Fourth Five-Year Review Report

for the

Moss-American Superfund Site
Milwaukee
Milwaukee County, Wisconsin

Prepared by:

U.S. Environmental Protection Agency
Region 5

Chicago, Illinois

Approved by:

Richard C. Karl, Director
for Superfund Division

Date:

3/18/2015

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BTEX	Benzene, Toluene, Ethyl Benzene, and/or Xylene(s)
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
Corps	U.S. Army Corps of Engineers
CPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon(s)
ECLR	Estimated Lifetime Cancer Risk
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ICs	Institutional Controls
KMC	Kerr-McGee Chemical Corporation
LTTD	Low Temperature Thermal Desorption
LTS	Long-Term Stewardship
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NPL	National Priorities List
NR	Wisconsin Natural Resources Rule Citation
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon(s)
PALs	Preventive Action Limits
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCL	Residual Cleanup Level
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSE	Remedial System Evaluation
SDWA	Safe Drinking Water Act
SSC	State Superfund Contract
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources

EXECUTIVE SUMMARY

The United States Environmental Protection Agency (EPA), in consultation with the Wisconsin Department of Natural Resources (WDNR), has completed the fourth five-year review (FYR) at the Moss-American Superfund site (Site) located in Milwaukee, Milwaukee County, Wisconsin. The purpose of a FYR is to review available information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this policy FYR was the signing of the previous FYR report on March 29, 2010.

The 88-acre Moss-American site is located in northwestern Milwaukee and is comprised of a former wood-treating facility plus several miles of the Little Menomonee River and its adjacent floodplain. (See Figure 1). From 1921 to 1976, T. J. Moss Tie Company and successor owners conducted wood-treating operations at the Site, causing polycyclic aromatic hydrocarbon (PAH) contamination of soil, groundwater, and sediment. In 1984, EPA placed the Site on the National Priorities List (NPL).

In September 1990, EPA signed a Record of Decision (ROD) to select a remedy for the Site. The cleanup was then completed in a series of phases, the first addressing contamination at the wood-treating facility property and the last addressing contaminated sediments of the Little Menomonee River. In March 1996, EPA, the State of Wisconsin, and potentially responsible party (PRP) Kerr-McGee Chemical Corporation (KMC) entered in to a consent decree (CD) requiring KMC to complete the remedial design and remedial action at the Site. From 1995-1998, KMC operated extraction wells to collect and remove free product (creosote). KMC installed a funnel-and-gate system to address contaminated groundwater in 1999-2000 and conducted thermal desorption soil treatment efforts from mid-2001 to early 2002. Lastly, contaminated sediments were removed from five segments of the Little Menomonee River beginning in late summer 2002 until completion in November 2009. During the cleanup, EPA modified the 1990 ROD remedy through an April 1997 Explanation of Significant Differences (ESD), a September 1998 ROD Amendment, and a November 2007 ESD.

In November 2009, EPA issued a Preliminary Close-out Report (PCOR) for the Site, which signified that construction of all response activities had been substantially completed. Currently, EPA and WDNR are working to optimize the efficiency of the groundwater treatment system.

Based on EPA's review, the remedy is protective of human health and the environment in the short term. Contaminated soils and sediments have attained cleanup goals and there is no current human exposure to contaminated groundwater. Institutional controls (ICs), in the form of deed restrictions, have been recorded to limit future re-use of the former wood-treating site and the floodplain downstream of the former facility. Long-term protectiveness requires additional remedial action to groundwater in order to achieve the cleanup standards and ensuring effective ICs are implemented, monitored, maintained, and enforced. To that end, additional IC evaluation actions such as review of title work and finalizing an ICs map will be performed. Also, long-term stewardship procedures will be developed and implemented through revision of the Operation and Maintenance (O&M) Plan. Long-term stewardship involves assuring effective procedures are in place to properly maintain and monitor the Site. Long-term stewardship will ensure effective ICs are maintained and monitored and the remedy continues to function as intended with regard to ICs.

EPA will conduct the next FYR at the Site five years after completion of this review because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

Site Location

Superfund
U.S. Environmental Protection Agency

Moss American Kerr-McGee
Milwaukee County, WI

EPA ID# WID039052626

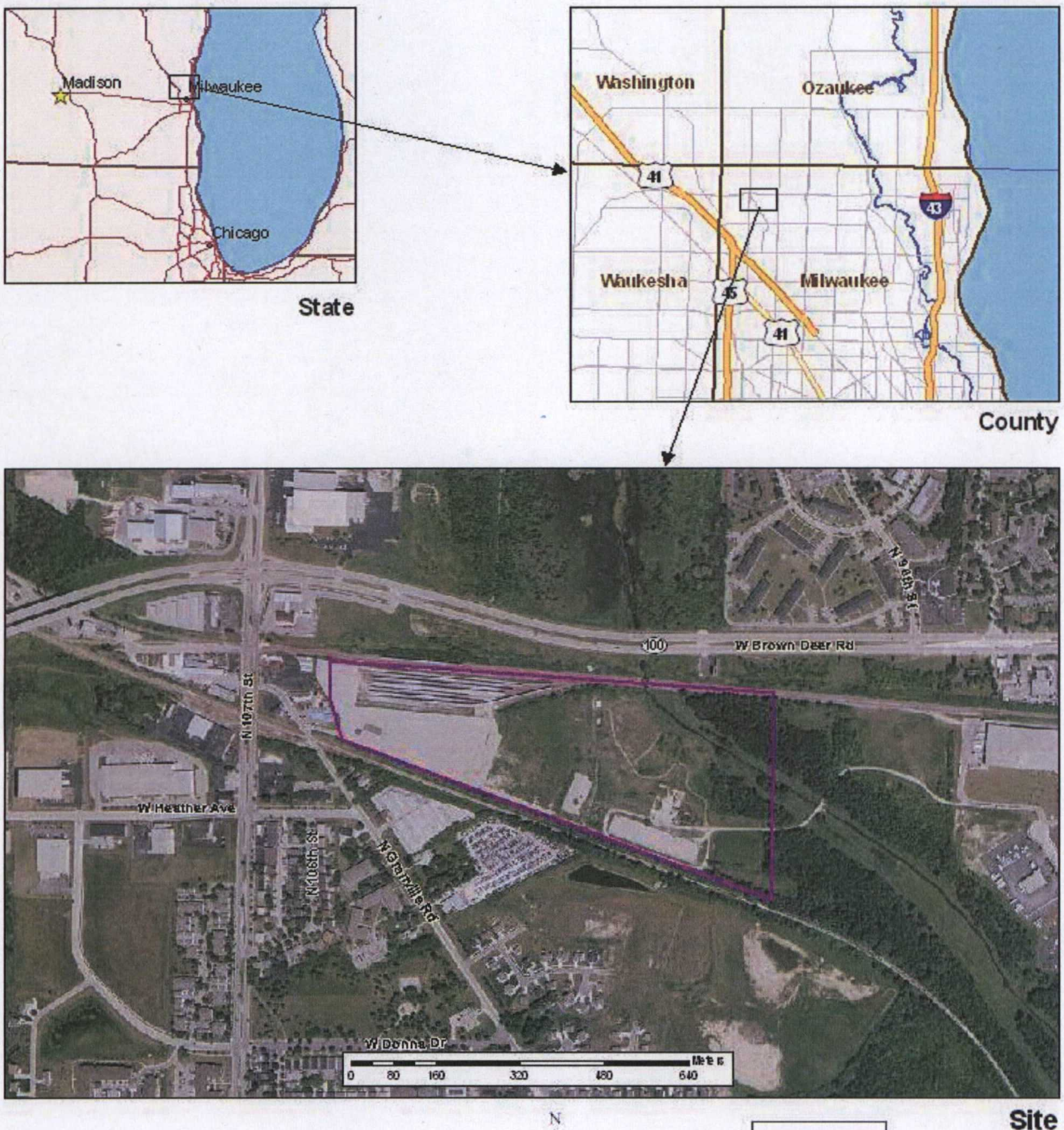


Figure 1

Produced by Angela Rozinski
U.S. EPA Region 5 on December 10, 2009
Image Date: 2009

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at anytime.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Moss-American Superfund Site		
EPA ID: WID039052626		
Region: 5	**State:** WI	**City/County:** Milwaukee/Milwaukee (both city and county)
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Ross del Rosario		
Author affiliation: EPA		
Review period: 6/4/2014 - 3/17/2015		
Date of site inspection: 7/16/2014		
Type of review: Policy		
Review number: 4		
Triggering action date: 3/29/2010		
Due date ***(five years after triggering action date)*****:** 3/29/2015		

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 01/Sitewide	**Issue Category: Remedy Performance**			
	Issue: The groundwater cleanup goals have not yet been met.			
	Recommendation: The State should consider implementing the recommendations of the 2011 Remedial Systems Evaluation Report (U.S. Army Corps of Engineers) to address remaining groundwater contamination and achieve current groundwater cleanup standards.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	12/31/2016

OU(s): 01/Sitewide	**Issue Category: Institutional Controls**			
	Issue: Effective ICs must be monitored, maintained, and enforced. Long-term stewardship of ICs has not been addressed.			
	Recommendation: Review title work and prepare a final ICs map. Develop and implement long-term stewardship procedures through revision of the O&M Plan.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	03/29/2017

OU1 & Sitewide Protectiveness Statement

Protectiveness Determination:
Short-term Protective

Protectiveness Statement:
The remedy is protective of human health and the environment in the short term because it is functioning as intended. Contaminated soils and sediments have attained cleanup goals and there is no current human exposure to contaminated groundwater. ICs, in the form of deed restrictions, have been recorded to limit future re-use of the former wood-treating site and the floodplain downstream of the former facility. Long-term protectiveness requires additional remedial action to groundwater in order to achieve the cleanup standards, and ensuring effective ICs are implemented, monitored, maintained, and enforced. To that end, additional IC evaluation activities such as review of title work and finalizing an ICs map will be performed. Also, long-term stewardship procedures will be developed and implemented through revision of the O&M Plan. Long-term stewardship involves assuring effective procedures are in place to properly maintain and monitor the Site. Long-term stewardship will ensure effective ICs are maintained and monitored and the remedy continues to function as intended with regard to ICs.

I. INTRODUCTION

The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

EPA conducts FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action."*

EPA conducted a FYR on the remedy implemented at the Moss-American Superfund site in Milwaukee, Milwaukee County, Wisconsin. EPA is the lead agency for developing and implementing the remedy for the Site. WDNR, as the support agency representing the State of Wisconsin, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the fourth FYR for the Site. The triggering action for this policy review is the completion date of the previous FYR report, dated March 29, 2010. This FYR is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for UU/UE. The Site consists of one operable unit (OU), which is addressed in this FYR report.

II. PROGRESS SINCE THE LAST REVIEW

EPA and WDNR undertook no significant remedial action activities at the Site since the previous FYR, but from July to November 2011, EPA completed several punch-list tasks that were not completed during the 2009 river dredging work. These tasks included the removal of soil piles, concrete/jersey barriers, leftover pipe and equipment, a concrete pad, and a temporary storage and/or staging area. EPA also removed a temporary river crossing at the request of WDNR. Also in 2011, WDNR assumed responsibility for O&M at the Site. At that time, EPA and WDNR agreed to temporarily shut down the groundwater treatment system to determine how groundwater quality would react to reducing the amount of available oxygen in the funnel and gate area.

Table 1 lists the protectiveness statement for the Site made in the 2010 FYR report and Table 2 lists the status of recommendations or follow-up actions.

Table 1: Protectiveness Determination/Statement from the 2010 FYR report

OU #	Protectiveness Determination	Protectiveness Statement
01 (Sitewide)	Short-term Protective	The remedy at the Moss American Superfund Site currently protects human health and the environment in the short term. Contaminated soils and sediments have attained cleanup goals, and there is no current human exposure to contaminated groundwater. ICs, in the form of deed restrictions, have been recorded to limit the use of the former wood treating site and along the floodplain downstream of the plant. Long-term protectiveness will require achieving groundwater cleanup standards and compliance with effective ICs. In addition, current ICs will be reviewed and additional IC evaluation activities will be conducted to ensure that effective ICs are in place, maintained, monitored, and enforced. Although current data suggests site groundwater is meeting cleanup standards prior to discharging to the Little Menomonee River, there are areas within the funnel and gate that have elevated COC levels. To address this concern, an optimization study will be performed on the system to develop a solution to remediate the elevated COC levels at those locations.

Table 2: Status of Recommendations from the 2010 FYR report

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
01	The funnel and gate groundwater treatment system may not be optimally capturing the groundwater contamination	Conduct optimization study to determine solution to elevated levels of COCs in local area of funnel and gate	PRP	EPA	4/15/2012	Completed	3/22/2011
01	There is no IC Plan to ensure all necessary Site ICs are in place and effective in the long term.	Develop IC Plan to determine if ICs in effect are protective.	PRP	EPA	4/15/2012	Completed	9/2/2010

Recommendation 1

In March 2011 the U.S. Army Corps of Engineers (Corps), on behalf of EPA, completed a Remediation System Evaluation (RSE) at the Site that was designed to help improve the effectiveness, reduce operational costs, and improve technical operation of the groundwater funnel-and-gate cleanup system (see Attachment 1). The Corps recommended in the RSE report that EPA modify the groundwater monitoring program and perform additional investigations involving nonaqueous phase liquids (NAPLs), the source of Site-area groundwater contamination. Depending on the results of the NAPL characterization studies, the Corps recommended that one of the following treatment modifications be implemented:

- Excavate NAPL-impacted soil near a stagnant zone in the groundwater treatment area and apply subsurface amendments to the excavated area to further mitigate remaining contaminants; or

- In addition to excavating NAPL-impacted soil and using subsurface amendments, install an additional groundwater treatment gate in the northwest corner of the treatment area.

In July 2012, WDNR agreed to implement the Site characterization work described in the RSE report. Initial results of Site characterization work are included a State report dated October 2, 2013. Currently, WDNR is working to complete all the Site characterization work recommended in the RSE report.

Recommendation 2

After completing the third FYR report on March 29, 2010, EPA began a review of all ICs at the Site. In its review, described in a technical memorandum dated September 2, 2010 (see Attachment 2), EPA found that a total of four ICs in the form of deed restrictions are recorded on the Site – three on the former wood-treating facility property only, while the fourth deed restriction applies to the whole Site, including a 5-mile stretch of the Little Menomonee River and its floodplain. The deed restriction covering the river and its floodplain were recorded by Milwaukee County. EPA later discovered that three parcels of land within the floodplain were not owned by the county and, therefore, were not covered by the fourth deed restriction. However, governmental controls do cover these properties. MILWAUKEE, WIS., CODE §§ 225-22, 225-23 and 225.39 (2012) include requirements for connections to the city water supply and private well abandonment.

After reviewing all available information, EPA determined that additional deed restrictions were not necessary for the three privately-owned parcels for the following reasons:

- The potential for future groundwater use is low. The area surrounding the three privately-owned parcels is served by the Milwaukee public water supply. City code mandates that every building intended for human habitation or occupancy located adjacent to a sanitary sewer, storm sewer or water main be connected to them; and wells on premises served by the municipal water system must be abandoned unless the city issues a permit after testing. One of the parcels is zoned parkland, making future residential development highly unlikely;

- Groundwater around the former wood-treating facility flows in a northeasterly direction (towards the river) and the three parcels are located south of the facility, which is upgradient of contaminated groundwater originating from the site. Consequently, site-related contaminants are not expected to be in the groundwater beneath the three parcels;

- The baseline risk assessment in the Site Remedial Investigation (RI) report found that a complete pathway for exposure through consumption of groundwater was not present. Thus, the actual risks posed by groundwater to nearby residents were minimal;

- Groundwater contamination at the site extended to a maximum depth of 20 feet below ground, limited to a 400-foot wide area near the processing area of the former wood-treating facility. According to the RI report, the upper aquifer where the contamination is found does not have the capacity to be a drinking water source. The intermediate and lower aquifers, which are capable of being a drinking water source, have not been shown to be contaminated; and,

- No Site remedial action components are located on the three privately-owned parcels.

