 has been turned off. MPE-2 and MW-5 remain the only two wells extracting at this time.

***Recommendation*:** Continue operational focus on removing LNAPL from MW-1. Perform high volume pumping of MW-1 and MW-5 to accelerate LNAPL removal efforts. Investigate and repair underground extraction piping, if infiltration or vacuum loss increases or if operation is no longer cost effective.

PROCESS AND TREATMENT SECTION

Extraction Blower

Through eight quarters of operations, the blower has been operating normally, pulling a vapor stream through the air carbon units between 150 and 170 degrees Fahrenheit (F). The temperature of the unit's bearing housings measures @ 140 degrees F, which is normal for this application. As per the manufacturer's recommendation, the unit's oil should be changed every 4,000 - 8000 hours of service (depending on oil temperature). The oil in this unit was changed at 7,277 hrs of service using the manufacturer-recommended Roots synthetic oil. As of the end of the second year of operations, the blower has operated for 13,385 hours in total. Also as per the manufacturer, the bearings in this unit were greased each week with NLGI # 2 premium grade aluminum complex grease.

The drive belts have been inspected on this unit during the year. The inspection revealed normal wear on the belts and showed no signs of cracking.

***Evaluation**:* Overall, this unit appears to be in good operating condition. Its bearings temperatures are in the normal operating range as per the manufacturer's specifications. The maintenance schedule has been followed by the Shaw representative on site. This unit should operate normally through the next four quarters.

Recommendation: Continue operation in current configuration. Replace belts as needed.

Extraction Blower Motor

Through eight quarters of operations, this motor has been operating normally. The motor's bearing temperatures measure at @ 120 degrees F and have been greased every 168 hours (weekly). The motor is supplied with 480 volts on three phases and draws @ 14 amps per phase, which is normal for this application.

Evaluation: Overall, this motor shows no sign of deterioration and should operate normally through the next four quarters of operations.

Recommendation: Continue operation in current configuration.

Knock-out Tank / Moisture Separator Pressure Tank

The knock-out tank provides an area where the water separates from the extracted air stream, dropping it to the bottom of the tank, where it flows by gravity into the moisture separator reservoir. Through eight

quarters of operations, this tank shows no signs of deterioration. The moisture separator pressure tank receives the drained water and through air charged actuators, pumps the water to the oil water separator holding tank. Through eight quarters of operations, this unit has experienced only one problem. In August 2010, the float, which operates the actuators when in the automatic mode, had filled with water and was preventing automatic operations. This condition caused a number of alarms. Although the float was manually troubleshot on several occasions, the leak of the float went undetected. Once discovered, the float was replaced, automatic operations resumed with no problems to note. Spare floats were purchased in the event of failures in the future.

***Evaluation*:** Overall, this equipment is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration.

Oil Water Separator Holding Tank

This tank acts as a reservoir for water received from the moisture separator tank and drains to the OWS unit by gravity.

***Evaluation*:** This tank is in good condition. There are no foreseen problems for the next year of operations.

Recommendation: Continue operation in current configuration.

Redux 390 Injection System

This system consists of (1) 55 gallon drum of Redux 390 (perishable), (1) chemical diaphragm pump, suction tubing and discharge tubing to the OWS unit. The pump is wired such that it's on / off application coincides with the operation of the moisture water separator's air actuator. This ensures proper injection timing and prevents over-dosing of sequestering agent.

***Evaluation*:** Overall, this equipment is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration.

Oil Water Separator Unit

There are no moving parts to the oil water separator. All internal components are currently in good working order and should continue to be so for the next reporting period. It was discovered on May 20, 2011 this unit was short-circuiting. The problem was a blockage in the unit's skimmer assembly. On June 28, 2011, the OWS unit was drained and thoroughly cleaned. Twenty gallons of LNAPL were removed from the unit and are stored in the 55 gallon reservoir drum.

***Evaluation*:** This tank is in good condition. There are no foreseen problems for the next year of operations.

Recommendation: Continue operation in current configuration. Increase unit maintenance and cleaning events to prevent blockages, build-up and short-circuiting.

Oil Water Separator Pump

Through eight quarters of operation, this pump has been operating normally with no failures. The pump is supplied with 480 volts on three phases and draws approximately 1.6 amps per phase, which is normal for this application. The bearing temperatures were not recorded since this unit runs intermittently, and does not typically see operating (continuous) temperatures. Additionally, this pump is oversized and must be throttled in order to keep discharge flow less than 15 gpm, so the air stripper unit can process water without backing up.

Evaluation: Overall, this pump is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration.

Air Stripper Unit

During the first four quarters of service, oxidation of metals and hardness caused blockages in the unit's air holes resulting in high operating pressures and frequent tray cleaning. The high pressures had also caused numerous alarms, intermittent gasket breaching, distortion of the gaskets and carbonate coating / corrosion on the sectional fasteners and adjacent walls. During the fifth quarter of service, investigations into these problems determined that calcium carbonate hardness was causing the high pressures and hydraulic restrictions. After verifying that influent metals were entering the system at lower concentrations than the NYCDEP effluent reporting limits, Shaw investigated modifying the operation by injecting a sequestering agent into the OWS unit. This agent would keep all hardness and metals in the dissolved phase and would allow them to pass harmlessly through the system. After successful field studies, a modification to the existing discharge permit for the use of Redux 390 (sequestering agent) was requested and approved by the NYCDEP on August 27, 2010. Once on line, the sequestering agent completely eliminated the high pressure and restriction problems.

Evaluation: Injection of Redux 390 has completely eliminated the restriction problem, allowing this unit to operate as designed. This unit is now in good working order.

Recommendation: Continue operation in its current configuration. Keep discharge flow rate between 10 and 12 gpm. Replace fasteners and gaskets as needed. Fasteners and gasket material for this unit have been cleaned and reconditioned. Currently, the original gaskets and fasteners are still in operation. Should they need to be replaced in the upcoming period of performance, they should be replaced as their condition becomes more deteriorated, but prior to failing.

Air Stripper Pump

Through eight quarters of operation, this pump has been operating normally with no failures. The pump is supplied with 480 volts on three phases and draws approximately 1.2 amps per phase, which is normal for this application. Additionally, this pump is oversized and must be throttled to keep the discharge flow to less than 15 gpm in order to keep its discharge flow at a rate the liquid carbon drums can process. The bearing temperatures for this pump were not recorded since this unit runs intermittently, and does not typically see operating (continuous) temperatures.

Evaluation: Overall, this pump is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration. Keep discharge flow rate between 10 and 12 gpm.

Air Stripper Blower

Near the close of the fourth quarter of operations, this blower failed and had to be sent to a facility for troubleshooting and repair. Since it is explosion-proof and sealed, it cannot be dismantled and inspected in the field as this would void the explosion-proof and UL certifications. The repair facility (Longo Industries) discovered that bearing damage within the unit caused the unit's failure. The bearings were replaced and the blower was reinstalled and returned to service. All explosion-proof and UL certifications for this unit have been maintained.

Note: Since this blower is explosion-proof and sealed, bearings are sealed as well and cannot be maintained via a grease schedule. This blower's motor is supplied with 480 volts on three phases and draws approximately 3.6 amps per phase, which is normal for this application. Temperature of the unit's outer housing measured @ 118 degrees F. After the fourth quarter repair, the blower operated through the second year of operations with no problems to note.

Evaluation: This blower is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration.

Filter Bag Housings

These two units are passive type filters (no moving parts) and receive water from the air stripper unit, prior to (liquid) carbon adsorption. Filter bags (25 micron) are changed-out when significant pressure loss, between the unit's influent and effluent piping, results in flow reduction. Throughout the year, the filter bags were changed out (infrequently) when needed. The filter bag housings have operated problem-free through eight quarters of operations.

Evaluation: No problems are foreseen for the upcoming year.

Recommendation: Continue operation in current configuration.

Liquid Phase Carbon Units

Currently, there are two (metal) liquid carbon drums on-line, operating in series. The addition of Redux 390, has eliminated the high pressure problems and weep hole development experienced by previous vessels. Additionally, the hose and piping connecting the units to each other and the effluent meter have been changed from 1" diameter to 2" diameter. This change has also helped lower operating pressures.

Evaluation: No problems are foreseen for the upcoming year.

Recommendation: Continue operation in current configuration.

Trident Water Flow Meter

On July 7, 2010, the original 1" diameter trident flow meter for this system was removed and replaced with a 1.5" Trident flow meter from Shaw stock. The installation of the larger meter helped lower operating pressures in the liquid carbon units. Upon project completion, this meter will be removed and returned to Shaw stock.

Evaluation: No problems are foreseen for the upcoming year.

Recommendation: Continue operation in current configuration.

Vapor Phase Carbon Units

Currently, these units are on line and are treating the vapor stream produced from the extraction process. The process modification of vapor carbon operations versus thermal oxidation occurred on October 7, 2010. Operational life of the (vapor) carbon has far surpassed original estimates, making it a much more cost effective method of removing VOC's from the air stream than the originally configured thermal oxidation unit. In order to put the carbon vessels on-line, a modification was made to the discharge piping, adding a 15ft exhaust stack to discharge treated air to the atmosphere. There were no problems to note during this modification.

***Evaluation*:** The units are in good condition. No problems are foreseen for the upcoming year.

Recommendation: Continue operation in current configuration.

Air Compressor

The air compressor supplies compressed air to the actuator valves and air switches associated with the moisture separator tank. The unit is drained of condensate water each visit and is in good working order.

Evaluation: No problems are foreseen for the upcoming year.

Recommendation: Continue operation in current configuration.

Electrical Power and Controls

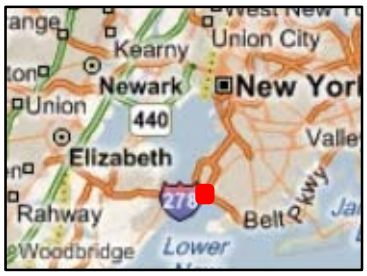
The electrical control panel is in good condition, with all terminations secure and numbered properly. All controls within the unit appear to be in good condition. All terminations within the panel are at room temperature. All relay temperatures measure between room temperature to 99 degrees F. All temperatures recorded are normal for control panels.

Evaluation: Overall, this equipment is in good working order. No problems are foreseen for the next reporting period.

Recommendation: Continue operation in current configuration.

THERMAL OXIDATION UNIT

Based on influent contaminant concentrations and cost comparisons presented in the Annual Operations Report – Year 1, the thermal oxidation unit was taken off –line on October 7, 2010 in favor of vapor carbon operations. Once the carbon system was proven to last more than thirty days, the lease for the thermal oxidation unit was cancelled, and the unit was demobilized back to its owner on December 14, 2010.



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U.S. Army Corps of Engineers

Shaw Environmental, Inc.

FIGURE 1

SITE LOCATION MAP

AAFES STATION, FT. HAMILTON, NEW YORK

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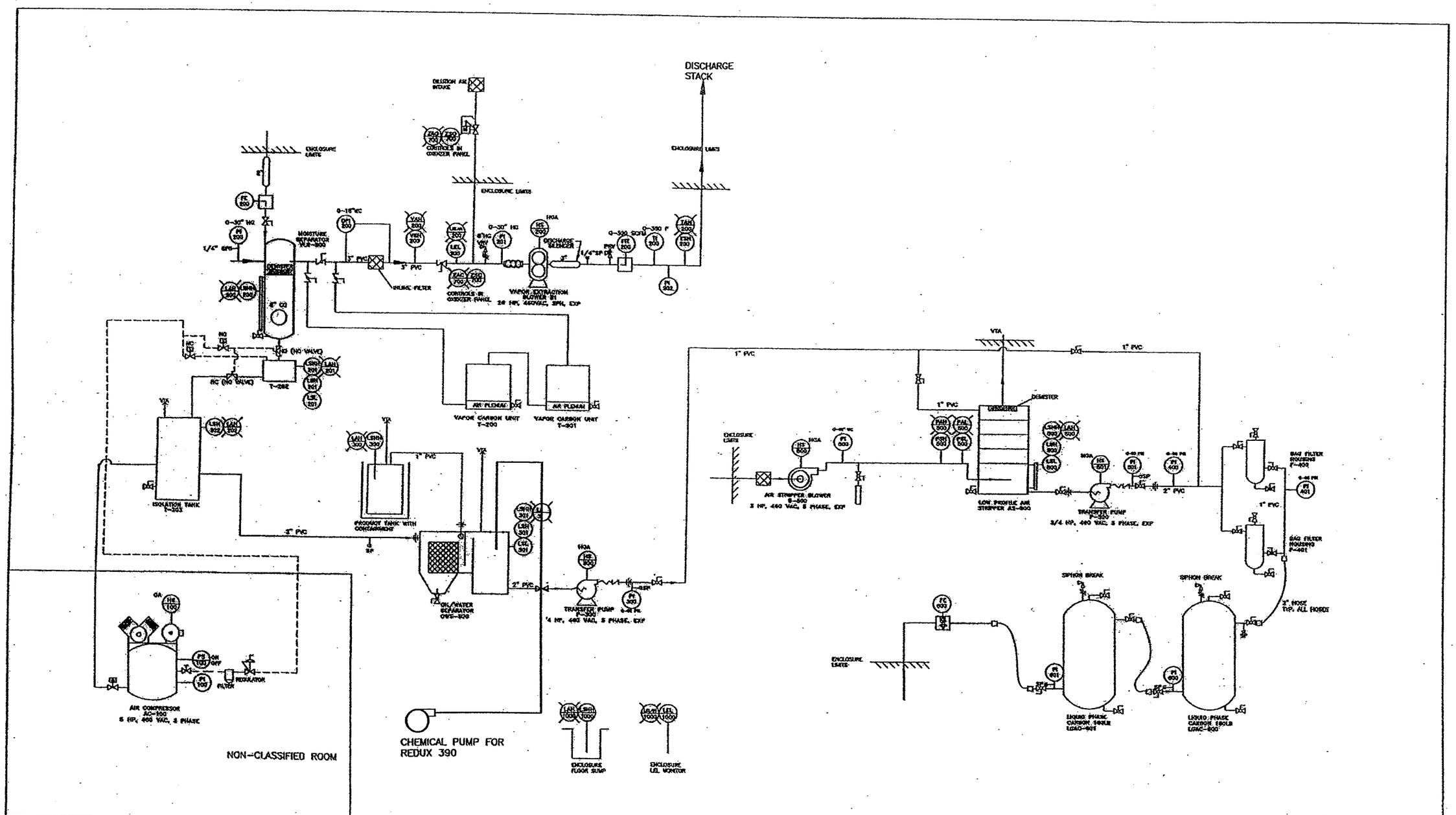

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Shaw Environmental, Inc.

FIGURE No. 2

P&ID SVE SYSTEM

AAFES STATION, FT. HAMILTON, NEW YORK

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SECTION 2

OPERATIONAL PROBLEMS DURING FOUR QUARTERS OF OPERATIONS AND THEIR IMPACTS TO TREATMENT

5th Quarter Systems Operations (July 1, 2010 through September 30, 2010)

Early in August, system shut-downs were occurring as the result of a faulty float in the moisture separator tank. The float was manually tested initially, and was found to be functional. It was later discovered that the float was not floating properly (internal leak) and was causing the failures. Once the float was replaced, the moisture separator ejection system returned to normal.

The system operated mainly in the vapor mode during the period. High pressures caused by water hardness again prevented dual phase operations. After determining that the New York City Department of Environmental Protection (NYCDEP) regulated metals were entering the system at concentrations below the permitted limit, the US Army Garrison at Fort Hamilton and Shaw submitted a proposed remedy of sequestering the hardness and metals to the NYCDEP on July 9, 2010. On August 27, 2010, Shaw received an approved permit modification from Mr. Sean Hulbert of the NYCDEP, allowing the use of sequestering agent Redux 390 to remedy the hardness problem at the site. Shaw will procure the chemicals and equipment as soon as possible and will install the remedy during the next reporting period.

The thermal oxidation unit experienced failures in September. Motor winding damage discovered on September 28th, kept the system inoperable the last few days of the period. A decision will be made in the first few days of the next period, either to repair the unit, or switch to vapor carbon operations. Concentrations vs. carbon life expectancy, currently being reviewed, will be finalized, in order to make the decision.

Evaluation of Quarter: The system was functional only 49.57 % of the time. Numerous failures including problems within the thermal oxidation unit, high operating pressures / hydraulic restrictions, a repair to the air stripper blower that occurred in the previous quarter, and a float failure in the moisture separator all contributed to the low operational time.