Institutional Controls

ICs are required for the Site to ensure the protectiveness of the remedy. ICs are non-engineered instruments (such as administrative and/or legal controls) that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for UU/UE. Table 3 (next page) summarizes the implemented and planned ICs at the Site. A draft map showing the area in which the ICs apply is included in Attachment 3. EPA or the State will prepare a final ICs map (see Section V – Issues/Recommendations).

The 1990 ROD requires ICs as a part of the remedy and calls for fencing the area and placing deed restrictions to prevent future redevelopment of the Site. The 1996 CD with KMC described deed restriction requirements in detail. Specifically, Appendix 6 of the (KMC) CD stipulated the following restrictions applicable to the entire Moss American site:

1. Any use of the site that interferes with implementation of the response action, impairs the effectiveness of any work performed, or damage any component of the remedy constructed pursuant to the ROD, CD, or SOW, is prohibited;
2. The installation, construction, or removal of any buildings, wells, piping, roads, ditches, or any structures is prohibited, except as approved by EPA and consistent with the CD and ROD: and
3. Applicable laws and regulations governing wetland and floodplain habitats shall be complied with.

Table 3: Summary of Implemented and Planned ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective(s)	Title of IC Instrument Implemented and Date (or planned)
Soil	Yes	Yes	Former wood treating Site - floodplain portion (County-owned)	Prohibit 1) Excavating or grading of land surface 2) penetration of existing cap(s)/cover(s) 3) Filling on covered areas 4) Construction, installation, or removal of a building, pipe, road, or any structure with a foundation that would sit on the cover 5) Plowing for agricultural cultivation 6) Extraction of groundwater for consumption or any purpose other than monitoring 7) Any activity that may damage any constructed remedy or impair its effectiveness. Limited to recreational use only.	Title: *Declaration of Restrictions and Notice to Future Purchasers*. Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931311.
Soil	Yes	Yes	Former wood treating Site – Non-floodplain property (County-owned)	Prohibit non-industrial use. Prohibit 1) Excavating or grading of land surface 2) penetration of existing cap(s)/cover(s) 3) Filling on covered areas 4) Construction, installation, or removal of a building, pipe, road, or any structure with a foundation that would sit on the cover 5) Plowing for agricultural cultivation 6) Extraction of groundwater for consumption or any purpose other than monitoring 7) Any activity that may damage any constructed remedy or impair its effectiveness.	Title: *Declaration of Restrictions and Notice to Future Purchasers*. Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931310.
Soil	Yes	Yes	Former wood treating site – Non-floodplain property owned by the railroad	Prohibit non-industrial use. Prohibit 1) Excavating or grading of land surface 2) penetration of existing cap(s)/cover(s) 3) Filling on covered areas 4) Construction, installation, or removal of a building, pipe, road, or any structure with a	Title: *Deed Restriction and Notice to Future Purchasers.* Recorded in Milwaukee County Register's Office on July 26, 2000. Reference No. 8756

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective(s)	Title of IC Instrument Implemented and Date (or planned)
				foundation that would sit on the cover 5) Plowing for agricultural cultivation 6) Extraction of groundwater for consumption or any purpose other than monitoring 7) Any activity that may damage any constructed remedy or impair its effectiveness. Limited to industrial use only.	
Soil	Yes	Yes	Floodplain downstream from former wood treating Site	Prohibit any installation, construction, or removal of structures around areas remediated during response action (i.e., areas rerouted). Prohibit use of area for any activity that may damage or impair the response action.	Title: *Amended Declaration of Restriction on Use of Real Property.* Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931309
Groundwater	Yes	Yes	Former wood treating Site	Prohibit consumption or other uses of groundwater. Note: No one in the area currently is using groundwater. Residents are connected to city water. According to the RI, the contaminated shallow groundwater does not have adequate capacity to be a drinking water source. Prohibit extraction of groundwater for consumption or any purpose other than groundwater monitoring or remediation.	Title: *Amended Declaration of Restriction on Use of Real Property.* Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931309. Also see Reference Nos. 791311 and 791310 above.
Groundwater	Yes	Yes	Entire Site including the three privately-owned parcels downstream from the former wood treating site	Requires abandonment or permits for wells on parcels connected to the public water supply and connection of sold parcels adjacent to water main.	MILWAUKEE, WIS., CODE §§ 225-22, 225-23 and 225-39

In addition to the site-wide restrictions specified above, Appendix 6 of the CD described additional restrictions that applied only to the former wood preserving facility and those portions of the Site that contained trenches, collection basins, or treatment systems and the future landfill cover. These additional restrictions are as follow:

1. Use of groundwater in these areas is prohibited;
2. There shall be no residential use of the former wood preserving plant property;
3. Activities involving people are prohibited on those portions of the site described above, except as part of implementing and maintaining the remedial action called for in the ROD and CD; and
4. Penetration of the installed cover is prohibited, including but not limited to any excavation, drilling, mining, piercing, digging, or boring.

In 1996, both the county and the railroad entered into CDs with EPA to repay EPA's past costs at the Site and both the county and railroad recorded deed restrictions incorporating language largely identical to what was contained in Appendix 6 of the (KMC) CD, prohibiting activities that may interfere with the cleanup of the site, preventing any construction/installation/removal of buildings, pipes, roads or other structures on property without approval by EPA, prohibiting the consumption or use of groundwater at the former wood preserving site, and prohibiting excavating, drilling, piercing, digging, or boring of the soil cover. In 2000, the ICs for the former wood preserving plant property were updated by the county and railroad to reflect the intended uses of specific areas of the site: 1) recreational use throughout the floodplain areas of the river and 2) industrial use for the non-floodplain portions of the former wood preserving plant. These updated ICs were consistent with the 1998 ROD Amendment providing for industrial use of the former wood treating site, thereby allowing worker direct contact with contaminated soil cleaned to non-residential standards, as long as appropriate ICs were in place and applied.

As presented in Table 3, there are four deed restrictions in place, covering the following areas of the Site:

1. Areas of the former wood preserving plant currently owned by the railroad;
2. Areas of the former wood preserving plant, not on the floodplain, owned by the county;
3. Areas of the former wood preserving plant, located along the floodplain, owned by the county; and
4. The floodplain areas along the Little Menomonee River, owned by the county, starting outside of the former wood preserving plant and stretching all the way to the confluence with the Menomonee River.

The deed restriction for the floodplain portion of the former wood preserving plant limits usage to recreational use. The other two deed restrictions related to the former wood preserving plant, except the floodplain portion, limit the land to industrial use. The deed restriction applicable to the river floodplain outside of the former wood preserving plant is located primarily along a public parkway (Little Menomonee River Parkway). In 2014, the State of Wisconsin reviewed the enforceability of the deed restrictions and determined they were enforceable under State law. Consequently, an amendment to the language in the document was not necessary to ensure that the public is protected and that the remedy remains effective.

While it appeared the four deed restrictions are adequate in minimizing the potential for nearby residents from being exposed to site-related contaminants and protect the integrity of the remedy, the previous FYR report (2010) found that a few sections of the Site were not covered by some form of IC. Specifically, two parcels owned by the City of Milwaukee and a parcel located on a residential lot, all three located just south of the former wood preserving plant, do not have any type of IC. However, as stated above, a city ordinance requires abandonment or permitting of wells on parcels connected to the city water supply. See MILWAUKEE, WIS., CODE §§ 225-22, 225-23 and 225.39 (2012). Also, groundwater restrictions are not needed for areas outside the former wood preserving plant property and these parcels do not contain remedial components.

As State law cited in the ICs changed since they were recorded, EPA asked WDNR to review the ICs for enforceability under current State law. By letter dated November 7, 2014, WDNR considered the language of the 1996 and more recent ICs recorded at the Site and opined that deed restrictions appear validly constructed and can be reasonably expected to remain enforceable and that the changes in statutory construction would not alter the force of the deed restrictions. Similarly, a 2012 settlement (in the Tronox, Inc. bankruptcy matter) that, among other things, released KMC's successor from the 1996 CD, did not alter the construction and enforceability of the recorded ICs.

The Moss-American Superfund site was declared "site-wide ready for reuse" on May 5, 2011.

Current Compliance

Compliance with ICs is required to ensure long-term protectiveness. Based on recent inspections and interviews, there are no known ICs compliance issues at the site. While the non-floodplain portion of the site, which lies within the former wood preserving plant property, can be used for industrial purposes consistent with the 1998 ROD Amendment and recorded ICs, recent inspections of the property revealed no such activities were occurring. Also, a representative from the railroad told EPA it has no plans to resume the railroad/freight activities on its portion of the property.

Long-term Stewardship

Long-term protectiveness requires compliance with effective ICs to ensure that the remedy continues to function as intended. Long-term protectiveness will be assured by conducting IC evaluation activities, including long-term stewardship procedures. Long-term stewardship will assure that effective ICs will be maintained, monitored and enforced. To achieve this goal, the existing O&M Plan will be reviewed and updated to incorporate long-term IC stewardship procedures such as regular inspection of ICs at the site and annual certification to EPA that ICs are in place and effective. EPA will also explore developing a communications plan and using the State's one call system.

Additional IC Follow-up Actions To Be Conducted

In addition to implementing long-term stewardship procedures, follow-up actions are required to assure the remedy remains protective. These additional IC evaluation activities will include review of title work and preparing a final ICs map.

System Operation/Operation and Maintenance (O&M) Activities

WNDR assumed responsibility for O&M duties in 2011 (Attachment 4) and has conducted the following activities at the Site:

- In consultation with EPA, WDNR shut down the groundwater treatment system in 2011 to determine the effects of reduced oxygen availability in the treatment zone of the funnel-and-gate system. The system is still shut down, pending review of the groundwater data; and,
- WDNR collected soil and groundwater samples in 2013 and 2014 as part of characterization work recommended by the Corps' RSE report (see Attachment 5).

The State also conducts routine maintenance activities at the site, including mowing and maintaining the Site fence.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

EPA notified the State that it was initiating the FYR on June 5, 2014 (see Attachment 6). The review was led by Ross del Rosario, EPA's Remedial Project Manager (RPM) for the Site and Susan Pastor, the Community Involvement Coordinator (CIC). Tom Wentland (WDNR) assisted in the FYR as the representative for the support agency.

The FYR consisted of the following components:

- Community involvement;
- Document review;
- Data review;
- FYR site inspection; and
- FYR Report development and review.

Community Notification and Involvement

EPA initiated activities to involve the community in the FYR process on June 5, 2014, when the CIC informed the RPM of her intent to update the Agency's web page for the Site (www.epa.gov/Region5/sites/mossamerican), which she then completed in August 2014. EPA also placed a newspaper ad in a local paper and contacted the local public library to ensure the repository at that location continued. EPA published a notice in the *Milwaukee Journal Sentinel*, on August 8, 2014, stating that it was beginning a FYR and inviting the public to submit any comments to EPA (Attachment 7). EPA will place the completed FYR report in the Site information repository located at the Mill Road Library, 6431 N. 76th Street, Milwaukee, Wisconsin, and on the Site webpage.

Document Review

The RPM reviewed certain Site documents for this FYR, including the September 1990 ROD, the 1997 ESD, the 2007 ESD, the 1998 ROD Amendment, the previous (2010) FYR report, relevant State laws and regulations, existing ICs, the 2011 RSE report (Corps), monitoring data collected by the State in 2008, 2013 and 2014 (Attachment 5), the November 2014 letter from WDNR, and the Milwaukee Code of Ordinances. Applicable groundwater cleanup standards, as listed in the 1990 ROD, were also reviewed.

Data Review

Contaminated soils and sediments have attained cleanup goals and there is no current human exposure to contaminated groundwater. The only remaining media to address at the site is groundwater. Groundwater monitoring data were collected from 2000 to 2009, prior to the Tronox, Inc. bankruptcy filing, and in 2010 and 2013 following the filing. EPA performed a trend analysis of the 2000 to 2009 groundwater data as part of the previous (2010) FYR report. That analysis suggested an upward trend in concentrations for a handful of contaminants at certain wells (e.g. MW-34S – see Figure 2).

Table 4 (next page) summarizes the levels of contamination found in the groundwater for selected monitoring wells and contaminants of concern (COCs) in the 2008, 2010, and 2013 sampling surveys. In general, the data suggest groundwater quality improved from 2008 to 2013, although exceedances of the State's cleanup standards are still evident at these selected wells. In particular, monitoring well MW-34S, located on the north side of the former wood preserving plant property, continues to show multiple exceedances of cleanup standards for the PAH compounds naphthalene, benzo(a)pyrene, chrysene, and anthracene and with benzene.

The State conducted a groundwater survey in 2013 and concluded the following:

1. Total PAH concentrations have decreased at all on-Site sample locations since September 2010;
2. Free-phase product (DNAPL) is still present at MW-34S and TG1-1; however, no indication of free-phase product was present at MW-7S where an oily sheen was observed in September 2010;
3. Low-level groundwater impacts were detected at wells located further downstream along the Little Menomonee River where no PAH impacts were identified in 2010. The water samples contained traces of sediment, which may have contributed to this anomaly;
4. The sheet pile containment system (funnel) continues to be effective in preventing contaminated groundwater from discharging directly to the river without first going through the treatment gates;
5. Based on one round of data from newly-installed wells located immediately outside of the sheet pile, there is no evidence of a groundwater plume existing outside of the containment area.

A comparison of groundwater data taken prior to shutdown (2010) and post-shutdown (2013) indicates no degradation in groundwater quality; in fact, data show a slight improvement in groundwater quality (see Table 4). The site's monitoring well network is shown in Figure 2.

The State plans to conduct further groundwater and DNAPL characterization work in 2015. Upon completion of this work, the State will propose to EPA various options for meeting groundwater cleanup goals. These options are expected to be similar to those recommended in the Corps' 2011 RSE report. In its RSE report, the Corps recommended various combinations of source removal, *in-situ* treatment, additional treatment gate(s), and expanding the existing containment wall. The estimated costs to implement these options ranged from about $200,000 to $979,000.

Site Inspection

EPA and WDNR conducted a FYR site inspection July 16, 2014 (see Attachment 8). RPM Ross del Rosario (EPA) and Tom Wentland (WDNR) attended. The purpose of the FYR site inspection was to assess the protectiveness of the remedy. To achieve this objective, the following activities were performed:

- Site reconnaissance (along the perimeter fence);
- Groundwater treatment building inspection;
- Location and identification of groundwater monitoring wells and the treatment gates associated with the groundwater treatment system;
- Confirmation that in 2011, EPA's contractor had removed designated soil piles, debris, and excess cleanup equipment; and,
- Verification that the temporary bridge crossing the river had been removed (per WDNR request).

The RPM took photographs of various parts of the Site during the inspection (see attached photos). Afterwards, the RPM sent WDNR a list of recommended "housekeeping" items, such as mowing, for WDNR to complete in the near term (Attachment 9). WDNR completed these tasks during the week of November 21, 2014.

Interviews

The RPM interviewed the WDNR representative during the Site inspection. The purpose of the interview was to document how well the O&M phase of the project was going, to ascertain whether improvements to groundwater quality have been observed since the 2010 FYR was completed, and to discuss the progress in implementing the recommendations in the Corps' 2011 RSE report. WDNR reported that its O&M activities were generally minimal after shutting down the groundwater treatment system in 2011, that additional soil and groundwater sampling will be performed by the State's contractor in 2014 as part of characterization work called for in the Corps' RSE report, and that groundwater quality improved slightly from 2010 to 2013. Other relevant information gathered during the interview included the following:

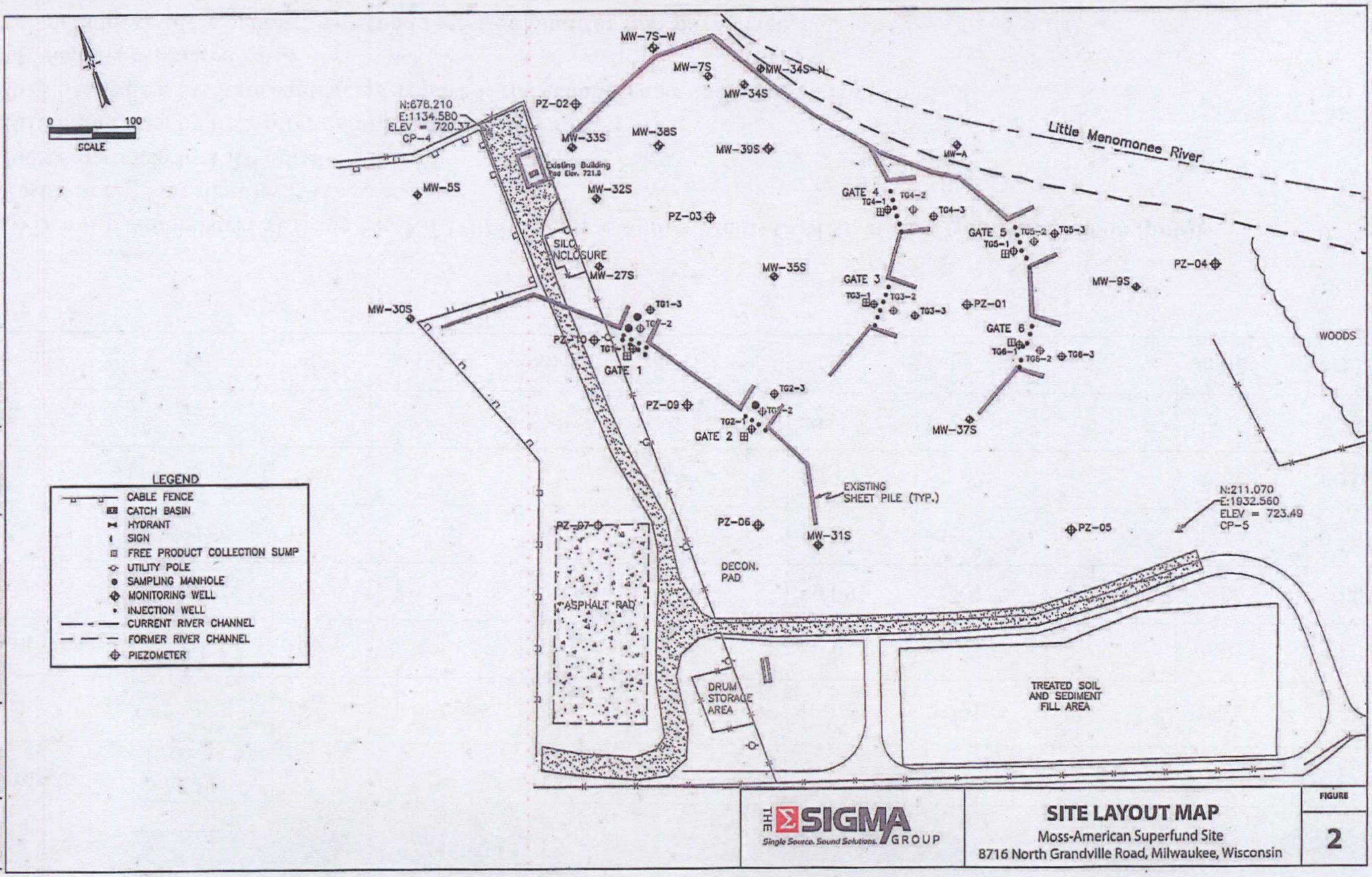
- The groundwater treatment building was vandalized sometime in 2011 or 2012. WDNR personnel noted the damages caused by the event and sent photographs to EPA to document the damage incurred;
- There is a need to mow the area around the groundwater treatment building and adjacent areas were monitoring wells are located; and
- There were no changes to State or local laws that impact the protectiveness of remedy at the Site.

Table 4: Comparison of groundwater data collected in 2008, 2010, and 2013

	WELL	MW-34S			MW-33S			MW-7S		
	YEAR	2008[3]	2010[4]	2013[5]	2008	2010	2013	2008	2010	2013
Contaminant	NR140 PAL (ppb)[1]									
Naphthalene	*10*	14,000[2]	11,000	4,100	76	100	0.201	22	1.6J[7]	0.43
Benzo(a)pyrene	*0.02*	160	120	<18[6]	--	<0.01	<0.018	--	<0.011	<0.018
Chrysene	*0.02*	480	0.061	<0.062	--	<0.061	<0.018	--	<0.065	<0.018
Benzene	*0.5*	7	6.2	7	--	<0.2	<0.27	0.9	0.9J	0.36J
Pyrene	*50*	2,400	1,400	222	--	<0.1	<0.025	--	<0.011	<0.025
Fluorene	*80*	2,500	1,700	330	--	49	0.251	--	1.5	0.83
Anthracene	*600*	840	450	88	1.1	0.62	0.132	--	<0.02	0.138

Notes:

1. **(Wisconsin Administrative Code Ch. NR 140) Preventive Action Limits (PALs), in μg/L (parts per billion (ppb))**
2. **Result in red font signifies PAL exceedance**
3. **2008 data taken by PRP (2010 FYR report)**
4. **2010 data taken by PRP after completion of 2010 FYR report**
5. **2013 data taken by State contractor as part of the groundwater optimization study**
6. **"J" denotes estimated value**
7. **"<" denotes result is below the method detection limit for that parameter**



0 100
SCALE
N:678.210
E:1134.580
ELEV = 720.37
CP-4
MW-7S-W
MW-7S
MW-34S-N
MW-34S
PZ-02
MW-33S
MW-38S
MW-39S
MW-A
Little Menomonee River
Existing Building
MW-5S
MW-32S
PZ-03
GATE 4
GATE 5
SILO INCLOSURE
MW-27S
MW-35S
GATE 3
PZ-01
MW-9S
PZ-04
WOODS
MW-30S
GATE 6
PZ-10
GATE 1
PZ-09
GATE 2
MW-37S
EXISTING SHEET PILE (TYP.)
N:211.070
E:1932.560
ELEV = 723.49
CP-5
PZ-07
PZ-06
MW-31S
PZ-05
DECON. PAD
ASPHALT PAD
DRUM STORAGE AREA
TREATED SOIL AND SEDIMENT FILL AREA
LEGEND
CABLE FENCE
CATCH BASIN
HYDRANT
SIGN
FREE PRODUCT COLLECTION SUMP
UTILITY POLE
SAMPLING MANHOLE
MONITORING WELL
INJECTION WELL
CURRENT RIVER CHANNEL
FORMER RIVER CHANNEL
PIEZOMETER
THE SIGMA GROUP
Single Source. Sound Solutions.
SITE LAYOUT MAP
Moss-American Superfund Site
8716 North Grandville Road, Milwaukee, Wisconsin
FIGURE
2

A summary of the State's responses to EPA's questions are included as part of the inspection report (see Attachment 10).

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Answer A: Yes. The groundwater treatment system (funnel-and-gate) was operating for approximately ten years until early 2011, when EPA and WDNR agreed to temporarily shut down the system to determine the effect of reducing the availability of oxygen in the treatment gates. A comparison of groundwater data taken prior to shutdown (2010) and post-shutdown (2013) indicates no degradation in groundwater quality; in fact, data show a slight improvement in groundwater quality (see Table 4). Groundwater monitoring will continue in the near future as part of the ongoing groundwater optimization work. In addition, all necessary ICs are in place and enforceable in compliance with the ROD. However, the O&M Plan will be updated to ensure that long-term stewardship procedures are developed and implemented so that ICs are properly maintained, monitored, and enforced and additional IC evaluation activities will be conducted.

The State now has the lead role in the project because it is in the O&M phase. Under the O&M plan, the State conducts required semiannual and annual groundwater monitoring and general Site maintenance tasks such inspection for vandalism, evaluating the conditions of the pumps and blowers, and mowing. The perimeter fencing at the Site is in generally good condition and all gates leading into the site are locked. There is only one access point to the site, through railroad-owned property, which requires advance notification to the railroad of intent to enter the Site. The other access point, on county property opposite the railroad property, was no longer available as of 2011 because EPA demolished the temporary river crossing used to enter the Site.

The State is working to optimize the Site groundwater treatment system under a July 2012 cooperative agreement between EPA and WDNR. EPA is providing oversight and funding support for this work. The State conducted fieldwork in 2013 based on the recommendations in the Corps' 2011 RSE report. One important finding during the 2013 survey was that the sheet piling installed along the river near the treatment area continues to prevent untreated groundwater contaminants from discharging into the river. The survey results assure EPA and WDNR that contaminated groundwater in the treatment area continues to be treated in the funnel-and-gate system prior to discharging into the river.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy section still valid?

Answer B: Yes. However, changes to the groundwater cleanup objectives are being considered in view of the anticipated future recreational or industrial uses of the Site. WDNR has proposed using alternative concentration limits (ACLs) in lieu of the current PALs required by the ROD. The ROD discusses establishing a Wisconsin ACL where it is not technically or economically feasible to achieve a PAL. The State's PALs, which are indicative of the presence of contaminants in the groundwater, are generally more restrictive than respective maximum contaminant limits (MCLs) under the federal Safe Drinking Water Act.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Answer C: No information has come to light to call into question the protectiveness of the remedy.

Technical Assessment Summary

EPA finds that the selected remedy, as constructed, is generally functioning as intended by the decision documents and no exposures to contaminated groundwater are occurring. Although the funnel-and-gate system was temporarily shut down in 2011, a comparison of groundwater data before and after the shutdown indicated no degradation in groundwater quality. Importantly, the sheet pile wall designed to prevent groundwater from entering the river before going through the treatment gates was found to be working as designed. Exposure assessments, toxicity data, and RAOs used at the time of remedy selection remain valid and are being addressed by the cleanup actions.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 01/Sitewide	**Issue Category:** Remedy Performance			
	Issue: The groundwater cleanup goals have not yet been met.			
	Recommendation: The State should consider implementing the recommendations of the 2011 Remedial Systems Evaluation Report (U.S. Army Corps of Engineers) to address remaining groundwater contamination and achieve current groundwater cleanup standards.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	12/31/2016

OU(s): 01/Sitewide	**Issue Category:** Institutional Controls			
	Issue: Effective ICs must be monitored, maintained, and enforced. Long term stewardship of ICs has not been addressed.			
	Recommendation: Review title work and prepare a final ICs map. Develop and implement long term stewardship procedures through revision of the O&M Plan.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	03/29/2017

VI. PROTECTIVENESS STATEMENT

OU1 & Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy is protective of human health and the environment in the short term because it is functioning as intended. Contaminated soils and sediments have attained cleanup goals and there is no current human exposure to contaminated groundwater. ICs, in the form of deed restrictions, have been recorded to limit future re-use of the former wood-treating site and the floodplain downstream of the former facility. Long-term protectiveness requires additional remedial action to groundwater in order to achieve the cleanup standards, and ensuring effective ICs are implemented, monitored, maintained, and enforced. To that end, additional IC evaluation activities such as review of title work and finalizing an ICs map will be performed. Also, long-term stewardship procedures will be developed and implemented through revision of the O&M Plan. Long-term stewardship involves assuring effective procedures are in place to properly maintain and monitor the Site. Long-term stewardship will ensure effective ICs are maintained and monitored and the remedy continues to function as intended with regard to ICs.

VII. NEXT REVIEW

The next FYR for the Moss-American Superfund Site is required five years from the completion date of this review.

A. SITE CHRONOLOGY

Table 5: Chronology of Site Events

Event	Date
Initial discovery of contamination	April 1971
Pre-NPL responses (State-enforced removal of creosote-contaminated soil and sediment)	1970s
NPL proposed listing	September 8, 1983
Site placed on NPL	September 21, 1984
RI/FS conducted	September 1985 to May 1990
Proposed Plan issued	May 29, 1990
Record of Decision (ROD) signed	September 27, 1990
RD/RA Consent Decree entered	March 29, 1996
First Explanation of Significant Differences (ESD) signed	April 29, 1997
ROD Amendment signed	September 30, 1998
Second ESD signed	November 28, 2007
Remedial Design Approvals - Free product - Funnel-and-gate system - Soil Low Temperature Thermal Desorption (LTTD) - Sediment (river segments)	 May 1995 September 1999 March 2000 - Segment 1 - September 2002 - Segments 2/3 - February 2004 - Segments 4/5 - March 2009
Remedial Action Construction - Groundwater funnel-and-gate installed - Soils LTTD work conducted - Sediment removal completed	 - November 1999 - June 2000 - May 2001- January 2002 - November 2009

Event	Date
First FYR Report signed Second FYR Report signed Third FYR Report signed	September 18, 2000 September 20, 2005 March 29, 2010
Prefinal Inspection Completed	November 20, 2009
Preliminary Closeout Report signed	November 25, 2009
Current Work - Develop IC Plan - Conduct Optimization Study	- Technical Memorandum (September 2010) - U.S. Army Corps of Engineers RSE Report (March 2011)
Fourth FYR Site Inspection	July 16, 2014
Site declared "site-wide ready for reuse"	May 5, 2011
Fourth FYR Report signed	(Pending)

B. BACKGROUND

Physical Characteristics

The 88-acre Moss-American site is located in the northwestern section of the City of Milwaukee (see Figure 1) and contains a former wood-treating facility plus several miles of the Little Menomonee River and its adjacent floodplain. The wood-treating facility property is bounded by the intersection of Brown Deer and Granville Roads on the west, and Brown Deer Road and 91st Street on the east. Twenty-three acres are industrially-zoned and owned by the Union Pacific Railroad, which recently has used this property as an automobile/light truck loading and storage area. Milwaukee County owns the remaining 65 acres, which contains part of the former wood-treating facility and parklands. Releases from the facility contaminated sediments of the adjacent Little Menomonee River. The property along that river's floodplain corridor is primarily owned by the County, and to a much lesser extent, the City of Milwaukee and private owners.

Hydrology/Hydrogeology

The Site is characterized by topographic features resulting from glacial processes. Local relief from the area is generally less than 100 feet, giving rise to rolling topography characteristic of glaciated areas. Average annual precipitation is between 29 and 30 inches with monthly averages ranging from 1.1 inches in February to 3.8 inches in July. The Little Menomonee River is a tributary to the Menomonee River, which discharges to the Milwaukee Harbor Estuary about 0.9 miles from Lake Michigan. The Menomonee River watershed includes approximately 137 square miles, with about 10 square miles belonging to the Little Menomonee River. Channelization has been carried out on approximately 80 percent of the perennial stream length of the watershed.

Three aquifers underlie the region: 1) sand and gravel, 2) dolomite, and 3) sandstone. The sand and gravel aquifer can be as thick as 250 feet in some areas, but varies in thickness by as much as 160 feet. The primary sources of the recharge to the sand and gravel aquifer are downward percolation of precipitation and surface water recharge from streams. The dolomite aquifer consists of Silurian- and Devonian-age dolomites, with groundwater flowing primarily through joints and bedding planes. Recharge results mainly from percolation through the overlying glacial deposits. The sandstone aquifer consists of the Cambrian- and Ordovician-age sandstones and dolomites. Recharge to that aquifer occurs primarily from percolation through overburden deposits 25 miles west of the Site, where the confining unit is absent.