On July 7th, a larger water meter was installed, replacing the undersized meter that records effluent discharge flow. On August 3rd, the faulty float within the moisture separator was replaced. On October 7th, the thermal oxidation unit was removed from service in favor of vapor carbon operations. On October 13th, the Redux 390 injection system installation was completed and put into service. On November 16th, the installation of new liquid carbon drums with 2" piping was completed and put on line.
All issues that caused the low run times were rectified, although most were completed during the sixth quarter of operations. Elimination of these problems would greatly improve operations during the next three quarters.

6th Quarter Systems Operations (October 1, 2010 through December 31, 2010)

Water level monitoring shows that MPE-1 is dry. This may not be a prolonged problem since water levels on site are very low; however, this condition must continue to be monitored to ensure that the dry condition is seasonal.

Evaluation of Quarter: The system was functional 82.9 % of the time. All problems experienced in the fifth quarter have been eliminated. Some of the repairs were made towards the middle of this reporting period, which is why operational times were not higher.

7th Quarter Systems Operations (January 1, 2011 through March 31, 2011)

Heavy snowfall and freezing temperatures in the area were responsible for a power failure, extraction header freeze-ups and restricted access to wells during the period. This resulted in a reduction of treatment and a lack of monitoring information at the extraction wells.

Evaluation of Quarter: The system was functional 97.3 % of the time. Although all operational problems have been resolved, cold weather and freeze-ups reduced extraction and limited treatment.

8th Quarter Systems Operations (April 1, 2011 through June 30, 2011)

The system alarm on May 18th was due to high pressure as the result of product carry-over from the OWS unit. The unit was cleaned and the carbon vessels will be replaced during the next reporting period.

Modifications of the extraction system, as recommended at the June 14th meeting with the NYSDEC were initiated on June 28th. This first attempt to accelerate the LNAPL removal process was unsuccessful; however, efforts to remedy this are under way. In the meantime, Shaw will pump out MW-1, MW-5 and MPE-2 on a routine basis.

Evaluation of Quarter: The system was functional 98.4 % of the time. Since the high pressure experienced this quarter in the carbon vessel was due to product carry over, the issue will be rectified by increased inspections and cleaning of the OWS unit.

OVERALL SUMMARY OF SYSTEM PROBLEMS

1. The Thermal Oxidation Unit (Thermox), which caused numerous shut downs in Year 1 and the first two quarters of 2011, was removed from service in favor of carbon operations. This action eliminated down times normally caused by the Thermox operation. Additionally, vapor carbon expenditure during operations was initially calculated to be between 33 and 45 days; however, carbon life has far exceeded projections.

2. High pressures and hydraulic restrictions due to (calcium carbonate) water hardness have been eliminated by the installation and operation of the Redux 390 sequesterant injection system. Additionally, installation of a larger effluent water meter and larger piping on the liquid carbon vessels have also aided in lowering pressures within the system.

3. The air stripper blower which failed on June 2010, in the previous reporting period, was repaired and re-installed during the fifth quarter of operations. There were no problems to note regarding the repair. All explosion-proof and UL certifications on this unit are still valid. This unit has operated trouble free throughout the remainder of the period.

4. As per the June 14, 2011 meeting with Jonathan Kolleny (NYSDEC), Shaw will strategically shut down extraction wells in order to focus on removing the remaining LNAPL still present in MW-01 and to lower BTEX and VOC concentrations in MW-1, MW-5 and MW-4 to < 500 ppb and 1,000 ppb, respectively. Additionally, all benzene concentrations must be below 100 ppb. All other wells are already below these values. Once these goals are accomplished, the system can be shut down and the site can be closed.

5. The expiration of the discharge permit had contributed to reduced operations during previous periods. Shaw has worked closely with the NYCDEP to establish routine procedures for future permit extensions. The current permit will expire on April 4, 2012. Shaw will begin permit extension procedures in February 2012 in order to receive the extension prior to the expiration date.

Overall Evaluation: The system is now in good working order and is operating very well (mechanically and hydraulically) and is no longer hindered by the high pressures, bulging drums with weep holes, or frequent Thermox shut downs. Focus on LNAPL removal in MW-01 is currently the operational priority. Increased system run times will help optimize this effort.

SECTION 3

OPERATION AND MAINTENANCE DATA

Quarters of Operations – 5 through 8

SYSTEM COMPLIANCE TABLES & EVALUATION

Quarters of Operations – 5 through 8

SYSTEM MONITORING AND EXTRACTION TABLES & EVALUATION

Quarters of Operations – 5 through 8

HISTORICAL WELL CONCENTRATIONS, GRAPHS & EVALUATION

MW02, MW03, MW04, MW05, MW06, MW07

LNAPL RECOVERY & EVALUATION

Quarters of Operations – 5 through 8

INFLUENT TPH CONCENTRATIONS AND EVALUATION

8 Quarters of Operation

5th Quarter System Operational Data

FORT HAMILTON TREATMENT UNIT
INFORMATION TABLE 5th Quarter System Operations

Description	7/7/2010	8/5/2010	8/17/2010	8/19/2010	9/14/2010
MPE System Blower Vacuum (in Hg)	3.0	5.0	5.0	5.0	5.0
MPE System Blower Flow Rate (cfm)	380	380	380	380	380
Influent Vapor Concentration (ppm)	14	15	19	18	NMT
Influent LEL %	0	0	0	0	0
Enclosure LEL%	0	0	0	0	0
Air Stripper Off Gas Concentration (ppm)	0	0	0	0	0
Thermox Effluent Vapor Concentration (ppm)	0	0	0	0	0
MPE Wells Operating	1,2,3,4,5,6,7 & MW 5	1,2,3,4,5,6,7 & MW 5	1,2,3,4,5,6,7 & MW 5	1,2,3,4,5,6,7 & MW 5	1,2,3,4,5,6,7 & MW 5
Blower Discharge Air Temp. (Fahrenheit)	125	130	130	130	130
Blower Hours	5587.47	5693.68	5960.61	6005.11	6603.29
Particle Filter Differential Pressure (in wc)	2.0	2.3	2.0	2.0	2.0
Blower Pitot Tube Differential Pressure (in wc)	2	2	2	2	2
OWS Pump Pressure (psi)	nr	nr	30	38	nr
LNAPL Collected in Drum (gallons)	0	0	0	0	0
Air Stripper Blower Pressure (in wc)	3	9	20	0^	4
Air Stripper Blower Hours	5306.63	5414.06	5704.16	5748.05	6337.20
Air Stripper Discharge Pump Pressure (psi)	nr	nr	5	nr	5
Bag Filter 1 Pressure 1 (psi)	nr	nr	3	nr	5
Bag Filter 1 Pressure 2 (psi)	nr	nr	3	nr	5
Bag Filter 2 Pressure 1 (psi)	nr	nr	3	nr	5
Bag Filter 2 Pressure 2 (psi)	nr	nr	3	nr	5
Effluent Water Meter Discharge Reading	10900	11010	11040	11070	11850
Oxidizer Inlet Temperature (Fahrenheit)	1400	1404	1395	1402	1400
Oxidizer Outlet Temperature (Fahrenheit)	1154	1178	1180	1189.00	1185.00
Oxidizer Flame Strength (Volts)	3.9	3.8	3.7	3.7	3.7
Gas (in wc)	60	60	60	60	60
Gas PS3 Gauge (in wc)	12	9	15	12	12
Gas Meter Reading (cf)	27996	28522	29752	29960	32625
Air Compressor (psi)	60	60	60	60	60

NMT - No Measurement Taken
cfm - cubic feet per minute
nr - Not Running
ppm - parts per millon
in wc - inches of water column
psi - pounds per square inch
cf - cubic feet

6th Quarter System Operational Data

FORT HAMILTON TREATMENT UNIT
INFORMATION TABLE **6th Quarter System Operations**

Description	10/29/2010	11/18/2010	12/14/2010
MPE System Blower Vacuum (in Hg)	-3.0	-4.0	-5.0
MPE System Blower Flow Rate (cfm)	250	250	250
Influent Vapor Concentration (ppm)	14	11	12
Influent LEL %	0	0	0
Enclosure LEL%	0	0	0
Air Stripper Off Gas Concentration (ppm)	0	0	0
Effluent Vapor Concentration (ppm)	0	0	0
MPE Wells Operating	1,2,3,4,5,6,7, MW 5	1,2,3,4,5,6,7, MW 5	1,2,3,4,5,6,7, MW 5
Blower Discharge Air Temp. (Fahrenheit)	140	150	160
Vapor Extraction Blower Hours	7206.65	7560.56	8185.77
Particle Filter Differential Pressure (in wc)	2.0	2.0	2.0
Blower Pitot Tube Differential Pressure (in wc)	2	2	2
OWS Pump Pressure	35	nr	nr
LNAPL Collected in Drum (gallons)	0	0	0
Air Stripper Blower Pressure (in. wc.)	15	6	12
Air Stripper Blower Hours	7082.12	7435.64	8060.00
Air Stripper Discharge Pump Pressure (psi)	30	40	nr
Bag Filter 1 Pressure 1	5	3	nr
Bag Filter 1 Pressure 2	5	3	nr
Bag Filter 2 Pressure 1	5	3	nr
Bag Filter 2 Pressure 1 (ft)	5	3	nr
Effluent Water Meter Discharge Reading	12740	13805	16130
Oxidizer Inlet Temperature (Fahrenheit)	Out	Of	Service
Oxidizer Outlet Temperature (Fahrenheit)	Out	Of	Service
Oxidizer Flame Strength (Volts)	Out	Of	Service
Gas (inches of water)	Out	Of	Service
Gas PS3 Gauge (inches of water)	Out	Of	Service
Gas Meter Reading	33063	33063	33063
Air Compressor (psi)	60	60	60

* Tubes were lifted high above groundwater levels in order to minimize water capture. (Re:high pressure problem)

nr - Not Running NMT - No Measurement Taken

^ Unit empty at time of measurement

7th Quarter System Operational Data

FORT HAMILTON TREATMENT UNIT
INFORMATION TABLE **7th Quarter System Operations**

Description	1/31/2011	2/17/2011	3/31/2011
MPE System Blower Vacuum (in Hg)	-5.0	-5.0	-6.5
MPE System Blower Flow Rate (CFM)	250	250	250
Influent Vapor Concentration (ppm)	NMT	18	11
Influent LEL %	0	0	0
Enclosure LEL%	0	0	0
Air Stripper Off Gas Concentration (ppm)	0	0	0
Effluent Vapor Concentration (ppm)	0	0	0
MPE Wells Operating	1,2,3,4,5,6,7, MW 5	1,2,3,4,5,6,7, MW 5	1,2,3,4,5,6,7, MW 5
Blower Discharge Air Temp. (Fahrenheit)	150	150	150
Vapor Extraction Blower Hours	9221.54	9631.05	10683.65
Particle Filter Differential Pressure (in wc)	2.0	2.0	1.5
Blower Pitot Tube Differential Pressure (in wc)	2	2	2
OWS Pump Pressure (psi)	38	NR	NR
LNAPL Collected in Drum (gallons)	0	0	0
Air Stripper Blower Pressure (in. wc.)	13	11	12
Air Stripper Blower Hours	9067.80	9477.40	10530.29
Air Stripper Discharge Pump Pressure (psi)	28	NR	NR
Bag Filter 1 Pressure 1 (psi)	4	NR	NR
Bag Filter 1 Pressure 2 (psi)	4	NR	NR
Bag Filter 2 Pressure 1 (psi)	4	NR	NR
Bag Filter 2 Pressure 2 (psi)	4	NR	NR
Effluent Water Meter Discharge Reading	26630	34100	53353
Air Compressor (psi)	60	60	60

NMT - No Measurement Taken. **NR - Not Running**

8th Quarter System Operational Data

FORT HAMILTON TREATMENT UNIT
INFORMATION TABLE **8th Quarter System Operations**

Description	4/26/2011	5/20/2011	6/28/2011
MPE System Blower Vacuum (in Hg)	-7.0	-8.0	-8.0
MPE System Blower Flow Rate (CFM)	250	250	250
Influent Vapor Concentration (ppm)	12	NMT	NMT
Influent LEL %	0	0	0
Enclosure LEL%	0	0	0
Air Stripper Off Gas Concentration (ppm)	0	0	0
Effluent Vapor Concentration (ppm)	0	0	0
MPE Wells Operating	1,2,3,4,5,6,7, MW 5	1,2,3,4,5,6,7, MW 5	2,5 and MW 5
Blower Discharge Air Temp. (Fahrenheit)	150	150	186
Vapor Extraction Blower Hours	11261.64	11800.96	12738.50
Particle Filter Differential Pressure (in wc)	2.0	2.0	1.5
Blower Pitot Tube Differential Pressure (in wc)	2	2	2
OWS Pump Pressure (psi)	NR	35	NR
LNAPL Collected in Drum (gallons)	0	0	20
Air Stripper Blower Pressure (in. wc.)	12	12	6
Air Stripper Blower Hours (Cumulative)	11108.22	11640.28	12583.12
Air Stripper Discharge Pump Pressure (psi)	NR	35	NR
Bag Filter 1 Pressure 1 (psi)	NR	5	NR
Bag Filter 1 Pressure 2 (psi)	NR	5	NR
Bag Filter 2 Pressure 1 (psi)	NR	5	NR
Bag Filter 2 Pressure 2 (psi)	NR	5	NR
Effluent Water Meter Discharge Reading	63960	70332	72503
Air Compressor (psi)	60	60	60

NMT - No Measurement Taken. **NR - Not Running**

System Compliance Table

5th Quarter of Operations

Fort Hamilton Building 200 Multi-Phase Treatment System Compliance Data Table

Daily Water Discharge Per Month						Jul-10	Aug-10	Sep-10
< 9,000 Gallons Per Day (recommended)				(Gallons / Day)		0	864	356
Air Effluent	*(Stack - Height 15 ft.)*			(Quarterly)			8/19/2010 (TO-15)	
Air flow (cfm)	Max. Benzene Emissions (ppm-v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)			Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
250 (design rate)	1.60	5272	0.00494			*	*	*
380 (actual rate)	1.05	3454	0.00494			0.00047 J	538	<0.00494
Air Stripper Off - Gas			(Quarterly)				8/19/2010 (TO-15)	
Air flow (cfm)	Max. Benzene Emissions (ppm-v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)			Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
150 (design rate)	2.66	8787	0.00494			0.00086	2.8	< 0.00494
Water Effluent	*(NYCDEP Discharge Parameters)*		(Monthly)					
Parameter	**Method**	**Daily Limit / Monthly Limit**	**Units**	**Sample Type**	**Sample Units**	No Discharge in July	FH-080510-NS-WE FH-080510-NS-WE-COMP August 5, 2010	FH-091410-NS-WE FH-091410-NS-WE-COMP September 14, 2010
Non-polar material	1664	50	mg/l	Instantaneous	mg/l		<2.0	<2.1
pH	SM4500	5-11	SU's	Instantaneous	su		7.64	7.85
Temperature	2550	< 150	Degree F	Instantaneous	Deg. F		<150	<150
Flash Point	1010A	> 140	Degree F	Instantaneous	Deg. F		>140	>140
Cadmium	200.7	2 0.69	mg/l mg/l	Instantaneous Composite	mg/l mg/l		<0.0010 <0.0010	<0.0010 <0.0010
Chromium (VI)	SM3500	5	mg/l	Instantaneous	mg/l		<0.0010	<0.0010
Copper	200.7	5	mg/l	Instantaneous	mg/l		<0.0050	<0.0050
Lead	200.7	2	mg/l	Instantaneous	mg/l		<0.0030	0.0011 J
Mercury	245.1	0.05	mg/l	Instantaneous	mg/l		<0.030	0.000035 J
Nickel	200.7	3	mg/l	Instantaneous	mg/l		<0.010	<0.010
Zinc	200.7	5	mg/l	Instantaneous	mg/l		0.096	0.023
Benzene	624	134 / 57	ppb	Instantaneous	ug/l		<1.0	<1.0
Carbon tetrachloride	624	---	---	Composite	ug/l		<1.0	<1.0
Chloroform	624	---	---	Composite	ug/l		<1.0	<1.0
1,4 Dichlorobenzene	624	---	---	Composite	ug/l		<1.0	<1.0
Ethylbenzene	624	380/142	ppb	Instantaneous	ug/l		<1.0	<1.0
MTBE (Methyl-Tert-Butyl-Ether)	624	50	ppb	Instantaneous	ug/l		<1.0	<1.0
Naphthalene	625	47/19	ppb	Composite	ug/l		<1.6	<1.4
Phenol	420.4	---	---	Composite	ug/l		<0.01	<0.01
Tetrachloroethylene (Perc)	624	20	ppb	Instantaneous	ug/l		<1.0	<1.0
Toluene	624	74/28	ppb	Instantaneous	ug/l		<1.0	<1.0
1,2,4 Trichlorobenzene	625	---	---	Composite	ug/l		<3.3	<2.9
1,1,1 Trichloroethane	624	---	---	Composite	ug/l		<1.0	<1.0
Xylenes (Total)	624	74/28	ppb	Instantaneous	ug/l		<2.0	<2.0
PCB's (Total)	608	1	ppb	Composite	ug/l		<0.53	<0.48
Total Suspended Solids (TSS)	2540	3504	mg/l	Instantaneous	mg/l		7.0	<5.0
CBOD	5210B	---	---	Composite	mg/l		<2.0	<2.0
Chloride	300.0	---	---	Instantaneous	mg/l		1010	134
Total Nitrogen	Calculation	---	---	Composite	mg/l		<1.0	<1.0
Total Solids	2540	---	---	Instantaneous	mg/l		1970	583
Other								

nr = No Reading

* NYSDEC "Stipulation Agreement" lists allowable benzene emissions concentrations for air discharge rates up to 250 cfm. Actual discharge was 380 cfm. An adjusted maximum allowable benzene concentration was calculated for the actual air discharge rate based on NYSDEC's maximum allowable benzene mass discharge rate of 0.00494 lbs/hr at 15 foot stack height.

** Sample collected and analyzed in the field

Compliance Evaluation

5th Quarter of Operations

(July 1, 2010 through September 30, 2010)

Effluent and effluent composite water treatment process samples were not collected in July 2010 since there was no discharge to the NYCDEP during that period. The system processed an average of 864 gallons per day in August 2010 and 356 gallons per day in September 2010. All gallonage and water analysis results were in compliance with the NYCDEP discharge permit limits. Quarterly influent / effluent air treatment process samples collected during the period were in compliance with the terms of the Stipulation Agreement between the Fort Hamilton Army Garrison and the New York State Department of Environmental Conservation.

System Compliance Table

6th Quarter of Operations

Fort Hamilton Building 200 Multi-Phase Treatment System Compliance Data Table

Daily Water Discharge Per Month						Oct-10	Nov-10	Dec-10
< 9,000 Gallons Per Day (recommended)				(Gallons / Day)		26	52	104
Air Effluent		*(Stack - Height 15 ft.)*		(Quarterly)			FH100710SET015	
Air flow (cfm)		Max. Benzene Emissions (ppm-v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
250 (design rate)		1.60	5272	0.00494		**<2.0**	**<0.6**	**<0.00494**
Air Stripper Off - Gas				(Quarterly)				
Air flow (cfm)		Max. Benzene Emissions (ppm-v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
150 (design rate)		2.66	8787	0.00494		**0.30**	**1.0**	**<0.00494**
Water Effluent		*(NYCDEP Discharge Parameters)*		(Monthly)				
Parameter	**Method**	**Daily Limit / Monthly Limit**	**Units**	**Sample Type**	**Sample Units**	FH-102810-NS-WE FH-102810-NS-WE-COMP October 28, 2010	FH-111810-NS-WE FH-111810-NS-WE-COMP November 18, 2010	FH-120710-WE FH-120710-NS-WE-COMP Deceember 7, 2010
Non-polar material	1664	50	mg/l	Instantaneous	mg/l	**<2.0**	**<2.1**	**<2.1**
pH	SM4500	5-11	SU's	Instantaneous	su	**8.72**	**9.3**	**8.32**
Temperature	2550	< 150	Degree F	Instantaneous	Deg. F.	**68**	**64**	**63**
Flash Point	1010A	> 140	Degree F	Instantaneous	Deg. F.	**>200**	**>200**	**>200**
Cadmium	200.7	2 0.69	mg/l mg/l	Instantaneous Composite	mg/l mg/l	**<0.0010** **<0.0010**	**<0.0010** **<0.0010**	**<0.0010** **<0.0010**
Chromium (VI)	SM3500	5	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Copper	200.7	5	mg/l	Instantaneous	mg/l	**0.0069**	**0.012**	**0.0068**
Lead	200.7	2	mg/l	Instantaneous	mg/l	**<0.0030**	**0.0031**	**0.0060**
Mercury	245.1	0.05	mg/l	Instantaneous	mg/l	**<0.00020**	**<0.00020**	**<0.00020**
Nickel	200.7	3	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Zinc	200.7	5	mg/l	Instantaneous	mg/l	**0.011**	**0.024**	**0.48**
Benzene	624	134 / 57	ppb	Instantaneous	ug/l	**<1.0 / <1.0**	**<1.0 / <1.0**	**<1.0 / <1.0**
Carbon tetrachloride	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Chloroform	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
1,4 Dichlorobenzene	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Ethylbenzene	624	380/142	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
MTBE (Methyl-Tert-Butyl-Ether)	624	50	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
Naphthalene	625	47/19	ppb	Composite	ug/l	**<1.4 / <1.4**	**<1.5 / <1.5**	**<1.4 /<1.4**
Phenol	420.4	---	---	Composite	mg/l	**<0.01**	**0.05**	**<7.7**
Tetrachloroethylene (Perc)	624	20	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
Toluene	624	74/28	ppb	Instantaneous	ug/l	**<1.0 / <1.0**	**<1.0 / <1.0**	**<1.0**
1,2,4 Trichlorobenzene	625	---	---	Composite	ug/l	**<2.9**	**<2.9**	**<2.9**
1,1,1 Trichloroethane	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Xylenes (Total)	624	74/28	ppb	Instantaneous	ug/l	**<3.0**	**<3.0**	**<3.0**
PCB's (Total)	608	1	ppb	Composite	ug/l	**<0.48**	**<0.48**	**<0.48**
Total Suspended Solids (TSS)	2540	3504	mg/l	Instantaneous	mg/l	**<5.0**	**5.0**	**<5.0**
CBOD	5210B	---	---	Composite	mg/l	**<2.0**	**2.4**	**<2.0**
Chloride	300.0	---	---	Instantaneous	mg/l	**110**	**58.4**	**591**
Total Nitrogen	Calculation	---	---	Composite	mg/l	**1.34**	**<1.0**	**<1.0**
Total Solids	2540	---	---	Instantaneous	mg/l	**596**	**395**	**1180**
Other								

Compliance Evaluation

6th Quarter of Operations

(October 1, 2010 through December 31, 2010)

Effluent and Effluent composite water treatment process samples were collected in October 2010, November 2010 and December 2010. The system processed 26 gallons per day in October, 52 gallons per day in November and 104 gallons per day in December. All gallonage and water analysis results were in compliance with the NYCDEP discharge permit limits. Quarterly influent / effluent air treatment process samples collected during the period were in compliance with the terms of the Stipulation Agreement between the Fort Hamilton Army Garrison and the New York State Department of Environmental Conservation.

System Compliance Table

7th Quarter of Operations

Fort Hamilton Building 200 Multi-Phase Treatment System Compliance Data Table

Daily Water Discharge Per Month						Jan-11	Feb-11	Mar-11
< 9,000 Gallons Per Day (recommended)				(Gallons / Day)		284	376	510
Air Effluent		*(Stack - Height 15 ft.)*		(Quarterly)		FH031711-NS-SE (TO-15)		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
250 (design rate)		1.60	5272	0.00494		**0.0073**	**23**	**<0.00494**
Air Stripper Off - Gas				(Quarterly)		FH031711-NS-AS (TO-15)		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
150 (design rate)		2.66	8787	0.00494		**<0.00020**	**<0.6**	**<0.00494**
Water Effluent		*(NYCDEP Discharge Parameters)*		(Monthly)				
Parameter	**Method**	**Daily Limit / Monthly Limit**	**Units**	**Sample Type**	**Sample Units**	FH-012011-NS-WE FH-012011-NS-WE-COMP January 20, 2011	FH-022511-NS-WE FH-022511-NS-WE-COMP February 25, 2011	FH-031411-NS-WE FH-031411-NS-WE-COMP March 14, 2011
Non-polar material	1664	50	mg/l	Instantaneous	mg/l	**<2.1**	**<2.0**	**<2.1**
pH	SM4500	5-11	SU's	Instantaneous	su	**8.38**	**8.67**	**8.00**
Temperature	2550	< 150	Degree F	Instantaneous	Deg. F	**<150**	**<150**	**<150**
Flash Point	1010A	> 140	Degree F	Instantaneous	Deg. F	**>200**	**>200**	**>200**
Cadmium	200.7	2 0.69	mg/l mg/l	Instantaneous Composite	mg/l mg/l	**<0.0010** **<0.0010**	**<0.0010** **<0.0010**	**<0.0010** **<0.0010**
Chromium (VI)	SM3500	5	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Copper	200.7	5	mg/l	Instantaneous	mg/l	**<0.0050**	**0.015**	**<0.0050**
Lead	200.7	2	mg/l	Instantaneous	mg/l	**<0.0030**	**0.010**	**0.0074**
Mercury	245.1	0.05	mg/l	Instantaneous	mg/l	**<0.00020**	**0.00020**	**0.00020**
Nickel	200.7	3	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Zinc	200.7	5	mg/l	Instantaneous	mg/l	**0.028**	**0.081**	**0.045**
Benzene	624	134 / 57	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
Carbon tetrachloride	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Chloroform	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
1,4 Dichlorobenzene	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Ethylbenzene	624	380/142	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
MTBE (Methyl-Tert-Butyl-Ether)	624	50	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
Naphthalene	625	47/19	ppb	Composite	ug/l	**<1.5**	**<1.4**	**<1.4**
Phenol	420.4	---	---	Composite	ug/l	**0.008 J**	**<0.004 J**	**<0.01**
Tetrachloroethylene (Perc)	624	20	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
Toluene	624	74/28	ppb	Instantaneous	ug/l	**<1.0**	**<1.0**	**<1.0**
1,2,4 Trichlorobenzene	625	---	---	Composite	ug/l	**<3.0**	**<2.9**	**<2.9**
1,1,1 Trichloroethane	624	---	---	Composite	ug/l	**<1.0**	**<1.0**	**<1.0**
Xylenes (Total)	624	74/28	ppb	Instantaneous	ug/l	**<3.0**	**<3.0**	**<3.0**
PCB's (Total)	608	1	ppb	Composite	ug/l	**<0.48**	**<0.49**	**<0.48**
Total Suspended Solids (TSS)	2540	3504	mg/l	Instantaneous	mg/l	**<5.0**	**<5.0**	**8.0**
CBOD	5210B	---	---	Composite	mg/l	**<2.0**	**12.9**	**<2.0**
Chloride	300.0	---	---	Instantaneous	mg/l	**2440**	**9030**	**2190**
Total Nitrogen	Calculation	---	---	Composite	mg/l	**1.60**	**<1.0**	**1.60**
Total Solids	2540	---	---	Instantaneous	mg/l	**4320**	**14600**	**3960**
Other								

Compliance Evaluation

7th Quarter of Operations

(January 1, 2011 through March 31, 2011)

Effluent and Effluent composite water treatment process samples were collected in January 2011, February 2011 and March 2011. The system processed 284 gallons per day in January, 376 gallons per day in February and 510 gallons per day in March. All gallonage and water analysis results were in compliance with the NYCDEP discharge permit limits. Quarterly influent / effluent air treatment process samples collected during the period were in compliance with the terms of the Stipulation Agreement between the Fort Hamilton Army Garrison and the New York State Department of Environmental Conservation.

System Compliance Table

8th Quarter of Operations

Fort Hamilton Building 200 Multi-Phase Treatment System Compliance Data Table

Daily Water Discharge Per Month						**Apr-11**	**May-11**	**Jun-11**
< 9,000 Gallons Per Day (recommended)				**(Gallons / Day)**		**393**	**304**	**56**
Air Effluent		***(Stack - Height 15 ft.)***		**(Quarterly)**		**FH062111-NS-SE (TO-15)**		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
250 (design rate)		1.60	5272	0.00494		**0.055**	**170**	**<0.00494**
Air Stripper Off - Gas				**(Quarterly)**		**FH062111-NS-AS (TO-15)**		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
150 (design rate)		2.66	8787	0.00494		**<0.00030**	**<0.9**	**<0.00494**
Water Effluent		***(NYCDEP Discharge Parameters)***		**(Monthly)**				
Parameter	**Method**	**Daily Limit / Monthly Limit**	**Units**	**Sample Type**	**Sample Units**	**FH-041211-NS-WE FH-041211-NS-WE COMP April 12, 2011**	**FH-052711-NS-WE FH-052711-NS-WE- COMP May 27, 2011**	**FH-062211-NS-WE FH-062211-NS-WE-COMP June 22, 2011**
Non-polar material	1664	50	mg/l	Instantaneous	mg/l	**<2.1**	**<2.1**	**<2.1**
pH	SM4500	5-11	SU's	Instantaneous	su	**7.75**	**7.46**	**7.82**
Temperature	2550	< 150	Degree F	Instantaneous	Deg. F	**18.5**	**19.9**	**20.5**
Flash Point	1010A	> 140	Degree F	Instantaneous	Deg. F	**<200**	**<200**	**<200**
Cadmium	200.7	2 0.69	mg/l mg/l	Instantaneous Composite	mg/l mg/l	**0.00055 J** **0.00055 J**	**0.00035 J** **0.00040 J**	**<0.0010** **<0.0010**
Chromium (VI)	SM3500	5	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Copper	200.7	5	mg/l	Instantaneous	mg/l	**0.0025 J**	**<0.0050**	**0.0049 J**
Lead	200.7	2	mg/l	Instantaneous	mg/l	**0.0029 J**	**<0.0030**	**0.094**
Mercury	245.1	0.05	mg/l	Instantaneous	mg/l	**<0.00020**	**<0.00020**	**<0.00020**
Nickel	200.7	3	mg/l	Instantaneous	mg/l	**0.011**	**0.0063 J**	**0.0084 J**
Zinc	200.7	5	mg/l	Instantaneous	mg/l	**0.10**	**0.036**	**0.15**
Benzene	624	134 / 57	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Carbon tetrachloride	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Chloroform	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
1,4 Dichlorobenzene	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Ethylbenzene	624	380/142	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
MTBE (Methyl-Tert-Butyl-Ether)	624	50	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Naphthalene	625	47/19	ppb	Composite	ug/l	**<1.4**	**<1.5**	**<1.5**
Phenol	420.4	---	---	Composite	ug/l	**0.008 J**	**0.002 J**	**<0.01**
Tetrachloroethylene (Perc)	624	20	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Toluene	624	74/28	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
1,2,4 Trichlorobenzene	625	---	---	Composite	ug/l	**<2.9**	**<2.9**	**<2.9**
1,1,1 Trichloroethane	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Xylenes (Total)	624	74/28	ppb	Instantaneous	ug/l	**<3.0**	*****	**<3.0**
PCB's (Total)	608	1	ppb	Composite	ug/l	**<0.48**	**<0.48**	**<0.49**
Total Suspended Solids (TSS)	2540	3504	mg/l	Instantaneous	mg/l	**11.0**	**36.0**	**10.0**
CBOD	5210B	---	---	Composite	mg/l	**<2.0**	**<2.0**	**<2.0**
Chloride	300.0	---	---	Instantaneous	mg/l	**1600**	**742**	**303**
Total Nitrogen	Calculation	---	---	Composite	mg/l	**1.30**	**<1.0**	**<1.0**
Total Solids	2540	---	---	Instantaneous	mg/l	**3980**	**1710**	**860**
Other								

* Method 624 analysis was not able to be performed due to sample vial breakage in the laboratory. There was no time left in the period to resample for that method.

Compliance Evaluation

8th Quarter of Operations

(April 1, 2011through June 30, 2011)

Influent / effluent water treatment process samples were collected and analyzed in April 2011, May 2011 and June 2011. The system discharged 393 gallons per day in April, 304 gallons per day May and 56 gallons per day in June. All gallonage and water analysis results were in compliance with the NYCDEP discharge permit limits. Quarterly influent / effluent air treatment process samples collected during the period were in compliance with the terms of the Stipulation Agreement between the Fort Hamilton Army Garrison and the New York State Department of Environmental Conservation.