Land and Resource Use

Wood-treating operations using creosote were conducted from approximately 1921 to 1976. Past site aerial photos showed that land usage patterns have changed considerably during that time. Photos from the 1930s to the 1950s showed the wood-treating plant operating in a relatively sparsely populated setting, with several farms surrounding the operations. From the 1960s to the present, residential and commercial use of nearby property increased considerably and agricultural and farming operations were phased out almost completely. Industrial parks and multi-lane highways also traversed the Site setting. County-owned land along the river corridor features recreational hiking and bicycle trails. These features have had a direct bearing on Site soil cleanup standards and sediment management at the Site.

Heavy commercial traffic presently surrounds the former wood treating facility. Retail establishments such as restaurants, home supply centers, auto dealerships, and repair shops dominate the nearby landscape. While the area is zoned primarily for commercial use, a heavy density of residential properties exists, with a few recreational areas (parks) abutting the commercial district.

The potential for Site groundwater use in the future is low given the availability of city water and a local ordinance requiring the abandonment or permitting of wells on parcels connected to the water main. In addition, the surficial upper aquifer (less than 20 feet below ground surface) where Site contamination is found does not have the capacity to be a drinking water source. ICs restrict groundwater use at the former wood preserving plant property.

History of Contamination

In 1921, the T. J. Moss Tie Company established a wood-preserving facility west of the Little Menomonee River. The plant preserved railroad ties, poles, and fence posts with creosote, a mixture of numerous chemical compounds derived from coal tar. While No. 6 fuel oil was also used, no evidence of pentachlorophenol usage was found. Creosote plant operations often contain storage facilities for creosote and fuels; a boiler for making steam, heating the creosote and applying the creosote to the wood; areas for unloading and storing incoming timbers; rail cars for transporting the creosote; and a drying area for subsequent storage. Creosote is the major source of PAHs, which comprise the main driver of risk at this site. Potential for release of PAHs existed throughout the storage, application, and drying processes.

From 1921 to 1971, the facility discharged wastes to settling ponds that ultimately discharged to the Little Menomonee River. These discharges ceased when the plant diverted its process water discharge to the Milwaukee sanitary sewerage system. Production ceased in 1976.

Kerr-McGee purchased the facility in 1963 and changed the facility's name to Moss-American. The name was changed again in 1974 to Kerr-McGee Chemical Corporation - Forest Products Division. The operator name changed to Kerr-McGee Chemical LLC (KMC) in 1998 and later became Tronox Inc., which Kerr-McGee had spun off in 2006, before Anadarko Petroleum Corp. purchased Kerr-McGee. In January 2009, Tronox filed for Chapter 11 bankruptcy. The federal government obtained settlements that addressed the Site on February 14, 2012, in the Tronox Inc. bankruptcy matter; and on January 21, 2015, in litigation with Anadarko Petroleum Corp.

Initial Response

Under a State order, KMC cleaned out eight former settling ponds and dredged about 1,700 feet of river to remove creosote-contaminated soil and sediment. From 1972 through 1973, three different dredging efforts were conducted in the Little Menomonee River within the first mile downstream of the facility.

In 1983, EPA proposed the Site for inclusion on the NPL. EPA placed the Site on the NPL in September 1984.

Basis for Taking Action

EPA conducted a baseline human health and ecological risk assessment as part of the remedial investigation effort for the Site. Major site contaminants fell into the chemical groups of PAHs and BTEX (benzene, toluene, ethylbenzene, xylene) compounds. PAHs are a primary component of creosote blends and have been associated with lung, stomach, and skin cancers. As for the BTEX compounds, benzene has been associated with occurrences of leukemia, while toluene and xylenes appear to cause depression of the human central nervous system.

According to the risk assessment, three exposure scenarios were defined to describe potential human exposures for current site conditions and potential future uses. These were:

- Site trespass (Current)
- Recreation use of the river (Current)
- Residential development (Potential)

Site Trespass – Soil

Risks associated with site trespass ranged from an excess lifetime cancer risk (ELCR) of 3×10^{-4} to 5×10^{-6}, with carcinogenic PAHs being the driving force on risk. Inhalation exposure had an ELCR less than 1×10^{-7}.

Recreational Use – River Sediment Exposure

Exposure to site sediments varied in each of the stream "segments" downstream from the former creosote processing area. The term "segment" denotes an area between major east-west highway bridges over the river at approximately one to one and a quarter mile intervals. Sediment exposure risks to humans were higher in segments 1, 2, and 3 - on the order of 1 x 10^{-4} ELCR due to CPAH exposure. In river segments 4 and 5, the ELCR dropped to 5 x 10^{-5} and 3 x 10^{-5}, respectively. Based on human exposure alone, exposure to CPAHs in sediment presented an ELCR at the upper (1 x 10^{-4}) range of EPA's acceptable risk range (1 x 10^{-6} to 1x 10^{-4}). However, sediments also presented an unacceptable risk to aquatic habitat. While not viewed as an applicable or relevant and appropriate requirement (ARAR) at the time of risk assessment, literature cited by WDNR indicated that 388 mg/kg (parts per million or ppm) of CPAHs in sediment should be a "to be considered" value for acceptable long-term aquatic habitat protection.

Residential Development – Soil

ELCRs associated with residential development ranged from 2 x 10^{-2} to 2 x 10^{-4}, with carcinogenic PAHs being the driving force.

C. REMEDIAL ACTIONS

Remedy Selection

EPA selected a remedy for the Site in the ROD signed on September 27, 1990. The remedy included measures to address contaminated site soil and groundwater and Little Menomonee River sediment. Remedy components included:

- Excavation of highly-contaminated soil with treatment in a bioslurry vessel;
- Disposal and cover of treated soil and lesser-contaminated soils on-site, with re-vegetation of the excavated areas;
- Fencing and ICs were also required to minimize potential dermal contact (ICs, in the form of deed restrictions, were further addressed in a 1998 ROD Amendment);
- Removal and off-site disposal of highly-contaminated sediments from the Little Menomonee River, creation of a new channel in the vicinity of the Little Menomonee River and then diverting flow into the new channel, and filling the dewatered existing channel with soils from the new channel excavation; and,
- Collection and treatment of contaminated site groundwater, presumably using a biological treatment system.

Remedial action goals were to reduce risks posed by CPAHs in soils to below an ECLR of 1 x 10^{-4} and establish 6.1 mg/kg CPAHs as the acceptable treatability variance. For sediments, the new channel would ensure exposure to below 3 mg/kg CPAHs in sediment for acceptable long-term exposure to CPAHs in the aquatic habitat. Removing the worst of the contaminated sediments in the existing channel, calculated at a value of 388 mg/kg of CPAHs or higher, would help minimize migration potential from the old channel to the new. Groundwater remediation goals were to prevent migration of contaminated Site groundwater into the Little Menomonee River, and to attain concentrations in Chapter NR 140 of the Wisconsin Administrative Code for COCs at the site. Groundwater COCs are PAHs and the BTEX compounds.

The overall RAOs for the specific media addressed in the ROD were:

- **On-site soil**: Minimize threats to human health and the environment from on-site contaminants via direct contact, inhalation, or ingestion and to prevent further contaminant migration into the groundwater and subsequently to the river;

- **Contaminated sediment in the Little Menomonee River**: Minimize direct contact or ingestion of contaminants in sediment; minimize acute and chronic effects on aquatic life from contaminants; and minimize migration of contaminants downstream to the Menomonee River; and,

- **Groundwater**: Prevent release of contaminants through the surficial groundwater aquifer to the Little Menomonee River surface water or sediment and remove contaminants from groundwater such that concentrations do not exceed applicable State groundwater standards.

Cleanup Goals:

Soil: Because no chemical-specific ARARs have been defined for CPAHs, the concentration level that correlates to the 1×10^{-4} ELCR level (6.1 mg/kg) was selected as the contaminant-specific goal for the soil cleanup goal.

Sediment: To meet the sediment RAOs, a new channel for the river will prevent contact with, or ingestion of, contaminated sediment by human or aquatic life. The target concentrations and volume of sediment removed in the old channel as part of the re-channelization efforts was also based on an ELCR level of 1×10^{-4}, corresponding to 388 mg/kg CPAHs in sediment. In addition, in areas where sediment was excavated in lieu of rerouting the river (mostly in the downstream portion of the river), sediments exceeding the calculated CPAH background level (15 mg/kg) would be removed.

Groundwater: Groundwater cleanup levels for the COCs were based on PALs established in Wisc. Admin. Code Ch. NR 140. PALs were derived primarily to inform the regulatory agency of potential groundwater contamination problems and are applicable both to controlling new releases as well as to restoring groundwater quality contaminated by past releases of contaminants. Table 6 (next page) lists the cleanup goals for Site COCs:

Table 6: Groundwater Cleanup Goals

Contaminant of Concern	Cleanup Concentration (µg/L (ppb))
Anthracene	600
Benzo(a)pyrene	0.02
Benzo(b)fluoranthene	0.02
Chrysene	0.02
Fluoranthene	80
Fluorene	80
Naphthalene	10
Pyrene	50
Benzene	0.067
Toluene	68.6
Ethylbenzene	272
Xylene	124

Enforcement

In March 1996, EPA, the State of Wisconsin, and KMC entered into a CD that required KMC to implement the ROD remedy. The February 2012 settlement in the Tronox Inc. bankruptcy matter subsequently released KMC from the 1996 CD.

Remedy Implementation

Groundwater Remediation: In November 1999, KMC began construction of the groundwater cleanup system by:

- Installing temporary structural sheet piling;
- Excavating treatment gate areas;
- Dismantling wells/piping associated with the free product recovery system;
- Preparing a blend of clean sand and other clean soils for gate backfill;
- Grading gate areas after backfill;
- Replacing temporary sheet piling with permanent Waterloo sheet piling;
- Constructing and on-Site treatment building;
- Installing injection wells for introduction of nutrient, air/oxygen, and/or microbe sources into the gate areas to enhance groundwater contaminant degradation;
- Installing new monitoring wells to help determine gate performance and supplement existing monitoring wells to judge aquifer response in attaining goals; and
- Installing piping runs to convey nutrients from the treatment building to the individual gates.

KMC completed most of the construction by April 2000.

Soil Treatment: The purpose of the soil LTTD procedure was not to actually "burn" the contaminated soils, but to heat them above the boiling points of the PAH and BTEX contaminants to drive them off the soil particles for collection. Once successfully treated, the soil was to be returned to their place of excavation. However, the volume of the treated soil exceeded the original volume estimate so some was stockpiled on Site. Some of the treated soils were later graded in place and other treated soils were used as fill in the old river channel.

Sediment Work: Sediment management activity at the Site involved dredging in localized areas, creating a new stream channel in relatively clean soil areas, diverting current stream flow into the new channel areas, dewatering the original channel, removing contaminant sediments from the original channel, and filling the original channel segments with clean cuttings from new channel excavation.

Reach (segment) 1 remediation work was conducted from October 2002 to January 2003. Over 16,000 cubic yards of sediments were excavated and disposed of off-site during this phase of the project. Sediment remediation work involving Reaches 2 and 3 was performed in two phases. Phase 1 work was performed from March 1, 2004 to July 16, 2004. Phase 2 activities began on September 13, 2004, and continued until December 30, 2004. The remediation of Reaches 2 and 3 accomplished the following: (1) 9000 feet of new channel length was created; (2) 8,060 feet of previous river channel were filled in; (3) 2,515 feet of river channel were dredged instead of rerouted to meet sediment cleanup objectives; and (4) 8,563 cubic yards of highly contaminated sediments were excavated and disposed of off-site.

After Tronox filed for bankruptcy and stopped work on Reach 4/5, EPA took over the remaining sediment remedial action. Contaminated sediments above background levels were excavated in the 4,300-foot section on this stretch of the river. In all, over 5,500 cubic yards of contaminated sediment were removed and disposed of off-site. EPA completed this work on November 19, 2009. Subsequently, EPA issued a preliminary construction completion report (PCOR) on November 25, 2009, to document completion of all response actions at the Site.

Amendments to the ROD

April 1997 ESD: In April 1997, EPA signed, with WDNR concurrence, an ESD concerning site contaminated groundwater collection and treatment. Predesign results indicated that, compared to groundwater management originally described in the ROD, a funnel and gate system could offer certain advantages. While exhibiting certain heterogeneity, soils at the Moss-American site generally are relatively fine-grained, resulting in slow groundwater movement. This allows adequate time for contaminant treatment as water is directed through a gate. Design information indicated that, once optimum nutrient/air dosages were established, groundwater contaminants at the Moss-American site could undergo effective aerobic degradation.

September 1998 ROD Amendment: EPA issued a ROD Amendment in September 1998 which changed the soil treatment technology to LTTD from bioslurry technology. Pilot testing done by KMC indicated reasonably good soils treatment of the lighter PAH soil contaminants using the bioslurry technology, but saw reduced treatment efficiency for the larger PAH compounds. Thus, EPA determined that a change to LTTD from the bioslurry technology was appropriate.

The 1998 ROD Amendment also incorporated more recently developed State cleanup standards for soil related contaminants. It allowed for non-residential direct contact cleanup exposure scenarios if appropriate deed restrictions were recorded.

The ROD Amendment withdrew a waiver of State liner/leachate provisions, but provided for a Corrective Action Management Unit (CAMU).

Based on review of groundwater monitoring network analyses and related soils data, the ROD Amendment also added some additional COCs, such as naphthalene.

The ROD Amendment also addressed compliance with Wis. Admin. Code Ch. NR 700, requiring protection of groundwater from site contaminants that pose a threat as a source of groundwater contamination. The ROD Amendment provided for groundwater protection from residual contaminant levels (RCLs) in the soil where attainment of groundwater PALs was not being realized. Groundwater protection component RCLs were provided for naphthalene, fluorene, benzo(a)pyrene, toluene, xylene(s), ethylbenzene, and benzene. The ROD Amendment also provided for protection from soil contamination through direct contact under industrial exposure scenarios. In addition, the ROD Amendment considered floodplain portions that might be affected by soil remediation technology, as well as possible recreational use of portions of the site.

2007 ESD: In November 2007, EPA issued an ESD acknowledging that rerouting of Reach 4/5 would not be necessary or efficient to achieve Site cleanup goals. Instead, EPA selected intermittent dredging of hot spot areas of contaminated sediments, along with off-site disposal of the contaminated sediments for Reach 4/5.

Current Remedial Activity

The only remaining remedial activity at the Site is groundwater restoration work. As described above, a groundwater treatment system, consisting of the funnel and gate system, air sparging, and a network of monitoring wells, is currently in place. The State shut down the system temporarily in 2011 to see if reduced oxygen will affect performance in the treatment gates. In coordination with EPA, the State is implementing recommendations made in the 2011 RSE report prepared by the Corps for optimizing the existing system. The first phase of the work, which began in 2013, involved characterizing the remaining contamination in soil and groundwater within the treatment area of the groundwater treatment system. Groundwater and soil samples were collected in 2013 and 2014 as part of this effort.

Operation and Maintenance Activities

A groundwater monitoring program is in place that requires semiannual and annual monitoring of the well network. As part of its O&M responsibilities, the State is responsible for carrying out these periodic groundwater surveys. The State conducted the most recent groundwater sampling in 2013 as part of the groundwater treatment system optimization effort. In addition to periodic groundwater sampling, the State will be performing routine maintenance activities at the site, including mowing and maintaining the Site fence.