System
Monitoring & Extraction
Table

5th Quarter of Operations

FORT HAMILTON MONITORING AND EXTRACTION WELL STATUS 5th Quarter System Operations

Description	7/1/2010	8/5/2010	9/9/2010	9/28/2010
MW-1 (Elevation)		98.93	98.93	98.93
DTW	N	20.90	22.80	23.65
DTP	O	20.56	22.41	22.9
LNAPL THICKNESS		0.34	0.39	0.75
GWELEV	M	78.03	76.13	75.28
CORRECTED GWELEV	E	78.28	76.42	75.83
PID READING (ppm)	A	780	3	750
MW - 4 (Elevation)	S	98.10	98.10	98.10
DTW	U	17.77	20.11	20.81
DTP	R	NPD	NPD	NPD
LNAPL THICKNESS	E	0.0	0.0	0.0
GWELEV	M	80.33	77.99	77.29
CORRECTED GWELEV	E	80.33	77.99	77.29
PID READING (ppm)	N	0	0	0
	T			
	S			
MW - 7 (Elevation)		99.47	99.47	99.47
DTW	T	18.55	20.21	21.06
DTP	A	NPD	NPD	NPD
LNAPL THICKNESS	K	0.0	0.0	0.0
GWELEV	E	80.92	79.26	78.41
CORRECTED GWELEV	N	80.92	79.26	78.41
PID READING (ppm)		0	0	0
	I			
MPE-3 (Elevation)	N	98.14	G	98.14
DTW		14.71	W	21.20
DTP	J	NPD		NPD
LNAPL THICKNESS	U	0.0	S	0.0
GWELEV	L	83.43	A	76.94
CORRECTED GWELEV	Y	83.43	M	76.94
MPE WELL VACUUM (in. Hg.)		4	P	NMT
PID READING		0	L	0
			I	
MPE-6 (Elevation)		98.93	N	98.93
DTW		15.60	G	21.27
DTP		NPD		NPD
LNAPL THICKNESS		0.0	E	0.0
GWELEV		83.33	V	77.66
CORRECTED GWELEV		83.33	E	77.66
MPE WELL VACUUM (in. Hg.)		4	N	NMT
PID READING		3.4	T	8

Description	7/1/2010	8/5/2010	9/9/2010	9/28/2010
MW - 2 (Elevation)		99.44	99.44	99.44
DTW	N	20.18	21.90	22.60
DTP	O	NPD	NPD	NPD
LNAPL THICKNESS		0.0	0.0	0.0
GWELEV	M	79.26	77.54	76.84
CORRECTED GWELEV	E	79.26	77.54	76.84
PID READING (ppm)	A	0	0	0
MW - 5 (Elevation)	S	98.74	98.74	98.74
DTW	U	17.10	17.85	22.15
DTP	R	NPD	NPD	22.10
LNAPL THICKNESS	E	0.0	0.0	0.05
GWELEV	M	81.64	80.89	76.59
CORRECTED GWELEV	E	81.64	80.89	76.62
MPE WELL VACUUM (in. Hg)	N	4	NMT	NMT
PID READING (ppm)	T	15	0	0
	S			
MPE-1 (Elevation)		99.00	G	99.00
DTW	T	21.25	W	
DTP	A	NPD		NO
LNAPL THICKNESS	K	0.0	S	WATER
GWELEV	E	77.75	A	IN
CORRECTED GWELEV	N	77.75	M	WELL
MPE WELL VACUUM (in. Hg)		4	P	
PID READING	I	0	L	
MPE-4 (Elevation)	N	99.19	I	99.19
DTW		15.90	N	22.20
DTP	J	NPD	G	NPD
LNAPL THICKNESS	U	0.0		0.0
GWELEV	L	83.29	E	76.99
CORRECTED GWELEV	Y	83.29	V	76.99
MPE WELL VACUUM (in. Hg)		4	E	NMT
PID READING		10.0	N	20
			T	
MPE-7 (Elevation)		97.42		97.42
DTW		15.21		19.82
DTP		NPD		NPD
LNAPL THICKNESS		0.0		0.0
GWELEV		82.21		77.60
CORRECTED GWELEV		82.21		77.60
MPE WELL VACUUM (in. Hg.)		4		NMT
PID READING		0.0		6

Description	7/1/2010	8/5/2010	9/9/2010	9/28/2010
MW- 3 (Elevation)		99.00	99.00	99.00
DTW	N	18.83	20.68	21.34
DTP	O	NPD	NPD	NPD
LNAPL THICKNESS		0.0	0.0	0.0
GWELEV	M	80.17	78.32	77.66
CORRECTED GWELEV	E	80.17	78.32	77.66
PID READING (ppm)	A	1.3	0	0
MW - 6 (Elevation)	S	99.10	99.10	99.10
DTW	U	24.95	25.93	26.28
DTP	R	NPD	NPD	NPD
LNAPL THICKNESS	E	0.0	0.0	0.0
GWELEV	M	74.15	73.17	72.82
CORRECTED GWELEV	E	74.15	73.17	72.82
PID READING (ppm)	N	0	0	0
	T			
	S			
MPE-2 (Elevation)		98.75	G	98.75
DTW	T	16.09	W	22.90
DTP	A	NPD		NPD
LNAPL THICKNESS	K	0.0	S	0.0
GWELEV	E	82.66	A	75.85
CORRECTED GWELEV	N	82.66	M	75.85
MPE WELL VACUUM (in. Hg.)		4	P	NMT
PID READING	I	0	L	2
MPE-5 (Elevation)	N	97.93	I	97.93
DTW		15.46	N	20.75
DTP	J	NPD	G	NPD
LNAPL THICKNESS	U	0.0		0.0
GWELEV	L	82.47	E	77.18
CORRECTED GWELEV	Y	82.47	V	77.18
MPE WELL VACUUM (in. Hg.)		4	E	NMT
PID READING		5	N	10
			T	

LNAPL measurements denote thickness of product in ft.

NMT - No Measurement Taken DTW - Depth to Water DTP - Depth to Product NPD - No Product Detected

GW Elev measurements denote feet above sea level. DTW / DTP measurements denote depth from top of casing.

Shaw does not have TOC elevations for MPE wells.

Corrected Groundwater Concentration (CGW) Calculation = LNAPL thickness multiplied by specific gravity of gasoline (vehicle) (0.739) plus the elevation of the LNAPL / water interface.

System
Monitoring & Extraction
Table

6th Quarter of Operations

FORT HAMILTON MONITORING AND EXTRACTION WELL STATUS — 6th Quarter System Operations

Description	10/29/2010	11/18/2010	12/14/2010
MW-1 (Elevation)	98.93	98.93	98.93
DTW	24.30	24.45	24.95
DTP	23.28	23.45	24.53
LNAPL THICKNESS	1.02	1.00	0.42
GWELEV	74.63	74.48	73.98
CORRECTED GWELEV	75.38	75.22	74.29
PID READING (ppm)	8	30	150
MW - 4 (Elevation)	98.10	98.10	98.10
DTW	21.18	21.10	22.30
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	76.92	77.00	75.8
CORRECTED GWELEV	76.92	77.00	75.8
PID READING (ppm)	0	0	0
MW - 7 (Elevation)	99.47	99.47	99.47
DTW	21.16	21.38	22.15
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	78.31	78.09	77.32
CORRECTED GWELEV	78.31	78.09	77.32
PID READING (ppm)	0	0	0
MPE-3 (Elevation)	98.14	98.14	98.14
DTW	16.02	16.55	16.20
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	82.12	81.59	81.94
CORRECTED GWELEV	82.12	81.59	81.94
MPE WELL VACUUM (in. Hg.)	-3	-4	-5
PID READING	0	0	0
MPE-6 (Elevation)	98.93	98.93	98.93
DTW	17.55	19.85	21.85
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	81.38	79.08	77.08
CORRECTED GWELEV	81.38	79.08	77.08
MPE WELL VACUUM (in. Hg.)	-3	-4	-5
PID READING	0	0	0

Description	10/29/2010	11/18/2010	12/14/2010
MW - 2 (Elevation)	99.44	99.44	99.44
DTW	23.06	23.45	24.40
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	76.38	75.99	75.04
CORRECTED GWELEV	76.38	75.99	75.04
PID READING (ppm)	0	0	1.4
MW - 5 (Elevation)	98.74	98.74	98.74
DTW	18.50	20.25	19.70
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	80.24	78.49	79.04
CORRECTED GWELEV	80.24	78.49	79.04
MPE WELL VACUUM (in. Hg)	-3	-4	-5
PID READING (ppm)	0	0	0
MPE-1 (Elevation)	99.00	99.00	99.00
DTW			
DTP			
LNAPL THICKNESS	WELL	WELL	WELL
GWELEV	DRY	DRY	DRY
CORRECTED GWELEV			
MPE WELL VACUUM (in. Hg)			
PID READING	0	0	0
MPE-4 (Elevation)	99.19	99.19	99.19
DTW	18.15	19.12	16.67
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	81.04	80.07	82.52
CORRECTED GWELEV	81.04	80.07	82.52
MPE WELL VACUUM (in. Hg)	-3	-4	-5
PID READING	0	0	0
MPE-7 (Elevation)	97.42	97.42	97.42
DTW	16.70	17.00	19.65
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	80.72	80.42	77.77
CORRECTED GWELEV	80.72	80.42	77.77
MPE WELL VACUUM (in. Hg.)	-3	-4	-5
PID READING	0.7	0	0

Description	10/29/2010	11/18/2010	12/14/2010
MW- 3 (Elevation)	99.00	99.00	99.00
DTW	21.89	22.10	24.00
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	77.11	76.90	75.00
CORRECTED GWELEV	77.11	76.90	75.00
PID READING (ppm)	0	0	0
MW - 6 (Elevation)	99.10	99.10	99.10
DTW	26.78	26.81	B
DTP	NPD	NPD	L
LNAPL THICKNESS	0.0	0.0	O
GWELEV	72.32	72.29	C
CORRECTED GWELEV	72.32	72.29	K
PID READING (ppm)	0	0	E
			D
MPE-2 (Elevation)	98.75	98.75	98.75
DTW	18.20	21.10	21.90
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	80.55	77.65	76.85
CORRECTED GWELEV	80.55	77.65	76.85
MPE WELL VACUUM (in. Hg.)	-3	-4	-5
PID READING	0	0	0
MPE-5 (Elevation)	97.93	97.93	97.93
DTW	17.75	18.10	19.94
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	80.18	79.83	77.99
CORRECTED GWELEV	80.18	79.83	77.99
MPE WELL VACUUM (in. Hg.)	-3	-4	-5
PID READING	0	0	0

LNAPL measurements denote thickness of product in ft.
NMT - No Measurement Taken DTW - Depth to Water DTP - Depth to Product NPD - No Product Detected
GW Elev measurements denote feet above sea level. DTW / DTP measurements denote depth from top of casing.
Shaw does not have TOC elevations for MPE wells.
Corrected Groundwater Concentration (CGW) C = LNAPL thickness multiplied by specific gravity of gasoline (vehicle) (0.739) plus the elevation of the LNAPL / water interface.

System
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Table

7th Quarter of Operations

FORT HAMILTON MONITORING AND EXTRACTION WELL STATUS

7th Quarter System Operations

Description	1/31/2011	2/17/2011	3/31/2011
MW-1 (Elevation)	98.93	98.93	98.93
DTW	23.55	21.99	19.85
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.00	0.00	0.00
GWELEV	75.38	76.94	79.08
CORRECTED GWELEV	75.38	76.94	79.08
PID READING (ppm)	150	38	205
MW - 4 (Elevation)	98.10	98.10	98.10
DTW	21.29	18.45	16.60
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	76.81	79.65	81.50
CORRECTED GWELEV	76.81	79.65	81.50
PID READING (ppm)	0	1.4	14
MW - 7 (Elevation)	99.47	99.47	99.47
DTW	No	18.15	15.02
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	81.32	84.45
CORRECTED GWELEV		81.32	84.45
PID READING (ppm)		0	0
MPE-3 (Elevation)	98.14	98.14	98.14
DTW	No	17.34	15.95
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	80.80	82.19
CORRECTED GWELEV		80.80	82.19
MPE WELL VACUUM (in. Hg.)		-2	-4
PID READING		0	0
MPE-6 (Elevation)	98.93	98.93	98.93
DTW	No	18.70	13.22
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	80.23	85.71
CORRECTED GWELEV		80.23	85.71
MPE WELL VACUUM (in. Hg.)		-2	-4
PID READING		0	0

Description	1/31/2011	2/17/2011	3/31/2011
MW - 2 (Elevation)	99.44	99.44	99.44
DTW	No	No	15.76
DTP	Access	Access	NPD
LNAPL THICKNESS	Due To	Due To	0.0
GWELEV	Snow	Snow	83.68
CORRECTED GWELEV			83.68
PID READING (ppm)			0
MW - 5 (Elevation)	98.74	98.74	98.74
DTW	22.15	17.70	13.68
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	76.59	81.04	85.06
CORRECTED GWELEV	76.59	81.04	85.06
MPE WELL VACUUM (in. Hg)	NMT	-1	-4
PID READING (ppm)	0	0	0
MPE-1 (Elevation)	99.00	99.00	99.00
DTW			21.31
DTP	Access	NO	NPD
LNAPL THICKNESS	Blocked	WATER	0.0
GWELEV		IN	77.69
CORRECTED GWELEV		WELL	77.69
MPE WELL VACUUM (in. Hg)			-3
PID READING			0
MPE-4 (Elevation)	99.19	99.19	99.19
DTW	No	17.50	16.51
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	81.69	82.68
CORRECTED GWELEV		81.69	82.68
MPE WELL VACUUM (in. Hg)		-2	-4
PID READING		0	0
MPE-7 (Elevation)	97.42	97.42	97.42
DTW	No	16.91	11.65
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	80.51	85.77
CORRECTED GWELEV		80.51	85.77
MPE WELL VACUUM (in. Hg.)		0	-3.5
PID READING		0	0

Description	1/31/2011	2/17/2011	3/31/2011
MW- 3 (Elevation)	99.00	99.00	99.00
DTW	21.63	18.58	13.94
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.00	0.0	0.0
GWELEV	77.37	80.42	85.06
CORRECTED GWELEV	77.37	80.42	85.06
PID READING (ppm)	0	0	0
MW - 6 (Elevation)	99.10	99.10	99.10
DTW	27.36	26.47	23.06
DTP	NPD	NPD	NPD
LNAPL THICKNESS	0.0	0.0	0.0
GWELEV	71.74	72.63	76.04
CORRECTED GWELEV	71.74	72.63	76.04
PID READING (ppm)	0	0	0
MPE-2 (Elevation)	98.75	98.75	98.75
DTW		20.02	21.86
DTP	Access	NPD	NPD
LNAPL THICKNESS	Blocked	0.0	0.0
GWELEV		78.73	76.89
CORRECTED GWELEV		78.73	76.89
MPE WELL VACUUM (in. Hg.)		-1	-3
PID READING		0	0
MPE-5 (Elevation)	97.93	97.93	97.93
DTW	No	17.20	18.95
DTP	Access	NPD	NPD
LNAPL THICKNESS	Due To	0.0	0.0
GWELEV	Snow	80.73	78.98
CORRECTED GWELEV		80.73	78.98
MPE WELL VACUUM (in. Hg.)		-2	-4
PID READING		0	0

LNAPL measurements denote thickness of product in ft.
NMT - No Measurement Taken
GW Elev measurements denote feet above sea level.
Shaw does not have TOC elevations for MPE wells.
Corrected Groundwater Concentration (CGW) Calculation

DTP - Depth to Product NPD - No Product Detected
DTW / DTP measurements denote depth from top of casing.

System
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Table

8th Quarter of Operations

Fort Hamilton Building 200 Multi-Phase Treatment System Compliance Data Table

Daily Water Discharge Per Month						**Apr-11**	**May-11**	**Jun-11**
< 9,000 Gallons Per Day (recommended)				**(Gallons / Day)**		**393**	**304**	**56**
Air Effluent		***(Stack - Height 15 ft.)***		**(Quarterly)**		**FH062111-NS-SE (TO-15)**		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
250 (design rate)		1.60	5272	0.00494		**0.055**	**170**	**<0.00494**
Air Stripper Off - Gas				**(Quarterly)**		**FH062111-NS-AS (TO-15)**		
Air flow (cfm)		Max. Benzene Emissions (ppm v)	Max Benzene Emissions (ug/m3)	Max Benzene Emissions (lbs./hr)		Benzene Emissions (ppm-v)	Benzene Emissions (ug/m3)	Benzene Emissions (lbs./hr)
150 (design rate)		2.66	8787	0.00494		**<0.00030**	**<0.9**	**<0.00494**
Water Effluent		***(NYCDEP Discharge Parameters)***		**(Monthly)**				
Parameter	**Method**	**Daily Limit / Monthly Limit**	**Units**	**Sample Type**	**Sample Units**	**FH-041211-NS-WE FH-041211-NS-WE COMP April 12, 2011**	**FH-052711-NS-WE FH-052711-NS-WE- COMP May 27, 2011**	**FH-062211-NS-WE FH-062211-NS-WE-COMP June 22, 2011**
Non-polar material	1664	50	mg/l	Instantaneous	mg/l	**<2.1**	**<2.1**	**<2.1**
pH	SM4500	5-11	SU's	Instantaneous	su	**7.75**	**7.46**	**7.82**
Temperature	2550	< 150	Degree F	Instantaneous	Deg. F	**18.5**	**19.9**	**20.5**
Flash Point	1010A	> 140	Degree F	Instantaneous	Deg. F	**<200**	**<200**	**<200**
Cadmium	200.7	2 0.69	mg/l mg/l	Instantaneous Composite	mg/l mg/l	**0.00055 J** **0.00055 J**	**0.00035 J** **0.00040 J**	**<0.0010** **<0.0010**
Chromium (VI)	SM3500	5	mg/l	Instantaneous	mg/l	**<0.010**	**<0.010**	**<0.010**
Copper	200.7	5	mg/l	Instantaneous	mg/l	**0.0025 J**	**<0.0050**	**0.0049 J**
Lead	200.7	2	mg/l	Instantaneous	mg/l	**0.0029 J**	**<0.0030**	**0.094**
Mercury	245.1	0.05	mg/l	Instantaneous	mg/l	**<0.00020**	**<0.00020**	**<0.00020**
Nickel	200.7	3	mg/l	Instantaneous	mg/l	**0.011**	**0.0063 J**	**0.0084 J**
Zinc	200.7	5	mg/l	Instantaneous	mg/l	**0.10**	**0.036**	**0.15**
Benzene	624	134 / 57	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Carbon tetrachloride	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Chloroform	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
1,4 Dichlorobenzene	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Ethylbenzene	624	380/142	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
MTBE (Methyl-Tert-Butyl-Ether)	624	50	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Naphthalene	625	47/19	ppb	Composite	ug/l	**<1.4**	**<1.5**	**<1.5**
Phenol	420.4	---	---	Composite	ug/l	**0.008 J**	**0.002 J**	**<0.01**
Tetrachloroethylene (Perc)	624	20	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
Toluene	624	74/28	ppb	Instantaneous	ug/l	**<1.0**	*****	**<1.0**
1,2,4 Trichlorobenzene	625	---	---	Composite	ug/l	**<2.9**	**<2.9**	**<2.9**
1,1,1 Trichloroethane	624	---	---	Composite	ug/l	**<1.0**	*****	**<1.0**
Xylenes (Total)	624	74/28	ppb	Instantaneous	ug/l	**<3.0**	*****	**<3.0**
PCB's (Total)	608	1	ppb	Composite	ug/l	**<0.48**	**<0.48**	**<0.49**
Total Suspended Solids (TSS)	2540	3504	mg/l	Instantaneous	mg/l	**11.0**	**36.0**	**10.0**
CBOD	5210B	---	---	Composite	mg/l	**<2.0**	**<2.0**	**<2.0**
Chloride	300.0	---	---	Instantaneous	mg/l	**1600**	**742**	**303**
Total Nitrogen	Calculation	---	---	Composite	mg/l	**1.30**	**<1.0**	**<1.0**
Total Solids	2540	---	---	Instantaneous	mg/l	**3980**	**1710**	**860**
Other								

* Method 624 analysis was not able to be performed due to sample vial breakage in the laboratory. There was no time left in the period to resample for that method.

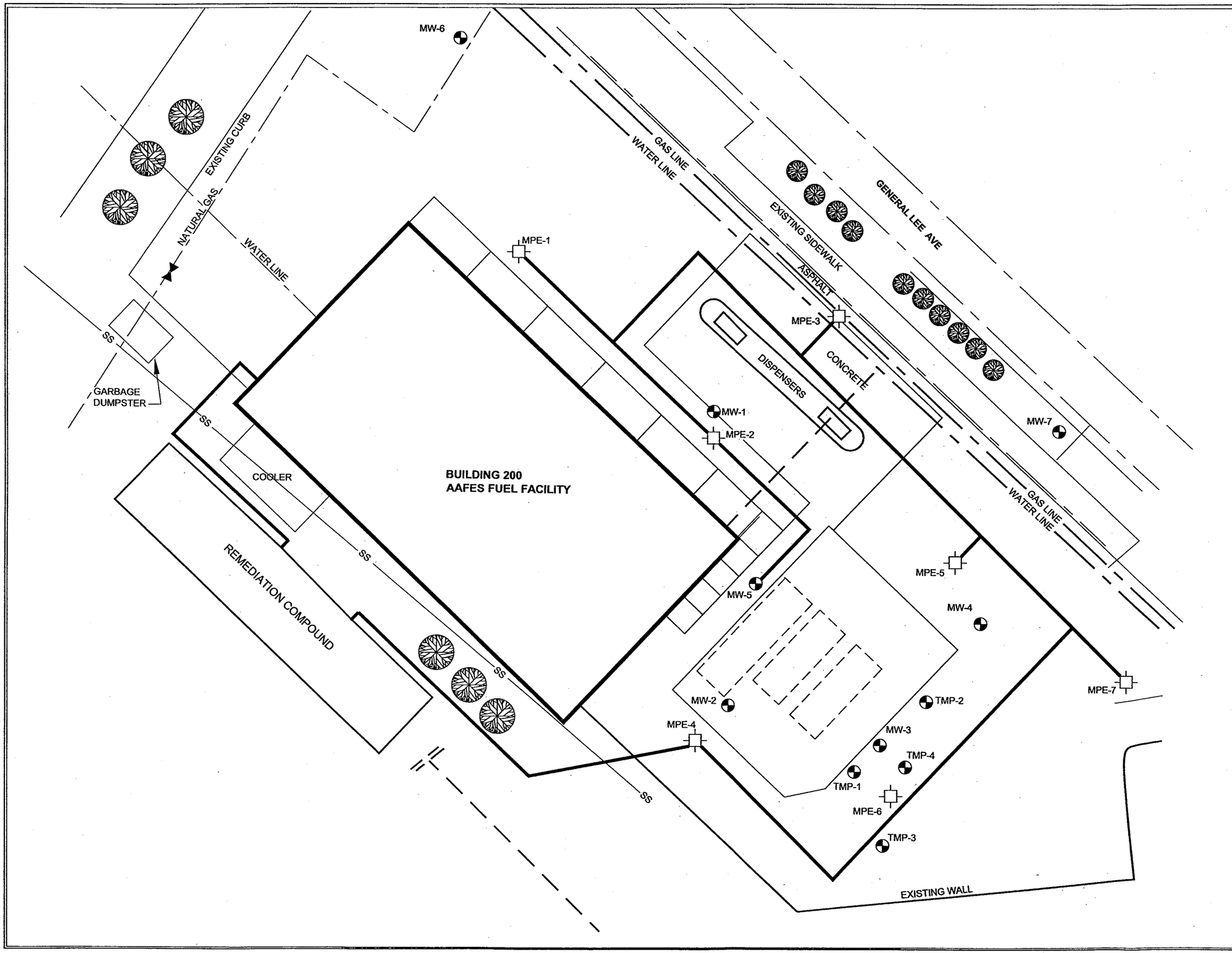
MONITORING & EXTRACTION

Quarters of Operations – 5 through 8

Evaluation

During the second year of operations, MW-5 did not display any presence of LNAPL. LNAPL thickness in MW-1 fluctuated throughout the year, showing the highest levels in the 6th quarter of operation and lowest in the 7th quarter of operation. Although there was not a direct downward trend, there is evidence that the plume is reducing. During the next year, extraction will be focused on MW-1 and MW-5 and should enhance the LNAPL extraction process.

Historical Well Concentrations Data



Legend

- Existing Monitoring L ocation
- MPE Extraction Well
  Underground Electric
- —SS— Sanitary Sewer Line
- MPE Header Pipe
- Buried Valve
- Underground Storage Tanks

N

FIGURE 3

Groundwater Monitoring Wells Map

AAFES Station, Fort Hamilton-New York

U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT

Shaw™ Shaw Environmental, Inc.

PROJECT NO.	FILE NO.
8095-07A	FIGURE 3

MONITORING WELL 1

(MW01)

Monitoring Well 1

Evaluation

Eight Quarters of Operation

No groundwater sampling has ever been performed on this well due to the presence of LNAPL within it at the time of sampling. The highest LNAPL thickness recorded at this location was 1.66 ft. in 2009. Since that measurement, LNAPL thicknesses have reduced to 0.0 ft on several occasions. The last LNAPL measurement for this period was 0.08 ft recorded on June 25, 2011.

Since this monitoring well is the only one that continues to exhibit the presence of LNAPL, remediation must continue. The plan of action for the upcoming period is to localize and increase vacuum at MPE-2 (extraction well near MW-01). Additionally, high volume extraction of MW-01 will be performed on a regular basis, pumping the well dry in attempts to draw out the remaining LNAPL within the surrounding soils and ultimately remove LNAPL and reduce BTEX compounds to <500 ppb and VOC's to < 1000 ppb.

MONITORING WELL 2

(MW02)

Monitoring Well 2

Evaluation

Eight Quarters of Operation

All groundwater from Monitoring Well # 2 has been collected as per USEPA low flow methodology. LNAPL has never been detected in this well. All total BTEX and VOC concentrations have been under 500 ppb and 1,000 ppb respectively and are currently at non-detectable levels.

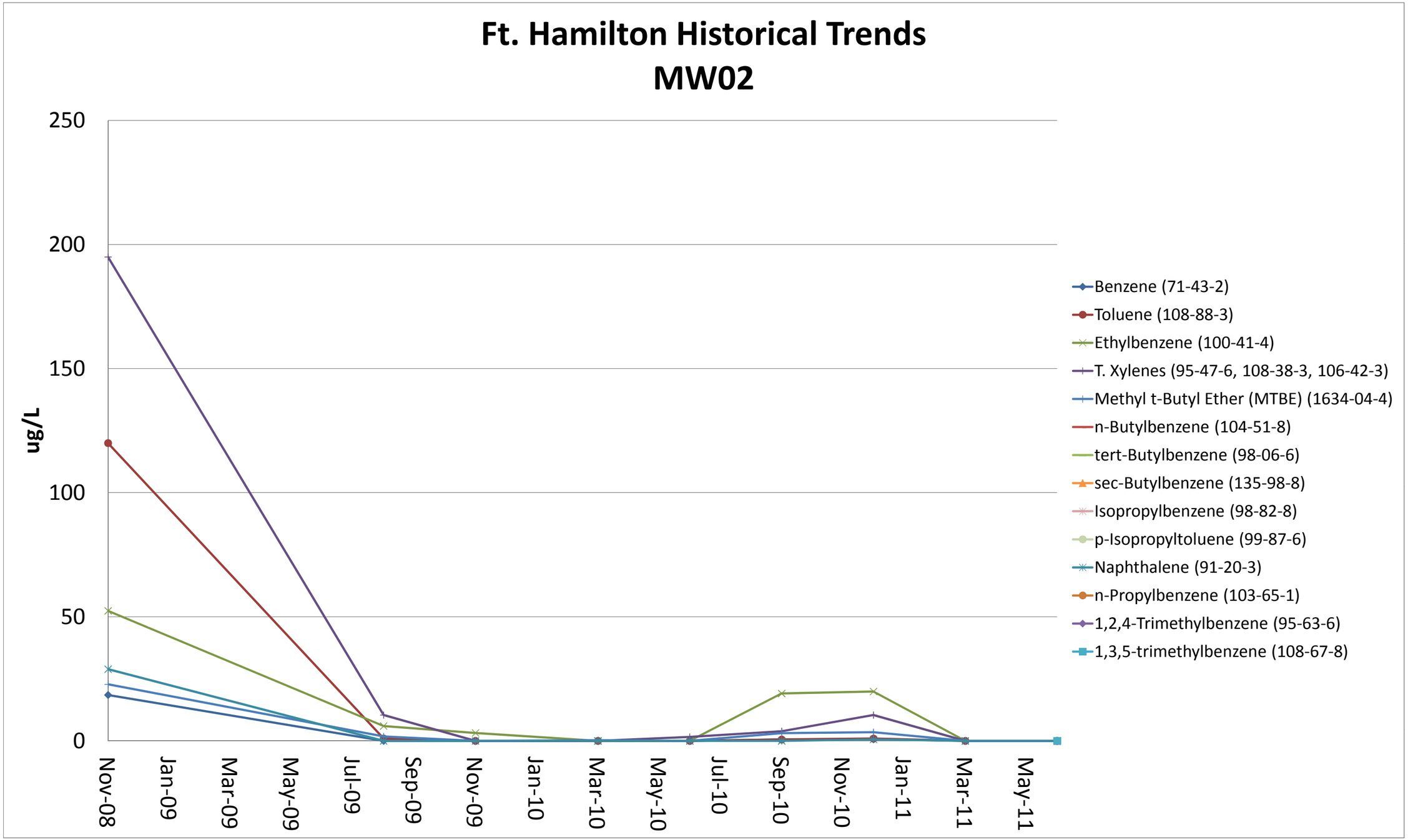
No further action is required for MW-02 at this time. MPE-4 (extraction well located nearest MW-02) has been turned off; however, well conditions will continue to be monitored. Should BTEX or VOC's rise significantly or LNAPL appears, MPE-4 will be returned to service and the remedial plan of action will be re-evaluated.

FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW02) (Detections)

Monitoring Well	GW Standards or Guidance		11/12/2008	8/18/2009	11/18/2009	3/10/2010	6/28/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-111208-NS-MW02 (ug/l)	FH-081809-NS-MW02 (ug/l)	FH-111809-NS-MW02 (ug/l)	FH-031010-NS-MW2 (ug/l)	FH-062810-NS-MW02 (ug/l)	FH-090910-NS-MW02 (ug/l)	FH-120610-NS-MW02 (ug/l)	FH-031711-NS-MW02 (ug/l)	FH-061511-NS-MW02 (ug/l)
Benzene (71-43-2)	1 ug/l	1 ug/l	**18.5**	ND	ND	ND	ND	0.54 J	0.67 J	ND	ND
Ethylbenzene (100-41-4)	5 ug/l	5 ug/l	**52.4**	**6.0**	3.2 J	ND	ND	**19.1**	**19.9**	ND	ND
n-Butylbenzene (104-51-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
tert-Butylbenzene (98-06-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
sec-Butylbenzene (135-98-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
Isopropylbenzene (98-82-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
p-Isopropyltoluene (99-87-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
Methyl t-Butyl Ether (MTBE) (1634-04-4)	nr	nvr	22.8	1.8 J	ND	0.27	ND	3.1	3.5	ND	ND
Naphthalene (91-20-3)	10 ug/l	nvr	**28.9**	ND	ND	ND	ND	ND	0.59	ND	ND
n-Propylbenzene (103-65-1)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
Toluene (108-88-3)	5 ug/l	5 ug/l	**120.0**	0.96 J	ND	ND	ND	0.55 J	0.93 J	ND	ND
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	5 ug/l	5 ug/l	**195.0**	**10.4 J**	ND	ND	1.6 J	3.9	**10.4**	ND	ND
1,2,4-Trimethylbenzene (95-63-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
1,3,5-trimethylbenzene (108-67-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	ND
Total BTEX			385.9	17.36	3.2	0	1.6	24.09	32.00	ND	ND
Total VOC's			437.6	19.16	3.2	0.27	1.6	27.19	36.09	ND	ND

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW02
ug/L
250
200
150
100
50
0
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Benzene (71-43-2)
Toluene (108-88-3)
Ethylbenzene (100-41-4)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

MONITORING WELL 3

(MW03)

Monitoring Well 3

Evaluation

Eight Quarters of Operation

All groundwater from Monitoring Well # 3 has been collected as per USEPA low flow methodology. LNAPL has never been detected in this well. All total BTEX and VOC concentrations have been under 500 ppb and 1,000 ppb, respectively.