Attachment 1

U.S. Army Corps of Engineers RSE Report (March 2011)

Remediation System Evaluation
Moss-American Superfund Site
Milwaukee, Wisconsin

Final Report
March 2011

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EXECUTIVE SUMMARY

This document presents the results of a Remediation System Evaluation (RSE) conducted for the Moss-American Superfund Site in Milwaukee, Wisconsin. The RSE process is designed to help site operators and managers improve effectiveness, reduce operation costs, improve technical operation, and gain site closeout. The observations and recommendations given within this RSE report are not intended to imply a deficiency in the work of either the designers or operators, but are offered as constructive suggestions to fill data gaps and optimize remedy performance.

This RSE report focuses primarily on optimizing system performance, in particular addressing the stagnant groundwater zone that is limiting flow through the treatment gates and elevated COC concentrations in the vicinity of MW-34S. Recommendations include:

- Monitoring program modifications to further delineate source and dissolved-phase contaminant extent. These modifications would result in additional costs of approximately **$22,500**. Benefits include ensuring that contaminants are not migrating through or around the sheet pile wall, as well as providing necessary information for implementing treatment enhancements, which would ultimately lead to earlier site closeout.
- Additional NAPL investigation. This investigation would cost approximately **$72,000.** Identification of source areas would allow targeted removal, thereby diminishing long-term contributions to the dissolved-phase plume and shortening time to achievement of cleanup objectives.
- Depending on results of characterization efforts, it is recommended that one of the following treatment modifications be implemented:
  1) NAPL-impacted soil excavation and enhanced dissolved-phase treatment. This option would cost roughly **$381,000** for the stagnant zone near MW-34S; costs for similar work near TG1-1 have not been developed but could be readily scaled from the estimate for the MW-34S area based on results from field investigations. Aggressive removal of identified source material (NAPL) and subsurface amendments of ORC Advanced® would greatly shorten time until achievement of cleanup objectives.
  2) Limited NAPL-impacted soil removal and installation of additional gate in NW corner. Costs for this option are estimated to be roughly **$979,000.** This option adheres closely to the original design, which included a gate in the northern portion of the sheet pile wall. Installation of a gate in the wall should improve flow and eliminate the stagnant zone, thereby resulting in more effective treatment of the dissolved-phase plume. Risk management and design considerations would determine whether the gate is installed near MW-34S or MW-7S.

1.0 INTRODUCTION

1.1 Purpose

The Remediation System Evaluation (RSE) as identified in the U.S. Army Corps of Engineers (USACE) Guidance is intended to achieve a number of goals, including:

- Assuring there is a clear system objective (an end to the project),
- Reducing costs and optimizing the system performance considering current conditions and new technologies,
- Evaluating the protectiveness of the system in accordance with the National Contingency Plan (the NCP and CERCLA requires reviews at least every five years), and
- Assuring adequate maintenance of government-owned equipment by operators. [not directly applicable to this RP-run system]

The Third Five-Year Review Report (EPA, 2010) concluded that the site is currently protective, but recommended that an optimization study be performed "to develop a solution to remediate the elevated" contaminant of concern (COC) levels found in areas within the funnel and gate system. Due to development of stagnation in groundwater flow and resulting reduction in flow through the treatment gates, these elevated COC levels persist, with consequences for long-term operations and overall costs. Because a site visit was not included in the scope for this study, the focus of this RSE was directed at optimizing system performance, with the intent of ensuring cleanup objectives can be reached within a reasonable timeframe, thereby reducing long-term costs. This report provides a brief background on the site, current operations, and recommendations for changes and additional actions. The cost impacts of the recommendations are also discussed.

1.2 Team Composition

This team conducting the RSE consisted of Mike Bailey (hydrogeologist, USACE Environmental & Munitions Center of Expertise), Mandy Michalsen (engineer, USACE Seattle District), and Sharon Gelinas (hydrogeologist, USACE Seattle District).

1.3 Documents Reviewed

Remedial Investigation Report, Moss-American Site, January 9, 1990

Superfund Record of Decision (ROD), Moss-American Co., Inc, USEPA, September 27, 1990

Explanation of Significant Differences (ESD), Moss-American Co., Inc, USEPA, April, 29, 1997

Superfund ROD Amendment, Moss-American Co., Inc, USEPA, September 30, 1998

ESD, Moss-American Co., Inc, USEPA, November 2007

Third Five-Year Review Report for Moss-American Superfund Site, USEPA, April 2010

Groundwater Monitoring Reports for the Moss-American Site from 1998-2008, Roy F. Weston, Inc (Weston)

Groundwater Remedial System Drawings, Weston ; Kerr-McGee Corporation, March 1998

Response to Comments on Focused Remedial Alternatives Evaluation for Soil and Sediment, Moss-American Site, Weston, January 12, 1996

Integrated Review Comments of Soil and Groundwater Remedy, Moss-American Site, Weston, January 20, 1997

Response to Comments on Intermediate (60%) Groundwater Design, Moss-American Site, Weston, February 3, 1997

Comments on Prefinal Design – Groundwater, Moss-American Site, USEPA, October 30, 1997

Supplemental GeoProbe Soil Investigation Report, Moss-American Site, Weston, May 2, 2001

1.4 Site Location, History, and Characteristics

1.4.1 Location

The Moss-American site is located in the northwestern section of the City of Milwaukee (Figure 1). The 88-acre site is comprised of a former wood treating facility plus several miles of the Little Menomonee River and its adjacent floodplain soils. The wood treating, using creosote, was conducted on land bounded roughly by the intersection of Brown Deer and Granville Roads on the west, and Brown Deer and 91st Street on the east.

With the cessation of wood treating operations, 23 acres of site land are now owned by the Union Pacific Railroad (railroad), which, until very recently, used this land as an automobile/light truck loading and storage area. Recent business conditions curtailed most of the vehicle storage/transfer function. Industrial site zoning and usage of this portion of the site remain intact. Milwaukee County (the county) owns the remainder of the land comprising the former wood treating facility, approximately 65 acres.

The Little Menomonee River flows approximately 5 miles to its confluence with the Menomonee River. Land along the floodplain corridor is owned primarily by the City of Milwaukee, the County, and to a much lesser extent, private owners.

1.4.2 History

Wood treating operations using creosote were conducted from approximately 1921 to 1976. Past site aerial photos show that land usage patterns have changed considerably with the passage of time. Photos from the 1930s to the 1950s show the wood treating plant operating in a relatively sparsely populated setting, where several farms surrounded the manufacturing operation. From the 1960s to the present, residential and commercial use of nearby property has increased considerably, and agricultural and farming operations have been phased out almost completely. Industrial parks and multi-lane highways also traverse the site setting. County owned land along the river corridor now features recreational hiking and bicycle trails. These features have had a direct bearing on site soil cleanup standards and sediment management at the site.

In 1921, the T. J. Moss Tie Company established a wood preserving facility west of the Little Menomonee River. The plant preserved railroad ties, poles, and fence posts with creosote, a mixture of numerous chemical compounds derived from coal tar. Creosote plant operations often contain storage facilities for creosote and fuels, a boiler for making steam, heating the creosote and applying the creosote to the wood, areas for unloading and storing incoming timbers, rail cars for transporting the creosote, and a drying area for subsequent storage. Creosote is the major source of a class of contaminants called polycyclic aromatic hydrocarbons (PAHs) which are the main driver of risk at this site. Potential for release of PAHs existed throughout the storage, application, and drying processes.

From 1921 to 1971, the facility discharged wastes to settling ponds that ultimately discharged to the Little Menomonee River. These discharges ceased when the plant diverted its process water discharge to the Milwaukee sanitary sewerage system. Production at the facility ceased in 1976.

Kerr-McGee purchased the facility in 1963 and changed the facility's name to Moss-American. The name was changed again in 1974 to Kerr-McGee Chemical Corporation - Forest Products Division. In 1998, the name of this company changed to Kerr-McGee Chemical LLC (KMC). Tronox assumed ownership of the site in 2006 when it was spun off from Kerr-McGee. In January 2009, Tronox filed for Chapter 11 bankruptcy.

1.4.3 Hydrogeology Setting

The site overlies a surficial water-bearing unit and confining bed. The water-bearing unit consists of a thin mantle of fill, alluvium, and weathered till. This thin layer of material would not yield sufficient water to wells to be classified as a true aquifer. The confining bed is the unweathered till of the Oak Creek Formation.

The surficial unit comprises everything above the confining bed. It includes extensive fill deposits, alluvial deposits along the river, and the weathered upper few feet of the Oak Creek Formation. The fill is highly variable and has been added to the site at different times for different reasons. Alluvial deposits are associated with the Little Menomonee River. They consist of sand and gravel channel deposits and silt and clay flood deposits. The till is part of the Oak Creek Formation, which consists of glacial till, lacustrine clay, silt and sand, and some glaciofluvial sand and gravel. The till is fine grained, commonly containing 80 to 90 percent silt and clay. The till was generally weathered to a depth of 2 to 10 feet.

The unweathered part of the Oak Creek Formation consists of a confining bed between the surficial water-bearing unit and underlying regional aquifers. The formation is a dense, silty clay till with interbedded lacustrine units. Below the site, the glacial deposits are approximately 150 feet thick and underlain by the dolomite aquifer. The minimum thickness of the confining bed below the site is at least 40 feet. Slug tests conducted during the RI on the most permeable parts of the Oak Creek Formation indicate average hydraulic conductivities of 10^{-5} to 10^{-6} cm/s [0.03 to 0.003 feet per day (ft/day)]. The overall hydraulic conductivity of the entire unit is probably less than the values reported.

Prior to implementation of the remedy, groundwater flowed toward the low-lying areas adjacent to the river. Groundwater discharged to these areas either migrates downriver through alluvial sands, or is lost to the atmosphere by evapotranspiration. Groundwater and surface water elevation data suggest that discharge to the river may vary seasonally. During dry periods, the Little Menomonee River is probably a losing stream (the river discharges to groundwater). Conversely, during wetter conditions, it is likely a gaining stream.

Constrained and channeled by the funnel and gate system, the groundwater within the shallow groundwater-bearing zone generally flows northeastward toward the Little Menomonee River. A review of data presented in the quarterly and annual groundwater monitoring reports by Weston indicate that in the topographically higher (western) portion of the site, the horizontal hydraulic gradient is relatively steep, at approximately 0.032 feet per foot (ft/ft) to the northeast. The topography of the site levels out near the river, as does the potentiometric surface with a northerly hydraulic gradient of approximately 0.013 ft/ft. The estimated hydraulic gradients within the treatment gates ranged from 0.0007 to 0.0043 ft/ft. The hydraulic gradient is relatively flat within the treatment gate area with an overall hydraulic gradient from TG1 to TG5 of approximately 0.0026 ft/ft in an easterly direction. Lowest hydraulic gradients are found in the area encompassing monitoring wells MW-7S, MW-33S, MW-34S, and MW-38S.

The hydraulic conductivity of the deposits located on the topographically higher, western portion of the site is in the range of 10^{-5} to 10^{-6} cm/s. In contrast, the hydraulic conductivity of material used to backfill areas within the funnel and gate remedial system is approximately 10^{-3} cm/s (3 ft/day). Using a hydraulic gradient of 0.032 ft/ft, an assumed effective porosity of 0.3, and a hydraulic conductivity of 0.03 ft/day, the groundwater flow velocity in the western portion of the site is calculated to be approximately 0.0032 ft/day. Near the river, using a hydraulic gradient of 0.013 ft/ft, a porosity of 0.3, and a hydraulic conductivity of 3 ft/day, the velocity of groundwater flow is calculated to be approximately 0.13 ft/day. The groundwater flow velocities within the treatment gates are estimated to range from 0.0066 to 0.1049 ft/day.

1.4.4 Description of Groundwater Plume

Historically, non-aqueous phase liquid (NAPL) has been identified in monitoring wells MW-34S, MW-7S and TG1-1. Recent NAPL occurrences in these wells have been limited to observations of sheen. The current dissolved-phase plume boundary is primarily in an area encompassing monitoring wells MW-7S, MW-33S, MW-34S, and MW-38S (Figure 2), which coincides in large part with the groundwater stagnation zone. There are also exceedances of State groundwater standards at MW-35S and treatment gate wells TG1-1, TG2-3 and TG4-1. In general, PAH concentrations measured in groundwater samples collected from the rest of the site were at relatively low levels with only sporadic detections.

Monitoring well MW-34S exceeds cleanup standards for numerous contaminants of concern including anthracene, benzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, fluorene, naphthalene, and pyrene. Monitoring well MW-7S exceeds standards for benzene and naphthalene, although trends for both contaminants are decreasing. In addition, increasing concentrations are identified for several COCs at these, and other, wells. Statistical analysis by EPA Region 5 indicates that multiple PAH contaminant concentrations are increasing, with current concentrations higher than the period just after construction of the funnel and gate system. Monitoring well MW-33S continues to exceed standards for naphthalene. Current contaminant concentrations from well MW-33S are also higher for anthracene and fluorene than they were shortly after implementation of the remedy.

2.0 PERFORMANCE OBJECTIVES

The focus of this RSE was on the groundwater remedy; the soil and sediment remedies were not evaluated. Groundwater remediation goals were to prevent migration of contaminated site groundwater into the Little Menomonee River and to attain concentrations in NR 140 of the Wisconsin Administration Code for COCs at the site. Groundwater contaminants of concern and their associated State preventative action levels (PAL) are listed in Table 1.

The remedial action objective (RAO) for groundwater as stated in the ROD was to: *Prevent release of contaminants through the surficial groundwater aquifer to the Little Menomonee River surface water or sediment and remove contaminants from groundwater such that concentrations don't exceed applicable State groundwater standards.*

3.0 SYSTEM DESCRIPTION

The groundwater remedy consisted of a funnel and gate system to capture and treat contaminated groundwater prior to discharge to the Little Menomonee River. The following section provides a description of the groundwater treatment system and associated monitoring program.

3.1 Groundwater Treatment System

A funnel and gate system was selected as the preferred alternative in the 1997 ESD. Pre-design results indicated that the relatively fine-grained site sediments would be well suited for this type of system. Groundwater flow was relatively uniform toward the Little Menomonee River with discontinuous zones of increased permeability (i.e. gravel fill and silty sand) acting to guide the direction of the contaminant plume. In the ESD, groundwater was predicted to move slowly through the treatment gates, which would provide adequate residence time for contaminant treatment.

The funnel and gate system is constructed of Waterloo sheet piling, which has an internal cavity sealable joint. This type of joint reduces the potential for leakage of contaminants through the joints. Early designs (60%) of the funnel and gate system showed two sets of funnel and gates: two gates on an upper funnel and three gates on a lower funnel located adjacent/parallel to the river. Installation was proposed in a phased approach. The upper funnel and gates would be installed and tested for performance. The lower funnel and gates, which had a higher potential to negatively impact the river, would then be installed following verification of the upper funnel and gate performance. This phased approach was not approved by the regulators because contaminants adjacent to the river would continue to be discharged during the test performance period.

The final design of the funnel and gate system changed the lower funnel and gates to a sheet pile containment wall with two sets of funnel/treatment gates to the east. Using this design, the entire system could be installed at one time and the potential for untreated contaminants reaching the river would be reduced. In considering the design change for the final funnel and gate system, it is uncertain if this system was thought to be capable of mobilizing contaminants located in the northwest corner of the sheet pile area toward the eastern gates for treatment. A groundwater model was reportedly developed for the 60% design, but was not available for review during this RSE.

The treatment gates consist of an area backfilled with a mixture of clean sand/soil and line of injection wells. The injection wells were installed at the up-gradient edge of the gate area and were designed to distribute air or other nutrients, as necessary. NAPL collection sumps were installed up-gradient of the gates to prevent potential plugging and/or treatment performance problems.