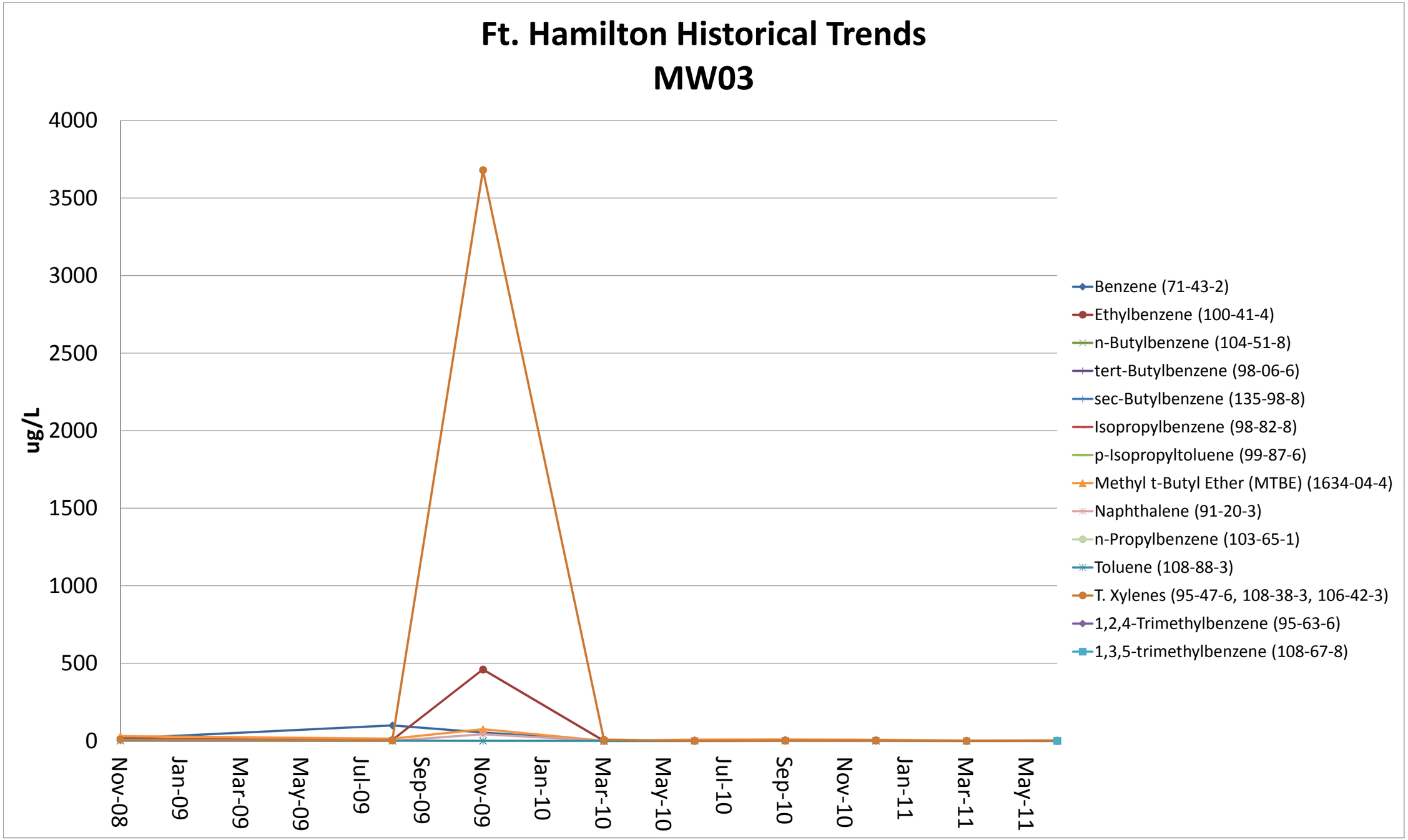
No further action is required for MW-03 at this time. MPE-6 (extraction well located nearest MW-03) has been turned off; however, well conditions will continue to be monitored. Should BTEX or VOC's rise significantly or LNAPL appears, MPE-4 will be returned to service and the remedial plan of action will be re-evaluated.

FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW03) (Detections)

Monitoring Well	GW Standards or Guidance		11/12/2008	8/18/2009	11/18/2009	3/10/2010	6/28/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-111208-NS-MW03 (ug/l)	FH-081809-NS-MW03 (ug/l)	FH-111809-NS-MW03 (ug/l)	FH-031010-NS-MW3 (ug/l)	FH-062810-NS-MW03 (ug/l)	FH-090910-NS-MW03 (ug/l)	FH-120610-NS-MW03 (ug/l)	FH-031711-NS-MW03 (ug/l)	FH-061511-NS-MW03 (ug/l)
Benzene (71-43-2)	**1 ug/l**	**1 ug/l**	**15.2**	**99.5**	**53.9**	ND	**4.1**	**7.2**	**3.8**	0.40 J	**2.3**
Ethylbenzene (100-41-4)	**5 ug/l**	**5 ug/l**	**12.2**	**5.2**	**460.0**	ND	0.29 J	3.0	3.6	ND	ND
n-Butylbenzene (104-51-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
tert-Butylbenzene (98-06-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
sec-Butylbenzene (135-98-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	1.6
Isopropylbenzene (98-82-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	0.84 J
p-Isopropyltoluene (99-87-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Methyl t-Butyl Ether (MTBE) (1634-04-4)	**nr**	**nvr**	30.1	13.7	74.8	ND	7.60	9.3	7.1	1.8	2.8
Naphthalene (91-20-3)	**10 ug/l**	**nvr**	0.73 J	ND	**42.2**	ND	ND	ND	ND	ND	ND
n-Propylbenzene (103-65-1)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Toluene (108-88-3)	**5 ug/l**	**5 ug/l**	1.5	1.0	ND	ND	0.26 J	0.90 J	ND	ND	ND
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	**5 ug/l**	**5 ug/l**	**8.2**	3.8	**3680.0**	**7.7**	ND	1.7 J	2.3 J	ND	ND
1,2,4-Trimethylbenzene (95-63-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
1,3,5-trimethylbenzene (108-67-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Total BTEX			37.1	109.5	4193.9	7.7	4.36	12.8	9.7	0.4	2.3
Total VOC's			38.56	123.2	4310.9	7.7	11.96	22.1	16.8	2.2	7.54

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW03
ug/L
4000
3500
3000
2500
2000
1500
1000
500
0
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Benzene (71-43-2)
Ethylbenzene (100-41-4)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
Toluene (108-88-3)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

MONITORING WELL 4

(MW04)

Monitoring Well 4

Evaluation

Eight Quarters of Operation

All groundwater from Monitoring Well # 4 has been collected as per USEPA low flow methodology. Since the last reporting period, total BTEX and VOCs have increased to levels well above 500 ppb and 1000 ppb concentrations in September 2010, December 2010 and March 2011. In June 2011, concentrations were below those levels.

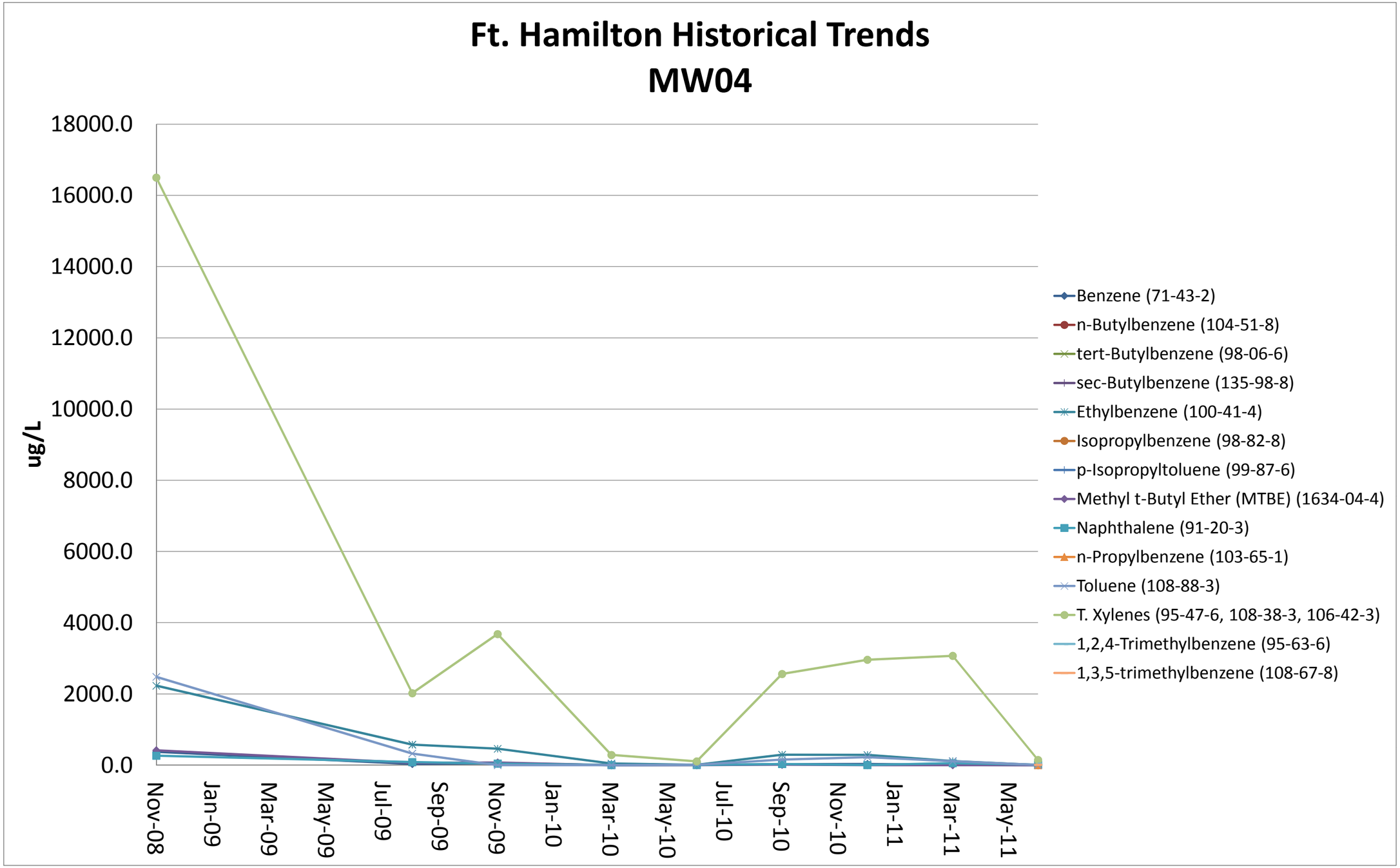
Currently, MPE-7 and MPE-5 (the extraction wells nearest MW-04) are off. MPE-7 will remain off indefinitely, since its operation would encourage BTEX and VOC's to migrate in a counter-productive direction. Vacuum at MW-04 will be checked to see if its water column is being influenced by MPE-2. Should BTEX or VOC concentrations rise or there is no influence by MPE-2, MPE-5 may be returned to service after an evaluation is made to confirm that reactivation of the extraction well is the best course of action.

FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW04) (Detections)

Monitoring Well	GW Standards or Guidance		11/12/2008	11/12/2008	8/18/2009	11/18/2009	3/10/2010	6/28/2010	9/9/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-111208-NS-MW04 (ug/l)	FH-111208-FD-MW04 (ug/l)	FH-081809-NS-MW04 (ug/l)	FH-111809-NS-MW04 (ug/l)	FH-031010-NS-MW4 (ug/l)	FH-062810-NS-MW04 (ug/l)	FH-090910-NS-MW04 (ug/l)	FH-090910-NS-MW04 DUP (ug/l)	FH-120610-NS-MW04 (ug/l)	FH-031711-NS-MW04 (ug/l)	FH-061511-NS-MW04 (ug/l)
Benzene (71-43-2)	1 ug/l	1 ug/l	**373.0**	**274.0**	**33.8**	**53.9**	**1.4**	**3.2**	**26.7**	**26.8**	**33.1**	**7.0**	0.98 J
n-Butylbenzene (104-51-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	3.5
tert-Butylbenzene (98-06-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND
sec-Butylbenzene (135-98-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND
Ethylbenzene (100-41-4)	5 ug/l	5 ug/l	**2180.0**	**2230.0**	**576.0**	**460.0**	**44.0**	**10.5**	**278.0**	**292.0**	**286.0**	**113.0**	4.7
Isopropylbenzene (98-82-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	**8.5**
p-Isopropyltoluene (99-87-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	2.1
Methyl t-Butyl Ether (MTBE) (1634-04-4)	nr	nvr	417.0	346.0	65.0	74.8	ND	ND	12.7	ND	ND	1.2	ND
Naphthalene (91-20-3)	10 ug/l	nvr	**257.0**	**265.0**	**85.9**	**42.2**	3.4	6.5	**33.7**	**24.8**	4.8	**55.0**	**11.6**
n-Propylbenzene (103-65-1)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND
Toluene (108-88-3)	5 ug/l	5 ug/l	**2470.0**	**2480.0**	**326.0**	ND	ND	**10.1**	154.0	153.0	**226.0**	**109.0**	3.5
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	5 ug/l	5 ug/l	**16500.0**	**16500.0**	**2020.0**	**3680.0**	**286.0**	**105**	**2470.0**	**2560.0**	**2960.0**	**3070.0**	**145**
1,2,4-Trimethylbenzene (95-63-6)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	**40.9**
1,3,5-trimethylbenzene (108-67-8)	5 ug/l	5 ug/l	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	**9.7**
Total BTEX			21523	21484	2955.8	4193.9	331.4	128.8	2928.7	3031.8	3505.1	3299	154.18
Total VOC's			22197	22095	3106.7	4310.9	334.8	135.3	2975.7	3056.6	3509.9	3355.2	230.48

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW04
ug/L
18000.0
16000.0
14000.0
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
0.0
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Benzene (71-43-2)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Ethylbenzene (100-41-4)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
Toluene (108-88-3)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

MONITORING WELL 5

(MW05)

Monitoring Well 5

Evaluation

Eight Quarters of Operation

The highest LNAPL thickness recorded (by Plexus Scientific) at this well was 6.14 ft on July 9, 2009. Beginning in March 2010, LNAPL was not detected through the end of the first year of operations. During the second year of operations, LNAPL was detected during the December 2010 groundwater monitoring event and therefore the well was not sampled. All total BTEX and VOC analysis have resulted in concentrations well above the 500 ppb and 1000 ppb threshold levels required for no further action.

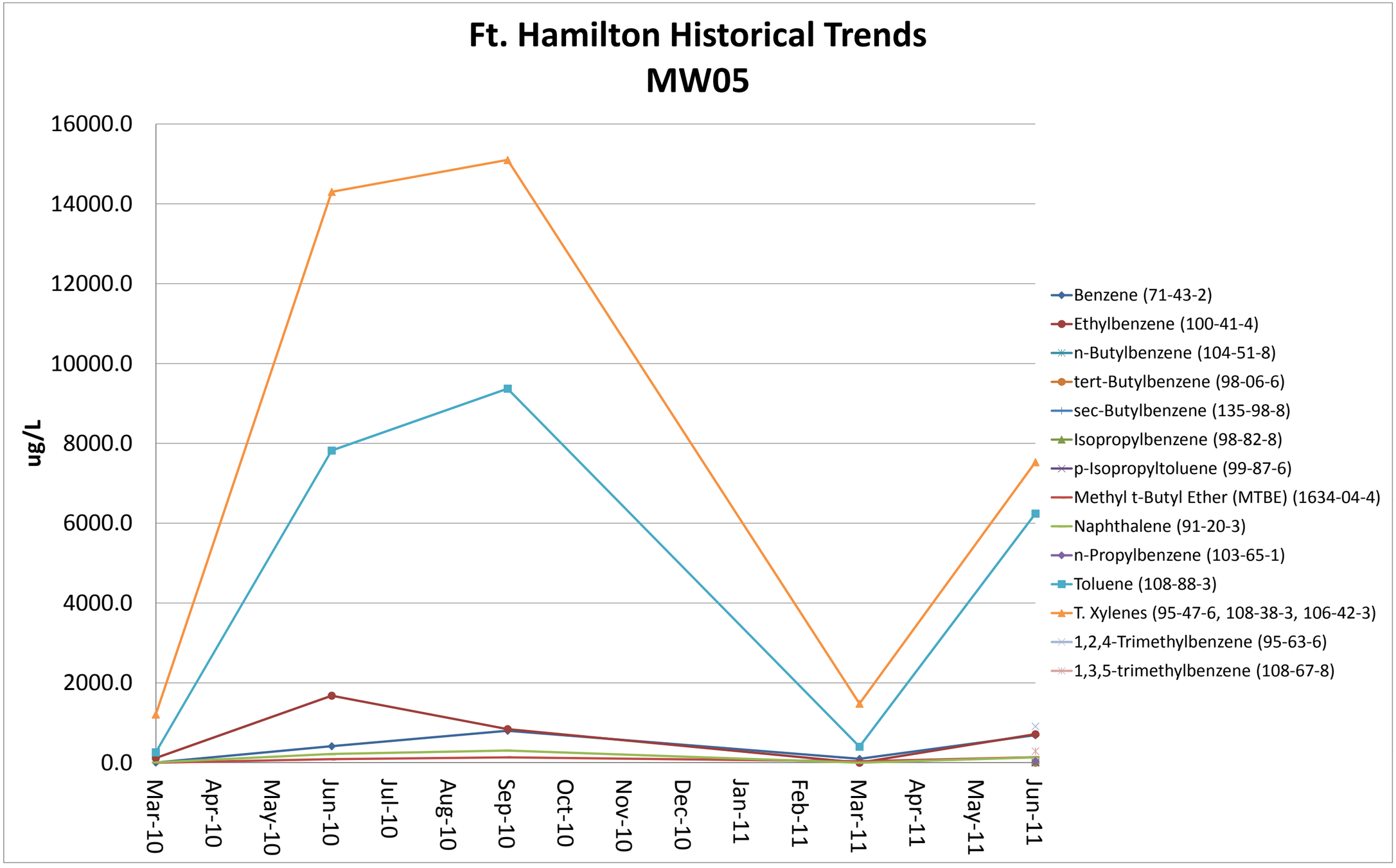
Since this monitoring well occasionally exhibits the presence of LNAPL, and total BTEX and VOC levels are elevated, remediation must continue. The plan of action for the upcoming period is to continue extraction at this well and increase the vacuum. Additionally, high volume extraction of MW-05 will be performed on a regular basis, pumping the well dry in attempts to draw out the remaining LNAPL within the surrounding soils and ultimately remove LNAPL and reduce BTEX compounds to <500 ppb and VOC's to < 1000 ppb.

FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW05) (Detections)

Monitoring Well	GW Standards or Guidance		3/10/2010	6/28/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-031010-NS-MW5 (ug/l)	FH-062810-NS-MW05 (ug/l)	FH-090910-NS-MW05 (ug/l)	MW05 (ug/l)	FH-031711-NS-MW05 (ug/l)	FH-061511-NS-MW05 (ug/l)
Benzene (71-43-2)	**1 ug/l**	**1 ug/l**	**4.7**	**414**	**800.0**	**Well not sampled. LNAPL present.**	**97.8**	**689**
Ethylbenzene (100-41-4)	**5 ug/l**	**5 ug/l**	**117.0**	**1680.0**	**842.0**		ND	**715**
n-Butylbenzene (104-51-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	ND
tert-Butylbenzene (98-06-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	ND
sec-Butylbenzene (135-98-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	ND
Isopropylbenzene (98-82-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	**30.1**
p-Isopropyltoluene (99-87-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	**6.1**
Methyl t-Butyl Ether (MTBE) (1634-04-4)	**nr**	**nvr**	ND	87.8	135.0		35.8	**139**
Naphthalene (91-20-3)	**10 ug/l**	**nvr**	8.2	**218**	**305.0**		ND	**134**
n-Propylbenzene (103-65-1)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	**42.4**
Toluene (108-88-3)	**5 ug/l**	**5 ug/l**	**261.0**	**7820.0**	**9370.0**		**402.0**	**6240**
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	**5 ug/l**	**5 ug/l**	**1210.0**	**14300.0**	**15100.0**		**1480.0**	**7530**
1,2,4-Trimethylbenzene (95-63-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	**911**
1,3,5-trimethylbenzene (108-67-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT		NT	**290**
Total BTEX			1592.7	24214	26112		1979.8	15174
Total VOC's			1600.9	24519.8	26552.0		2015.6	16726.6

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW05
ug/L
16000.0
14000.0
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
0.0
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Oct-10
Nov-10
Dec-10
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Benzene (71-43-2)
Ethylbenzene (100-41-4)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
Toluene (108-88-3)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

MONITORING WELL 6

(MW06)

Monitoring Well 6

Evaluation

Eight Quarters of Operation

All groundwater from Monitoring Well # 6 has been collected as per USEPA low flow methodology. All BTEX and VOC concentrations have been at non-detectable levels for eight consecutive quarters. This well is clean and no further action is required. MPE-1 (extraction well located nearest MW-06) has been turned off. Existing conditions at this well are not expected to change; however, if they do, the plan of action will be reevaluated.

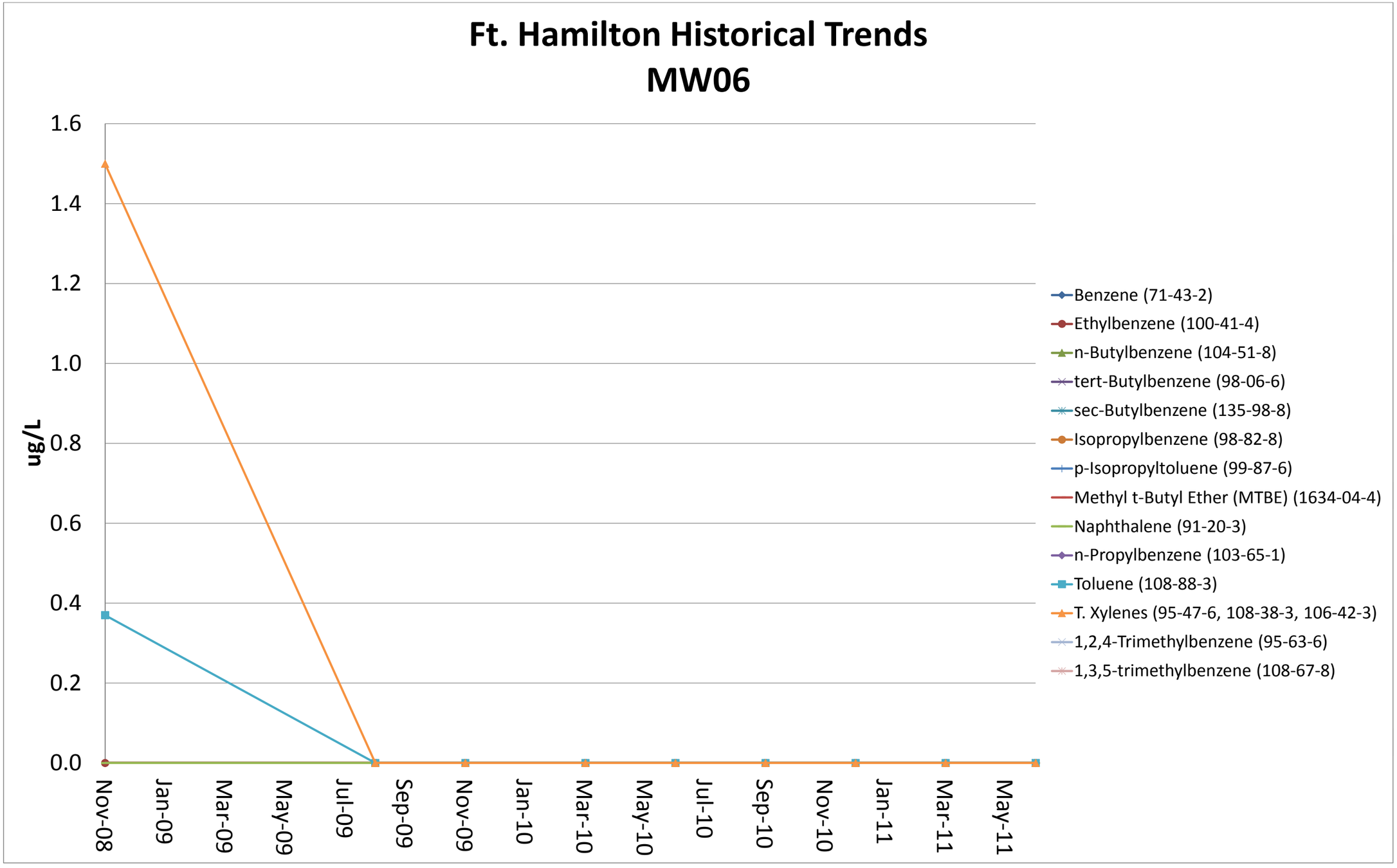
FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW06)

(Detections)

Monitoring Well	GW Standards or Guidance		11/12/2008	8/18/2009	11/18/2009	3/10/2010	6/28/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-111208-NS-MW06 (ug/l)	FH-081809-NS-MW06 (ug/l)	FH-111809-NS-MW06 (ug/l)	FH-031010-NS-MW6 (ug/l)	FH-062810-NS-MW06 (ug/l)	FH-062810-NS-MW06 (ug/l)	FH-120610-NS-MW06 (ug/l)	FH-031711-NS-MW06 (ug/l)	FH-061511-NS-MW06 (ug/l)
Benzene (71-43-2)	**1 ug/l**	**1 ug/l**	**ND**	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (100-41-4)	**5 ug/l**	**5 ug/l**	**ND**	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene (104-51-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
tert-Butylbenzene (98-06-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
sec-Butylbenzene (135-98-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Isopropylbenzene (98-82-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
p-Isopropyltoluene (99-87-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Methyl t-Butyl Ether (MTBE) (1634-04-4)	**nr**	**nvr**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene (91-20-3)	**10 ug/l**	**nvr**	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene (103-65-1)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Toluene (108-88-3)	**5 ug/l**	**5 ug/l**	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	**5 ug/l**	**5 ug/l**	1.5 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene (95-63-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,3,5-trimethylbenzene (108-67-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	NT
Total BTEX			1.87	ND	ND	ND	ND	ND	ND	ND	ND
Total VOC's			1.87	ND	ND	ND	ND	ND	ND	ND	ND

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW06
ug/L
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Benzene (71-43-2)
Ethylbenzene (100-41-4)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
Toluene (108-88-3)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

MONITORING WELL 7

(MW07)

Monitoring Well 7

Evaluation

Eight Quarters of Operation

All groundwater from Monitoring Well # 7 has been collected as per USEPA low flow methodology. All BTEX and VOC concentrations have been well below 500 ppb and 1,000 ppb, respectively. MTBE remains the only compound detected; however, those concentrations are also well below maximum allowed BTEX and VOC levels. No further action is required for this well. MPE-5 (extraction well located nearest MW-07) is currently off. Existing conditions at this well are not expected to change; however, if they do, the plan of action will be reevaluated.

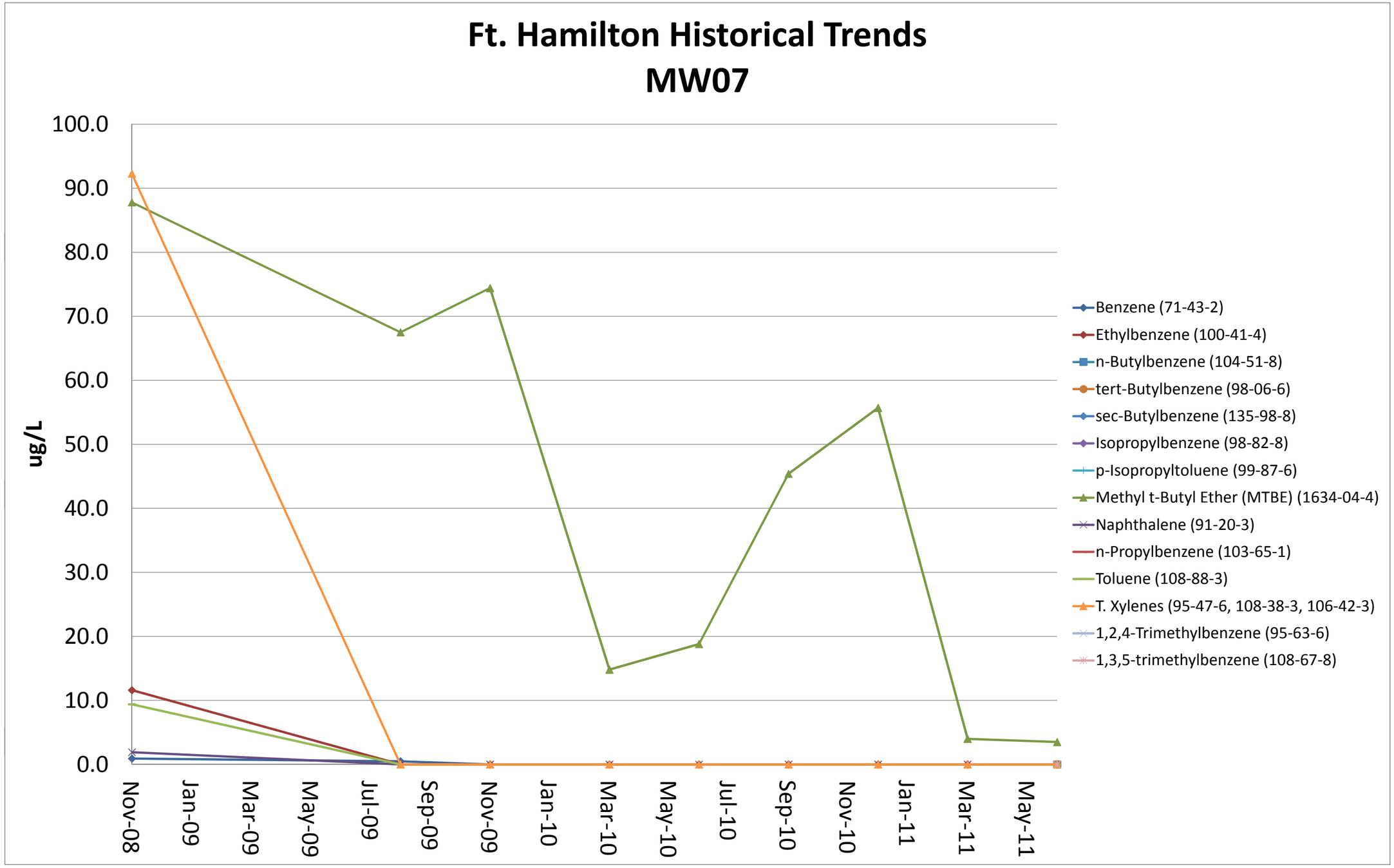
FORT HAMILTON HISTORICAL GROUNDWATER MONITORING DATA (MW07)

(Detections)

Monitoring Well	GW Standards or Guidance		11/12/2008	8/18/2009	11/18/2009	3/10/2010	6/28/2010	9/9/2010	12/6/2010	3/17/2011	6/15/2011
Sample ID / CAS Number	TOGS 1.1.1 Values	6 NYCRR Values	FH-111208-NS-MW07 (ug/l)	FH-081809-NS-MW07 (ug/l)	FH-111809-NS-MW07 (ug/l)	FH-031010-NS-MW7 (ug/l)	FH-062810-NS-MW07 (ug/l)	FH-090910-NS-MW07 (ug/l)	FH-120610-NS-MW07 (ug/l)	FH-031711-NS-MW07 (ug/l)	FH-061511-NS-MW07 (ug/l)
Benzene (71-43-2)	**1 ug/l**	**1 ug/l**	0.92 J	0.49 J	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene (100-41-4)	**5 ug/l**	**5 ug/l**	**11.6**	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene (104-51-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
tert-Butylbenzene (98-06-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
sec-Butylbenzene (135-98-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Isopropylbenzene (98-82-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
p-Isopropyltoluene (99-87-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Methyl t-Butyl Ether (MTBE) (1634-04-4)	**nr**	**nvr**	87.8	67.5	74.4	14.8	18.8	45.4	55.7	4.0	3.5
Naphthalene (91-20-3)	**10 ug/l**	**nvr**	1.9	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene (103-65-1)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Toluene (108-88-3)	**5 ug/l**	**5 ug/l**	**9.4**	ND	ND	ND	ND	ND	ND	ND	ND
T. Xylenes (95-47-6, 108-38-3, 106-42-3)	**5 ug/l**	**5 ug/l**	**92.3**	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene (95-63-6)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
1,3,5-trimethylbenzene (108-67-8)	**5 ug/l**	**5 ug/l**	NT	NT	NT	NT	NT	NT	NT	NT	ND
Total BTEX			114.22	0.49	ND	ND	ND	ND	ND	ND	ND
Total VOC's			203.92	67.99	74.4	14.8	18.8	45.4	55.7	4	3.5

nvr - no value recorded **nr - not regulated as per Table 3 of TOGS guidance manual.**

ND - Not Detected **NT - Not Tested**


Ft. Hamilton Historical Trends
MW07
ug/L
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Benzene (71-43-2)
Ethylbenzene (100-41-4)
n-Butylbenzene (104-51-8)
tert-Butylbenzene (98-06-6)
sec-Butylbenzene (135-98-8)
Isopropylbenzene (98-82-8)
p-Isopropyltoluene (99-87-6)
Methyl t-Butyl Ether (MTBE) (1634-04-4)
Naphthalene (91-20-3)
n-Propylbenzene (103-65-1)
Toluene (108-88-3)
T. Xylenes (95-47-6, 108-38-3, 106-42-3)
1,2,4-Trimethylbenzene (95-63-6)
1,3,5-trimethylbenzene (108-67-8)

LNAPL RECOVERY

5th Quarter System Operation

LNAPL MASS REMOVAL CALCULATIONS

System Information: **Thermal destruction 100%**

Operating minutes:	65,662.8
Blower CFM:	380 cfm
Influent TPH:	130 mg/m3 = 130ug/l
Effluent TPH:	ND mg/m3

Conversions:

1 Cu. Ft. = 28.3168466 (L) Liters.

380 CFM = 10,760.401708 (L/M)	Calc: (380x28.3168466)
706,558,105.2720624 Liters	Calc: (10,760.401708 L/M x 65,662.8 Minutes)
91,852,553,685.368112 UG (micrograms)	Calc: (130 ug/l x 706,558,105.2720624L)

91,852,553.685.368112 micro grams removed in total

91,852,553.685.368112 micro grams = 202.50021773 pounds.