Treatment at the gates consists of air injection to enhance biodegradation of COCs. Dissolved oxygen concentrations in the gate area have been measured at less than 1 to over 4 mg/L. Well packers were installed at Gate 5 in June 2000 to help direct the air injection; however, no discernable changes in dissolved oxygen levels were observed until 2003. Packers were also proposed at Gates 1 and 2, but could not be properly installed. Nutrients were added at Gate 1 from June 2001 through October 2002 using a solution containing potassium nitrate (KNO_3) and potassium phosphate ($KHPO_4$). Nutrient augmentation was discontinued due to inconclusive evidence that it was enhancing biodegradation. Air injection has been the only treatment since that time.

3.2 Monitoring Program

Performance monitoring for the funnel and gate system consists of an evaluation of groundwater hydraulics and groundwater chemical analyses. The groundwater monitoring program has been revised several times, most recently in 2006/2007. During this last revision, twenty-two monitoring wells and piezometers across the site that were no longer sampled were abandoned. In addition, two monitoring wells were installed within the northwest area of the sheet pile for the funnel and gate system. Monitoring wells currently sampled as part of the monitoring program are shown in Table 2. All of the wells and piezometers are screened in the shallow groundwater-bearing zone underlying the site (surficial aquifer).

Water level measurements are collected on an annual basis at all monitoring wells and piezometers at the site to evaluate groundwater hydraulics. Chemical analyses are collected annually except at monitoring wells MW-7S, MW-34S, MW-38S, and MW-39S, where samples are collected semi-annually. Piezometers installed in 2002 and the middle performance monitoring well at each gate are not included in the chemical monitoring program. In addition to the on-site monitoring wells listed in Table 2, 11 shallow groundwater monitoring wells (MW-A through MW-K) located along the Little Menomonee River are sampled to monitor groundwater chemical conditions between the old and new river channels.

Analytical parameters collected at each well include benzene, toluene, ethylbenzene, and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), and field parameters: pH, oxidation-reduction potential, dissolved oxygen, specific conductance, temperature, and turbidity. Samples collected at the treatment performance monitoring wells at each gate also are analyzed for microbial enumeration, nitrate-nitrogen (NO_3-N), nitrite-nitrogen (NO_2-N), total Kjeldahl nitrogen (TKN), ammonia-nitrogen (NH_3-N), phosphate-phosphorous (PO_4-P), orthophosphate (ORP), biological oxygen demand (BOD), chemical oxygen demand (COD), and total organic carbon (TOC).

4.0 SYSTEM PERFORMANCE

4.1 Groundwater Flow

Groundwater elevation data collected since the funnel and gate system was completed in 2000 were reviewed to evaluate flow through the system. Groundwater at the site generally flows from south to north toward the Little Menomonee River. Due to the presence of the sheet pile wall along the north and west portion of the system, groundwater is directed toward the eastern treatment gates.

The groundwater flow evaluation indicates that there are several areas of concern where groundwater may not be hydraulically contained or treated by the gates:

- Groundwater flow maps consistently indicate the presence of a stagnation zone in the northwest corner of the sheet pile area near MW-34S and MW-7S. Groundwater elevation data show that there is only a very slight gradient between these two wells. The boring log for MW-7S indicates the surficial aquifer in this area is composed of low permeable materials (very fine sand and silt), which, coupled with the low gradient, would result in a very low groundwater velocity. The borelog for MW-34S was not available for review.

- Groundwater elevation data at MW-33S and PZ-02 indicate that groundwater may be flowing around the end of the sheet pile wall. A head difference of about 0.5 feet is typically measured between MW-33S and PZ-02. Borelogs for these two wells were not available for review.

- Groundwater elevation data from performance wells at gates 1, 3, and 4 frequently show the gradient is reversed (flowing from down-gradient of the gate toward the up-gradient side). It should be noted that the magnitude of the calculated gradient is very low, so the possibility of measurement error (i.e water levels, top of casing survey) should also be considered.

Two monitoring wells, MW-38S and MW-39S, located near the groundwater stagnation zone, were installed in 2006 to help delineate the remaining dissolved-phase plume in the northwestern portion of the system. These wells were never surveyed and have never been used in the preparation of groundwater flow maps. These wells could be surveyed and used in future construction of groundwater flow maps to help evaluate groundwater flow across the site.

4.2 Groundwater Chemical Concentrations

Contaminants in groundwater are consistently detected above cleanup goals in two areas: 1) in the northwest section of the sheet pile area in the groundwater stagnation zone at monitoring wells MW-7S, MW-33S, MW-34S, and MW-38S, and 2) up-gradient of Gate 1 in TG1-1.

4.2.1 Contaminant Concentrations in Northwest Corner of Site

Trend analyses for the most prevalent contaminants (benzene, naphthalene, fluorene, and benzo(a)pyrene) show that there are decreasing trends or no trends for wells in the northwest corner (Appendix B). Trend testing results confirmed decreasing naphthalene concentrations in MW-7S and MW-38S and decreasing benzene concentrations in MW-7S, indicating that natural attenuation is occurring in these areas. However, these trends cannot be used in a predictive sense, because overall trends indicate that PALs should have been achieved within the past year or two. Instead, recent sampling results suggest that trends may be asymptotically "bottoming-out."

Measurable NAPL has historically been detected at MW-34S. In 2008, 3.24 inches of NAPL was measured. Since that time measurements have decreased to trace detections, although dissolved-phase concentrations of naphthalene continue to exceed 10,000 µg/L (September 2009 data). Given high dissolved-phase PAH concentrations and typical inaccuracies with NAPL measurements, it is assumed that some NAPL remains in the vicinity of MW-34S and could be a continued source to the dissolved-phase plume. It should also be noted that the soil excavation completed during the installation of the funnel and gate system only occurred to the southeast of MW-34S and did not extend into the current dissolved-phase plume area (see Groundwater Remedial System drawings, March 1998). Presence of NAPL and the development of a stagnation zone in the funnel and gate system have the potential to greatly extend time to restoration.

Besides the extended time to restoration, there are several potential issues with the remaining dissolved-phase plume. As suggested in the 2010 Five-Year Review, the pattern of water levels near MW-7S/MW-34S could indicate that the sheet pile barrier to the north does not form a sufficiently competent barrier to groundwater flow. Thus, contaminated groundwater could be flowing through joints in the sheet pile wall near MW-34S and discharging to the river. In addition, the flow evaluation indicated that groundwater has been moving around the end of the sheet pile wall near MW-33S. Since there are no chemical samples collected north of the sheet pile wall, contamination migration along this pathway cannot be ruled out.

4.2.2 Contaminant Concentrations Up-gradient of Gate 1

Concentrations of benzene and PAHs in groundwater are typically measured above PALs at up-gradient performance monitoring well TG1-1. Trend tests show concentrations of naphthalene, fluorene, and benzo(a)pyrene have been increasing, indicating a continued source of contamination in this area (Appendix B). NAPL was historically detected in TG1-1 up to 11 inches thick; however, only trace or sheen thickness has been observed since 2003. As with MW-34S, naphthalene concentrations in TG1-1 currently exceed 10,000 µg/L (September 2009 data), which suggests that a NAPL source persists in the area. Since the extent and magnitude of the remaining contamination in soil and groundwater near Gate 1 is uncertain and contaminant concentrations continue to rise, time to restoration cannot currently be estimated. Most of the monitoring wells used to define the historical extent of the groundwater contamination near Gate 1 have been abandoned. However, there are several piezometers used only for hydraulic monitoring near Gate 1 that could be sampled to help delineate the remaining dissolved-phase plume.

4.3 Treatment Gates

With the exception of Gate 1, contaminant concentrations up-gradient and down-gradient of the treatment gates indicate that much of the historical groundwater contamination has been removed. Several PAHs (benzo(a)pyrene, benzo(f)fluorene, and chrysene) are sporadically detected above PALs in monitoring wells near Gates 3 and 4, however, concentrations are low, just above the cleanup goal of 0.02 µg/L. Even with the potential gradient reversal at Gates 3 and 4, the treatment gates appear to be functioning adequately.

The only gate area with significant remaining contamination is Gate 1. Even though groundwater concentrations are elevated at TG1-1, there are typically no detections of PAHs in the down-gradient performance monitoring well, TG1-3. Oxygen levels measured in Gate 1 are also low, signifying that the injected oxygen is being consumed, and the gate is functioning adequately.

5.0 REMEDY OPTIMIZATION OPTIONS

Previous assessments in annual reports and Five-Year Reviews determined that the existing funnel and gate remedy was having limited success in the northwest corner of the site due to development of a stagnant zone in groundwater. Investigations recommended to ensure effectiveness of the remedy and to inform decisions about ways to improve effectiveness and shorten time to site closeout are discussed below (Section 5.1). Section 5.2 evaluates three options to hasten site closeout through source removal and/or groundwater gradient enhancements.

5.1 Recommendations to Improve Effectiveness

5.1.1 Monitoring Program Modification

The primary areas of concern for the monitoring program are the lack of chemical data outside the sheet pile wall near MW-7S and MW-34S, where there is a possibility that contaminants could be passing through the joints or migrating around the end of the wall, and the extent of remaining contamination near TG1-1. A secondary area of concern is the extent of the dissolved-phase plume in the interior of the funnel and gate system. The following enhancements to the monitoring program are recommended (see Figure 2 for well locations):

- Install two monitoring wells outside the sheet pile wall to the north of MW-34S and to the west of MW-7S to determine if contaminants are migrating through the sheet pile wall.
- Develop and sample piezometer PZ-02 to determine if contaminants are migrating around the end of the sheet pile wall.
- Develop and sample piezometers PZ-07, -09, and -10 to determine the up-gradient extent of remaining contamination near TG1-1.
- Develop and sample piezometer PZ-03 to confirm the extent of the dissolved-phase plume in the interior of the funnel and gate system.
- Survey MW-38S and MW-39S and include water levels from these wells in groundwater flow maps.

Costs for modifying the monitoring program include **$13,100** for the installation and development of two monitoring wells (includes oversight and reporting) and **$5,000** for development of five existing piezometers. Prior to development of the piezometers, their construction should be verified (i.e. depth, well screen interval). Additional costs of about **$5,900** for labor and laboratory analysis would also be accrued during each sampling event. Costing assumptions are described in Table 3. If contaminants are not detected in new monitoring locations after four sampling events, the wells/piezometers could be dropped from the program.

5.1.2 NAPL Investigation

Removal of residual NAPL in areas near MW-34S and TG1-1 would eliminate this continued contaminant source to the dissolved-phase plume and shorten time to site closeout. A localized direct push soil and groundwater investigation could be implemented to spatially delineate residual NAPL contamination in these areas. NAPL is likely not uniformly distributed in site soil, which means absence of NAPL in a particular soil boring would not necessarily preclude NAPL presence in nearby soil. In order to improve NAPL delineation during the investigation, grab groundwater samples could be collected by the direct push rig during completion of soil borings. Groundwater samples with naphthalene concentrations approaching 9,100 µg/L[1] would indicate NAPL presence in the vicinity of the soil boring. A schematic of a potential NAPL investigation program is provided on Figure 3. Locations where NAPL presence, soil concentrations or groundwater naphthalene concentrations greater than 9,100 µg/L were detected would be considered for inclusion in an excavation footprint. This investigation for each area would cost an estimated **$36,000** based on assumptions described in Table 3.

5.2 Recommendations to Improve Site Closeout

Remedy optimization options were developed primarily to address the elevated COC concentrations in the vicinity of MW-34S and the stagnant groundwater zone that is limiting flow through the treatment gates. Because treatment at Gate 1 is currently effective and the remedy is functioning as intended, future work to shorten time to site closeout in that area is discretionary and of secondary importance to work in the MW-34S area. Consequently, costs for enhancements to the remedy near Gate 1 have not been developed but should be readily scalable from those for the MW-34S area. Implementation of these options would be influenced by the results of investigations discussed in Section 5.1.

Options were evaluated for effectiveness using a simplified numerical groundwater model and by considering implementability, and if applicable, cost (Table 4). It should be noted that a more robust numerical model would likely be needed if the selected remedy optimization includes significant modifications to the groundwater flow system, such as with the installation of a new gate or extraction wells. For those options which were deemed technically ineffective or for which there was insufficient site information, costs have not been developed and are not presented herein.

The groundwater model was designed to simulate groundwater flow only in the vicinity of the funnel and gate system and was calibrated to water level data collected during the 3rd quarter of 2009. Details on the model setup, calibration, and results are presented in Appendix A. The following simplifying assumptions were utilized:

- The flow system is steady state,
- The surficial unit (shallow aquifer zone) is uniformly 15-feet thick,
- The topographically higher, western portion of the site has a lower hydraulic conductivity than the topographically lower portion within the funnel and gate system, and
- The sheet pile barrier has a bulk hydraulic conductivity of 1×10^{-7} cm/s.

5.2.1 NAPL-Impacted Soil Excavation and Enhanced Dissolved-Phase Treatment

Locations identified during the NAPL investigation where NAPL presence, soil concentrations or groundwater naphthalene concentrations representing a significant percentage of the solubility level were detected could be considered for inclusion in an excavation footprint. We have assumed that an area centered around MW-34S extending 50 ft from the wall and 75 ft along the wall would be included in the excavation footprint (Figure 3). Excavation costs near TG1-1 are not included but could be scaled from MW-34S, depending on the results of field investigations. Based on current data, it is believed that excavation near TG1-1 would be less extensive than near MW-34S and costs proportionally lower.

[1] Estimated effective naphthalene groundwater water solubility in presence of NAPL calculated assuming a typical creosote composition; calculations are included in Appendix C for reference.

Available boring logs[2] for nearby wells MW-7S and MW-39S indicate that depth to the confining clay layer is 10-12 feet bgs. An average depth of 15 feet has been assumed for the thickness of the surficial unit in the numerical groundwater model, so this excavation depth was assumed as well. A lined staging and dewatering area for excavated soil could be prepared near the excavation pit and could be sloped to allow dewatering water to collect in the excavation pit. A sump could be included to capture any product seeping from the dewatering water. Groundwater could be allowed to accumulate in the excavation pit, the bottom of which could be sloped to function as a sump as well. Any accumulated product in the excavation could be removed by pumping. Excavation, materials, handling and associated activities would cost an estimated **$202,000** based on assumptions described in Table 3.

Although the final depth of sheet pile wall installation into the clay layer is not known, preliminary design documents indicate a target final depth of 3 ft below the clay layer surface, i.e. a final sheet pile wall depth of ~ 18 ft bgs. Because the sheet pile wall will function as a retaining wall during excavation, and the engineering rule for minimum wall depth is 2x the excavation height, the wall section adjacent to the excavation area will need to be improved to safely meet depth requirements. Assuming a 15 ft excavation, the required improved sheet pile wall depth in this area would be 50 ft bgs. Materials and installation for the improved 50 ft x 75 ft section of sheet pile wall would cost an estimated **$94,000** based on assumptions described in Table 3.

Oxygen Releasing Compound Advanced (ORC Advanced®) could be incorporated into the excavation backfill to enhance biodegradation of dissolved-phase contaminants in both the excavation and groundwater. Because molecular oxygen would subsequently diffuse into groundwater surrounding the ORC Advanced® amended backfilled area, biodegradation of dissolved-phase contaminants would be enhanced in surrounding groundwater as well. The groundwater model also showed that there would be some localized groundwater flow into the ORC backfilled area (Figure A-4).

ORC Advanced® is a proprietary formulation of food-grade, calcium oxy-hydroxide that produces a controlled release of molecular oxygen for a period of up to 12 months upon hydration by groundwater[3] and has been demonstrated to enhance treatment of PAHs[4] and benzene[5] in groundwater. The recommended application rate for ORC Advanced® is 0.1-0.3 percent by weight of excavated soil. Approximately 5.2 tons of ORC Advanced® would be required for an excavated soil mass of 2,600 tons[6], which would cost an estimated **$86,000** based on assumptions described in Table 3.

Total cost for this option, assuming excavation only in the MW-34S area, would be approximately **$381,000**. In addition, limited design work not included in this estimate may be necessary for sheet pile shoring and excavation.

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[2] The MW-34S boring log was not available during our analysis.
[3] Information for ORC Advanced is available online: http://www.regenesis.com/contaminated-site-remediation-products/enhanced-aerobic-bioremediation/orc-advanced/
[4] Koenigsberg, S. and Sandefur C. The Use of Oxygen Release Compound for the Accelerated Bioremediation of Aerobically Degradable Contaminants: The Advent of Time-Release Electron Acceptors. (1999, Winter) *Remediation.* 6(4), 3-29.
[5] Bianchi-Mosquera, G. C., Allen-King, R. M., Mackay, D. M. Enhanced Degradation of Dissolved Benzene and Toluene Using a Solid Oxygen-Releasing Compound. (1994, Winter). *GWMR* X(X), 120-128.
[6] Assumes excavation volume of 2083 cy and bulk density of 1.26 ton/cy.

Despite evidence for decreasing trends in some wells, groundwater in the vicinity of NAPL-impacted wells MW-34S and TG1 will likely not attenuate within a reasonable timeframe. Targeted NAPL removal in these areas followed by addition of ORC Advanced® would enhance dissolved-phase attenuation in the TG1 and MW-34S areas and decrease restoration timeframes in nearby wells MW-7S and MW-38S as well.

5.2.2 Limited NAPL-Impacted Soil Removal and Installation of Additional Gate in NW Corner

The installation of a new treatment gate with air injection system in the northwest corner of the sheet pile, similar to the original design concept, could also be adopted. A new gate would increase the hydraulic gradient in the NW corner and eliminate the stagnation zone and the potential for groundwater to flow around the end of the sheet pile, as well as provide long-term treatment for any remaining dissolved-phase contaminants. Excavation of NAPL-containing soils near MW-34S could be conducted in conjunction with the installation of the gate system, thereby potentially eliminating the need for structural sheet pile during excavation as discussed in Section 5.2.1.

Two gate scenarios were evaluated: one installed to the north of MW-34S and one installed to the west of MW-7S. Both scenarios include limited excavation of NAPL-containing soil near MW-34S that is easily accessible without requiring reinforcement of the sheet pile wall. The groundwater model shows that if a new gate is installed to the north of MW-34S, the majority of groundwater flow from the upper treatment gates (Gate 1 and 2) would be directed toward the new gate (Figure A-8), eliminating the stagnation zone. Potential issues with installation of this gate include the proximity to the river, slope stability issues and a limited buffer zone between the treatment gate and the river. Concern about contaminant discharge to the river from the treatment gate should be alleviated by performance data from existing gates. Engineering complications associated with proximity of the river would have to be resolved during design.

A new gate to the west of MW-7S could also induce groundwater flow in the area of the stagnant dissolved-phase plume. The groundwater model shows that groundwater from Gates 1 and 2 would continue to flow toward the eastern treatment gates and groundwater within the dissolved-phase plume would flow toward the new gate near MW-7S. Costs for either gate scenario would total approximately **$979,000**. These costs do not include additional modeling or design work that may be necessary, especially if proximity to the river requires special design considerations.

It should be noted that a gate near NW-34S is preferred over one near MW-7S for hydraulic reasons, because it does a better job of improving flow through the stagnant zone. However, risk management and design considerations may make a gate near MW-7S preferable.

5.2.3 Groundwater Flow Modification to Enhance Treatment of Existing Funnel & Gate System

Groundwater flow modifications using the existing funnel and gate configuration could be implemented to induce a hydraulic gradient across the site and eliminate the zone of stagnation in the northwest corner. Excavation of NAPL-containing soils around MW-34S could also be conducted in conjunction with the flow modifications as described in Section 5.2.1.

Two model scenarios were evaluated: 1) installation of extraction wells down-gradient of Gates 5 and 6 and 2) installation of a large scale re-circulation cell that includes an injection well near MW-7S and an extraction well down-gradient of Gate 5. The groundwater model shows that even with extraction wells, the groundwater stagnation area may still exist (Figure A-6). The extraction wells induce a slight gradient across the site as there is a reduction in flow around the end of the sheet pile near MW-33S. Due to the low permeability soils, groundwater extraction rates were predicted to be less than 1 gpm. Since the gradient across the site would still be very low, it could take over 30 years for contaminated groundwater near the stagnation zone to reach the eastern treatment gates.

The groundwater model shows that with a large scale re-circulation cell groundwater within the stagnation zone would flow toward the eastern treatment gates; however, there could be increased flow around the end of the sheet pile near MW-33S due to mounding effects (Figure A-7). Again, the low permeability materials would limit the extraction/injection rates. When compared to the extraction well scenario, the gradient across the site is increased, but it could still take over 20 years for contaminated groundwater near the stagnation zone to reach the eastern treatment gates. In addition, such flow modification would encourage contaminated groundwater flow into areas that currently contain low-level contamination, thereby potentially increasing the volume of groundwater contaminated above cleanup levels at the site.

Planting poplar trees by the final gate pairs has also been proposed in lieu of extraction wells to induce a gradient across the site. In addition to the low gradient issues stated above, poplar trees would only have a seasonal influence on the water levels at the site. Also rejected as ineffective was extension of the sheet pile wall near MW-33S. Preliminary modeling showed no improvements to flow in the stagnant zone. Due to problems associated with persistence of the stagnation zone, sheet pile wall bypassing due to groundwater mounding, and excessive transport times to reach treatment gates, manipulations to hydraulic gradients (in the context of the existing funnel & gate system) are of questionable effectiveness. Costs were not developed for these scenarios due to perceived ineffectiveness at achieving desired results.

6.0 SUMMARY

The observations and recommendations contained in this report are not intended to imply a deficiency in the work of either the designers or operators, but are offered as constructive suggestions to fill data gaps and optimize remedy performance. These recommendations obviously have the benefit of operational data unavailable to the original designers. The RSE process is designed to help site operators and managers improve effectiveness, reduce operation cost, improve technical operation, and expedite site closeout.

Improvements to site characterization and the groundwater monitoring program were recommended in order to evaluate effectiveness and protectiveness of the system as installed and better understand subsurface conditions in advance of remedy alterations. At a minimum it is recommended that the limited monitoring program adjustments and subsurface characterization activities discussed in Sections 5.1.1 and 5.1.2 be seriously considered. These recommendations include:

- Installation of two monitoring wells outside the sheet pile wall to determine if contaminants are migrating through the wall [addresses effectiveness of the wall and evaluates protectiveness for receptors in the river]
- Conversion of PZ-02 (by developing and sampling) to a monitoring well to determine if contaminants are migrating around the end of the wall [addresses effectiveness of the wall and evaluates protectiveness for receptors in the river]
- Conversion of several piezometers (PZ-03, -07, -09, and -10) to monitoring wells to better understand residual source and dissolved-phase contaminant extent [feeds into design for system modifications leading to quicker site closeout]
- Direct push soil and groundwater investigation in the stagnant zone to delineate persistent source area [feeds into design for system modifications leading to quicker site closeout]

In addition, the following options were evaluated with the goal of improving system performance and shortening time to achievement of cleanup objectives:

- NAPL-impacted soil excavation and enhanced dissolved-phase treatment
- Limited NAPL-impacted soil removal and installation of additional gate in NW corner
- Groundwater flow modification to enhance treatment of existing funnel & gate system

Of these, the first two have the greatest potential to improve treatment efficiency and shorten time to achievement of cleanup objectives. However, the second option, which is most similar to the original design, has the potential to discharge contaminants above PALs to the Little Menomonee River. This potential is considered unlikely given a considerable record of successful treatment in the existing gates at the site. The third option was found to be ineffective or of limited benefit because of the difficulty associated with enhancing the hydraulic gradient in the low permeability soils and protracted times to site closeout.

Results from field investigations could determine the most cost-effective option for improving system performance. If minimal amounts of NAPL are encountered, the assumed need for sheet pile wall improvement and volume of soil excavation and ORC Advanced® quantities required may be reduced thereby resulting in a lower estimated cost. Likewise, institution of the original design concept of a treatment gate in the NW corner may be sufficient to flush and treat remaining dissolved-phase contaminants. If significant quantities of NAPL are found, more aggressive excavation, followed by amending the backfilled area with ORC Advanced®, may be more suitable to achieving site cleanup goals in a reasonable timeframe. A determination may have to be made whether the latter option requires an additional decision document.

TABLES AND FIGURES

Table 1. Groundwater Cleanup Goals

Constituent	PAL (µg/L)
Anthracene	600
Benzo(a)pyrene	0.02
Benzo(b)fluoranthene	0.02
Chrysene	0.02
Fluoranthene	80
Fluorene	80
Naphthalene	8
Pyrene	50
Benzene	0.5
Toluene	68.6
Ethylbenzene	140
Xylene	124

Notes:
PAL – Wisconsin Department of Natural Resources (WDNR) Preventative Action Level, Ch. NR 140, Wis. Adm. Code
µg/L – microgram per liter

Table 2. Monitoring Program

Well ID	Monitoring Purpose	Screened Interval (feet bgs)	Analytical Sampling	Water Level Measurements
MW-7S	Containment	10-15	Semi-Annual	Semi-Annual
MW-34S	Containment	*	Semi-Annual	Semi-Annual
MW-38S	Containment	10-15	Semi-Annual	Semi-Annual
MW-39S	Containment	10-15	Semi-Annual	Semi-Annual
MW-5S	Containment	12-17	Annual	Annual
MW-9S	Containment	8-13	Annual	Annual
MW-27S	Containment	*	Annual	Annual
MW-30S	Containment	*	Annual	Annual
MW-31S	Containment	*	Annual	Annual
MW-32S	Containment	*	Annual	Annual
MW-33S	Containment	*	Annual	Annual
MW-34S	Containment	*	Annual	Annual
MW-37S	Containment	*	Annual	Annual
MW-38S	Containment	*	Annual	Annual
MW-39S	Containment	*	Annual	Annual
TG1-1	Treatment	*	Annual	Annual
TG1-2	Treatment	*	--	Annual
TG1-3	Treatment	*	Annual	Annual
TG2-1	Treatment	*	Annual	Annual
TG2-2	Treatment	*	--	Annual
TG2-3	Treatment	*	Annual	Annual
TG3-1	Treatment	*	Annual	Annual
TG3-2	Treatment	*	--	Annual
TG3-3	Treatment	*	Annual	Annual
TG4-1	Treatment	*	Annual	Annual
TG4-2	Treatment	*	--	Annual
TG4-3	Treatment	*	Annual	Annual
TG5-1	Treatment	*	Annual	Annual
TG5-2	Treatment	*	--	Annual
TG5-3	Treatment	*	Annual	Annual
TG6-1	Treatment	*	Annual	Annual
TG6-2	Treatment	*	--	Annual
TG6-3	Treatment	*	Annual	Annual
PZ-01	Piezometer	*	--	Annual
PZ-02	Piezometer	*	--	Annual
PZ-03	Piezometer	*	--	Annual
PZ-04	Piezometer	*	--	Annual
PZ-05	Piezometer	*	--	Annual
PZ-06	Piezometer	*	--	Annual
PZ-07	Piezometer	*	--	Annual
PZ-09	Piezometer	*	--	Annual
PZ-10	Piezometer	*	--	Annual

Table 2 Notes:
Piezometer – Additional water level measurements locations to verify hydraulic containment
Containment – Shallow and Containment Performance Monitoring Wells
Treatment – Treatment Performance Monitoring Wells
Annual – Sampled during 3rd Quarter (September)
Semi-Annual – Sampled during 1st and 3rd Quarter (March and September)
-- Not sampled
* Well construction details not available, proposed construction included a 5-foot screen interval and total depth of 10-12 feet bgs.

Table 4. Remedy Optimization Options Evaluation Summary

Recommendation	Effectiveness	Implementability	Cost
5.1.1 Monitoring program modification	Evaluates effectiveness of remedy to gain site closure.	Easily implemented by installing two new wells and using existing piezometers.	$22K
5.1.2 NAPL investigation	Evaluates the extent of residual NAPL. Reduces uncertainty in the required excavation extent to gain site closeout.	Easily implemented using direct-push technology.	$72K
5.2.1 NAPL-impacted soil excavation and enhanced dissolved-phase treatment (MW-34S area only)	Removal of residual NAPL would eliminate the continued source to the dissolved-phase plume and shorten the time to site closeout. ORC will enhance bioremediation in the vicinity of the excavation.	Moderate effort to improve sheet pile wall near MW-34S prior to excavation. ORC Advanced can easily be incorporated into excavation backfill.	$381K
5.2.2a Limited NAPL-impacted soil removal and installation of additional gate in NW corner	Limited removal of residual NAPL would eliminate a continued source to the dissolved-phase plume and shorten the time to site closeout. The treatment gate near the excavation would eliminate the groundwater zone of stagnation and provide long-term treatment of any remaining dissolved-phase contaminants. More hydraulically effective than a gate near MW-7S.	Moderate effort to remove sheet pile wall, excavate residual NAPL, install gate near MW-34S and install air injection system. State no longer has concerns with a treatment gate close to the river. Proximity to river may make this more complicated than a gate near MW-7S.	$979K
5.2.2b Limited NAPL-impacted soil removal and installation of additional gate west of MW-7S	Limited removal of easily accessible residual NAPL would eliminate a continued source to the dissolved-phase plume and shorten time to site closeout. A treatment gate to the west of MW-7S would eliminate the groundwater zone of stagnation and provide long-term treatment of any remaining dissolved-phase contaminants. Less hydraulically effective than gate near MW-34S.	Moderate effort to remove sheet pile wall, excavate residual NAPL, install new gate near MW-7S and install air injection system. The State no longer has concerns with a treatment gate close to the river. Possibly easier to implement than a gate near MW-34S.	$979K

Note: Table 3 of this report omitted due to confidential business information (CBI) content

Recommendation	Effectiveness	Implementability	Cost
5.2.3a Groundwater flow modification to enhance treatment of existing funnel & gate system – install extraction wells	Installation of extraction wells down-gradient of Gates 5 & 6 would only induce a slight hydraulic gradient across the site; thus it would take years for contaminants to reach the treatment gates. Deemed ineffective.	Moderate effort to install extraction wells and treat groundwater prior to discharge. Long-term treatment of remaining dissolved-phase contaminants may not be necessary if source removed.	Not costed, ineffective
5.2.3b Groundwater flow modification to enhance treatment of existing funnel & gate system – large scale re-circulation cell	The re-circulation cell would induce flow in the groundwater zone of stagnation, however, there could be increased flow around the end of the sheet pile. Flow modification would encourage contaminated groundwater to migrate into areas that currently contain low-level contamination. Deemed ineffective.	Moderate effort to install extraction/injection wells and piping. Long-term treatment of remaining dissolved-phase contaminants may not be necessary if source removed.	Not costed, ineffective.