Gasoline weight = 5.93 to 6.42 pounds

202.50021773 / 5.92 = 34.21gallons
202.50021773 / 6.42 = 31.54 gallons

Minimum Removal – 31.54 Gallons
Maximum Removal –34.21 Gallons

Note: All air calculations are based on one air analysis collected during the quarterly time period.

6th Quarter System Operation

LNAPL MASS REMOVAL CALCULATIONS

System Information: **Thermal destruction 100%**

Operating minutes:	109829.4
Blower CFM:	250 cfm
Influent TPH:	23.19 ug/l
Effluent TPH:	ND ug/l

Conversions:

1 Cu. Ft. = 28.3168466 (L) Liters.	
250 CFM = 7079.21165 (L/M)	Calc: (250x28.3168466)
77,750,567.99251 Liters	Calc: (7079.21165L/M x 109829.4 Minutes)
1,803,035,671.7463069 (micrograms)	Calc: (23.19 ug/l x 77,750,567.99251L)

1,803,035,671.7463069 micro grams removed in total

1,803,035,671.7463069 micro grams = 3.97501 pounds.

Gasoline weight = 5.93 to 6.42 pounds

3.97501 / 5.92 = 0.67 gallons
3.97501 / 6.42 = 0.62 gallons

Minimum Removal – 0.62 Gallons
Maximum Removal –0.67 Gallons

Note: All air calculations are based on one air analysis collected during the quarterly time period.

7th Quarter System Operation

LNAPL MASS REMOVAL CALCULATIONS

System Information: **Thermal destruction 100%**

Operating minutes:	130278.6
Blower CFM:	250 cfm
Influent TPH:	5.7 ug/l

Conversions:

1 Cu. Ft. = 28.3168466 (L) Liters.

250 CFM = 7079.21165 (L/M)	Calc: (250x28.3168466)
922,269,782.86569 Liters	Calc: (7079.21165L/M x 130.278.6 Minutes)
4,167,366,386.386623 (micrograms)	Calc: (5.7 ug/l x 922,269,782.86569L)

5,256,937,762.334433 micro grams removed in total

5,256,937,762.334433 micro grams = 11.5895 pounds.

Gasoline weight = 5.93 to 6.42 pounds

11.5895 / 5.92 = 1.96 gallons
11.5895/ 6.42 = 1.81 gallons

Minimum Removal – 1.81 Gallons
Maximum Removal –1.96 Gallons

Note: All air calculations are based on one air analysis collected during the quarterly time period.

8th Quarter System Operation

LNAPL MASS REMOVAL CALCULATIONS

Air Treatment System Information:

Carbon Adsorption

Operating minutes:	128,931.6
Blower CFM:	250 cfm
Influent TPH:	ND (< 4.9 ppmV)

Conversions:

1 Cu. Ft. = 28.3168466 (L) Liters.

250 CFM = 7079.21165 (L/M) Calc: (250x28.3168466)

912,734,084.773 Liters Calc: (7079.21165L/M x 128931.6 Minutes)

0 micro grams removed in total

No removal took place through air extraction during the period.
On June 28th, the Oil / Water Separator in the treatment unit was cleaned.
20 gallons of product were removed / recovered from the unit.

Note: All air calculations are based on one air analysis collected during the quarterly time period.

LNAPL RECOVERY

Evaluation

Eight Quarters of Operation

Based on treatment process air samples, the system has removed between 53.97 gallons and 56.84 gallons of LNAPL during the period. Cumulatively, the system has removed between 1,225.23 gallons and 1,327.36 gallons of LNAPL in 12,738.50 hours of service, which represents a minimum of 0.096 gallon per hour removal rate and a maximum 0.10 gallon per hour removal rate.

Since December 2010, contaminates within the extracted air stream are being treated through vapor phase carbon vessels. Prior to that date, contaminates within the extracted air stream were being thermally destroyed by a thermal oxidation unit. MW-01's plan of action, combined with the increased percentage of time the system operates during each period, should maximize LNAPL recovery based on the current system design. Shaw will investigate other recovery methods that may further optimize removal of LNAPL.

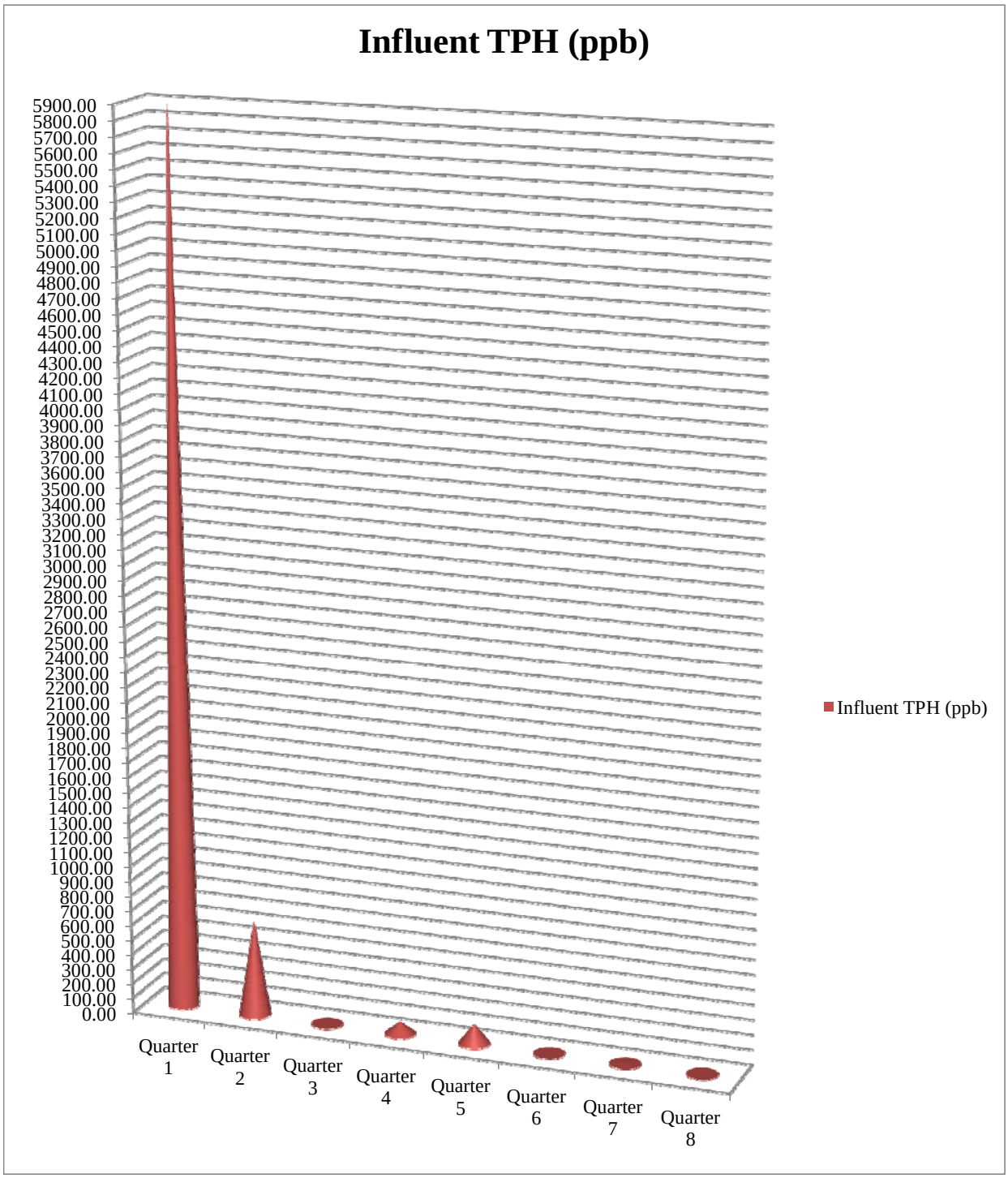
INFLUENT TPH CONCENTRATIONS

Chart, Graph

And

Evaluation

FORT HAMILTON INFLUENT TPH SAMPLE TRACKING								
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 5	Quarter 6	Quarter 7	Quarter 8
Influent TPH (ppb)	5900.00	640.00	ND	78.00	130.00	ND	5.70	ND



INFLUENT TPH CONCENTRATIONS

Evaluation

Eight Quarters of Operation

Influent TPH concentrations have plummeted since operations started in 2009. Given the continued presence of LNAPL within MW-1, it appears that the low concentrations are possibly occurring as the result of a lack of capture of the source areas. Focus of extraction in MPE-2 and MW-5 should increase concentrations until LNAPL in the MW-1 area has been removed.

SECTION 4

(Summary of Evaluations)

(Operational Recommendations)

SUMMARY OF EVALUATIONS

Fifth through Eighth Quarters of Operation

The equipment currently in operation within this treatment system is working normally and all pressure and hydraulic restriction problems have been eliminated. Possible breaches within the underground extraction piping have not impacted operations to date. Although not a direct downward trend, LNAPL presence within MW-1 has decreased and VOC concentrations in remaining wells are reducing. Approved strategic extraction operations and high volume purging of MW-01 and MW-05 should increase influent TPH concentrations to the treatment system, and accelerate the removal of LNAPL in the MW-1 and MW-5 area.

Overall, the system is operating well and run times have increased to the upper ninetieth percentile.

OPERATIONAL CHANGES FOR THE UPCOMING OPERATIONAL YEAR

1. All extraction wells except MPE-2 and MW-05 have been shut down in order to supply MPE-2 with more vacuum so as to help accelerate LNAPL removal and BTEX, VOC reduction processes at MW-01 and MW-05.
2. High volume purging of MW-01 and MW-05 will become a routine procedure in order to assist the LNAPL removal and BTEX, VOC reduction processes.
3. Inspection of LNAPL accumulation within the OWS unit will increase to remove LNAPL and to detect problems within the unit.
4. Continue investigations as to how the LNAPL removal process can be maximized.

SECTION 5

PHOTOGRAPHS

PHOTOGRAPH 1

Extraction Well Surface Piping

(All wells are identical)

PHOTOGRAPH 2 & 3

Vacuum Extraction Blower and Motor

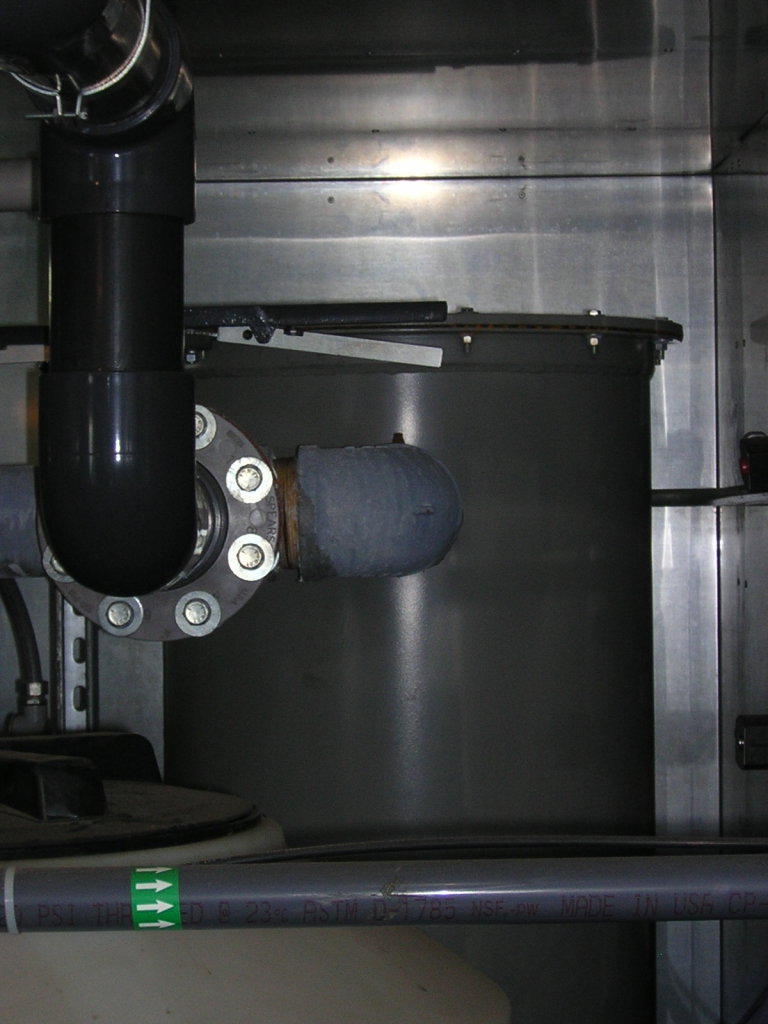
HOT
CAUTION
CAUTION

DANGER
HOT

PHOTOGRAPH 4 & 5

Knock-out Tank

TIGHT CONDUIT — SUNLIGHT RESISTANT


PSI THR ED @ 23° ASTM D-1785 NSF-pw MADE IN USA

PHOTOGRAPH 6

Moisture Separator Tank

PHOTOGRAPH 7 & 8

Vapor Carbon Units

PHOTOGRAPH 9

Oil Water Separator Holding Tank

PHOTOGRAPH 10

Oil Water Separator Unit

PHOTOGRAPH 11

Oil Water Separator Discharge Pump

Krystil Klear Filtration
800-869-0325
Phone 574-278-7161
Fax 574-278-7118
Indiana,
USA

PHOTOGRAPH 12

LNAPL Receiving Drum

OUTLET

PHOTOGRAPH 13

Filter Bag Units

OUTLET

PHOTOGRAPH 14

Air Stripping Unit

OUTLET

PHOTOGRAPH 15

Air Stripping Unit Discharge Pump

RELIANCE
MOTOR SER.
SERIAL NO.

PHOTOGRAPH 16

Air Stripping Unit Blower

PHOTOGRAPH 17

Liquid Phase Carbon Vessels

And Modified Piping

SOLBERG
INLET
SIEMENS

PHOTOGRAPH 18

1/5” Diameter Trident Water Meter

From Shaw Stock

neptune
GALLONS
MADE IN U.S.A.
319354-54
ASTM D2572

PHOTOGRAPH 19

Redux 390 Injection System

REDUX-525
REDUX TECHNOLOGY
REDUX-525