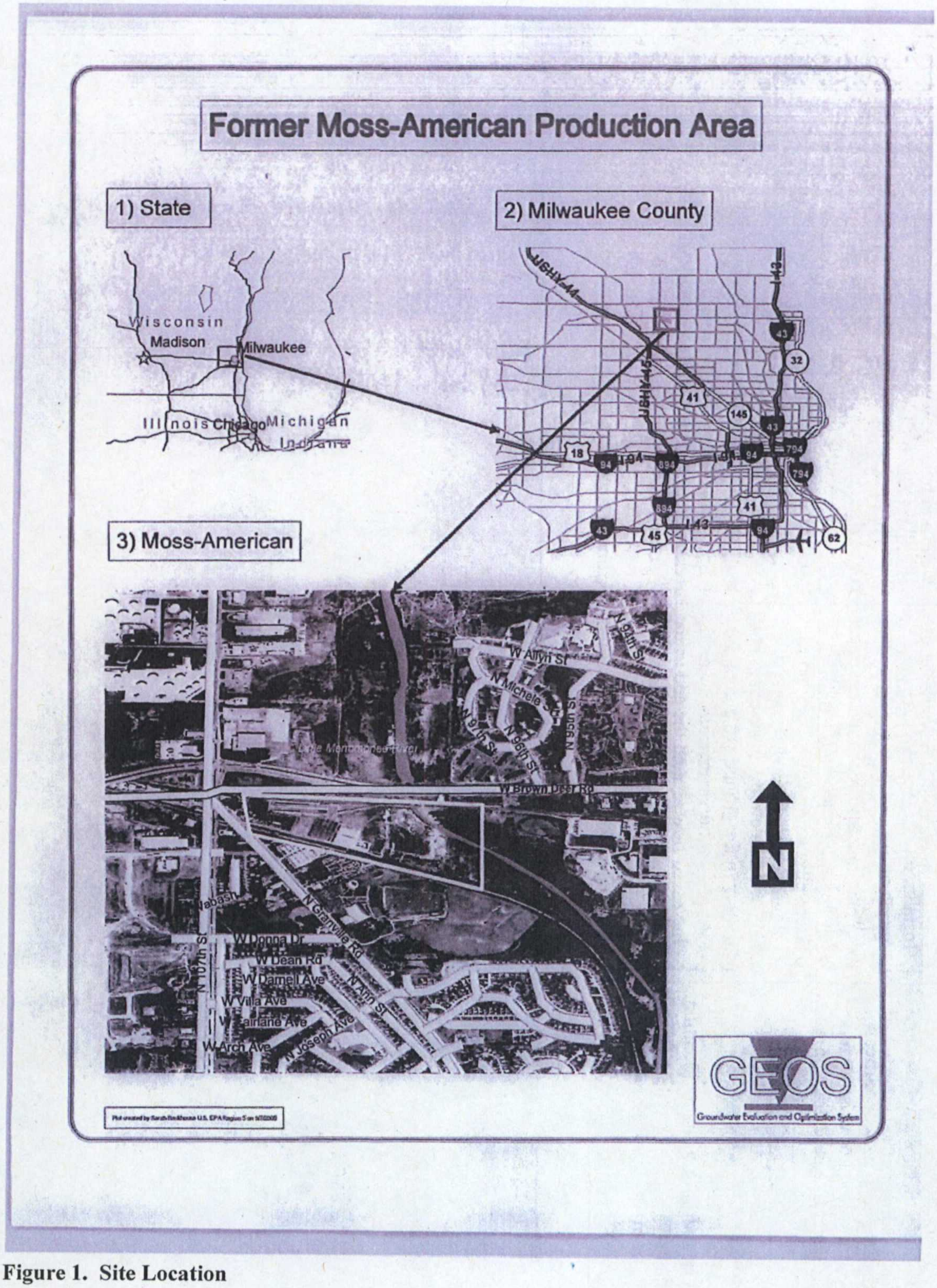


Figure 1. Site Location

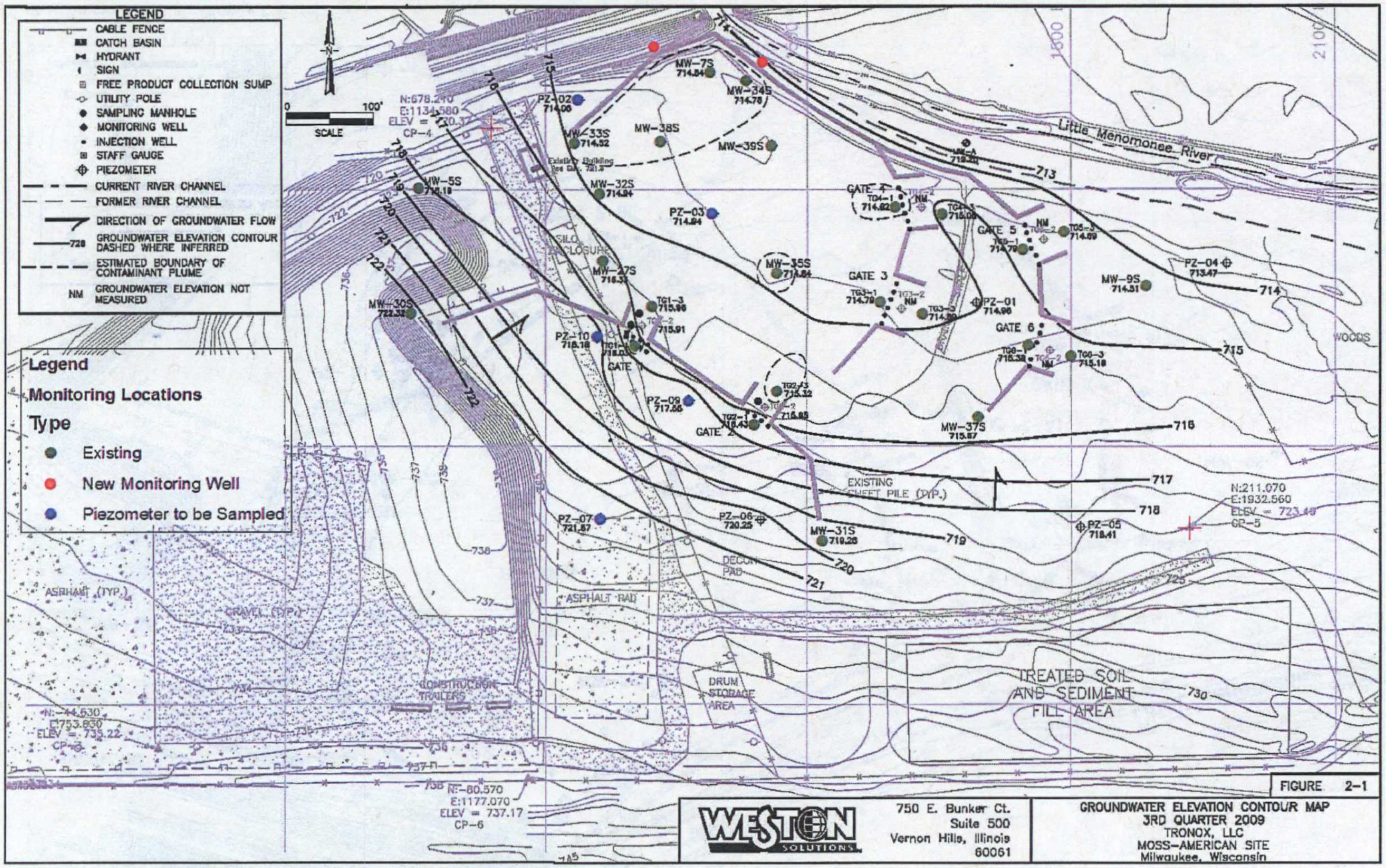


Figure 2. Proposed Additional Monitoring Locations for Chemical Analysis

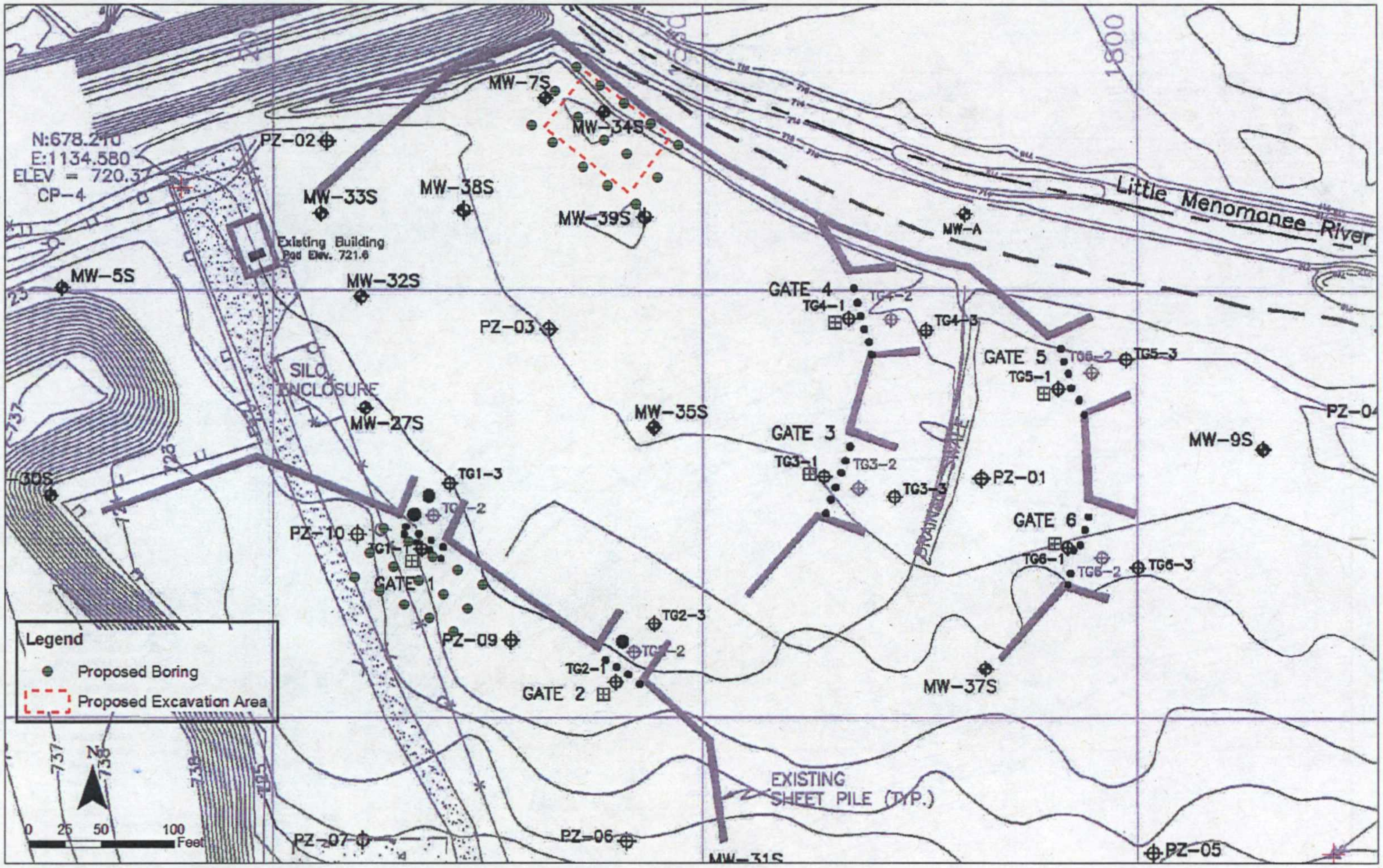


Figure 3. Potential NAPL Investigation Program

Appendix A
Groundwater Modeling Documentation

1. Computer Code

MODFLOW-2000 (Harbaugh et al., 2000) was utilized for the groundwater flow model. The Department of Defense Groundwater Modeling System (GMS) version 7.1 (EMRL, 2005) was used as the software platform and graphical-user interface for the groundwater flow model.

MODFLOW has a modular structure that allows it to be easily modified to simulate different aspects of the project. The model must use one flow and one solver package available. Those utilized for the Moss American model are:

- Layer Property Flow Package – This package defines how hydraulic properties of the model layers are defined, read, and utilized during the simulation. It differs from other flow packages in that all input data that define hydraulic properties are independent of model cell dimensions.
- Pre-conditioned Conjugate Gradient Solver Package – This package contains the information that defines the simultaneous equations that must be solved at each cell. Convergence information is output with this package if the solver fails to meet closure criteria.

Boundary condition packages are optional packages used to simulate various site-specific features of the project. The boundary condition packages utilized for the Moss American model are:

- Horizontal Flow Barrier (HFB) – This package is used to simulate the effects of the sheet pile walls, slurry trenches, or other objects which act as a barrier (or partial barrier) to horizontal flow.
- Well – This package is used to simulate injection wells or extraction wells.

2. Groundwater Model Design

Due to the limited site information, a simplified model was developed to screen groundwater flow modification alternatives at the Moss American site.

2.1. Domain and Grid

The model domain includes the area surrounding the funnel and gate system from just up-gradient of the southern-most gate system to the river. The simplified model consists of one layer with a uniform cell size of 10 feet horizontal and 15 feet thick and is shown in Figure A-1. The top elevation of each cell was interpolated from survey data of existing wells. It was assumed that the model lower boundary (top of the confining till unit) was uniformly 15 feet below ground surface (bgs).

2.2. Boundaries

Numerical models require boundary conditions, such that the hydraulic head or groundwater flux must be specified along all the outer edges of the system and any internal cells to which conditional head values must be determined (i.e., extraction well cells, drain cells). The boundary conditions used for the Moss American model include:

- A specified head boundary was used to represent the river elevation at the north-eastern boundary.

- A specified head boundary was used to simulate groundwater flow from upgradient of the model domain. Due to the limited site information, recharge was accounted for in the upgradient specified head instead of using the recharge package.
- Groundwater flows from the south to the north toward the river; therefore the north-western and south-eastern boundaries were specified as no flow.

2.3. Material Properties

Hydrologic properties were assigned to individual grid cells based on average properties referenced in the quarterly/annual groundwater monitoring reports. Based on slug tests completed during the remedial investigation (RI), the hydraulic conductivity of material location on the topographically higher, western portion of the site ranged from 0.03 to 0.003 ft/d. Based on the laboratory-performed hydraulic conductivity analyses conducted on material used to backfill areas of the site located along the river, the hydraulic conductivity of the material on the topographically lower portion of the site within the funnel and gate system is approximately 3 ft/d.

According to design documents, the funnel and gate system was constructed using internal cavity sealable joint sheet piles. Bulk hydraulic conductivity values for Waterloo Barriers, which have a sealable joint, have been reported at less than 1×10^{-8} cm/s. A conservative estimate for the hydraulic conductivity of 1×10^{-7} cm/s (0.00028 ft/d) was used to represent the sheet pile at the Moss American site.

2.4. Calibration

The purpose of model calibration is to establish that the model can reproduce field-measured hydraulic heads and flows. During the calibration process, model input parameters are adjusted so that field-measured heads and flows are reasonably correlated and are considered to provide a good representation of actual site conditions.

The Moss American groundwater model was calibrated to water levels collected during the 3rd quarter of 2009. Hydraulic conductivity values were varied until modeled water levels provided a reasonable match to the observed values and the residuals of the modeled versus observed heads were minimized. All water level values were weighted equally. Table A-1 presents the residual calibration statistics and Figure A-2 shows the graphical representation.

Table A-1. Residual Calibration Statistics

Mean Residual (Head)	-0.076
Mean Absolute Residual (Head)	0.611
Root Mean Squared Residual (Head)	0.715
Mean Weighted Residual (Head+Flow)	-0.149
Mean Absolute Weighted Residual (Head+Flow)	1.20
Root Mean Squared Weighted Residual (Head+Flow)	1.40
Sum of Squared Weighted Residual (Head+Flow)	62.8

The final hydraulic conductivity values used for the model are shown on Figure A-1 and were:

- South/Western area – 0.2 and 0.5 ft/d
- Funnel and gate area – 3.0 ft/d

3. Predictive Simulations

The calibrated model was used to evaluate modifications to the funnel and gate system that could improve groundwater flow in the north-west section near monitoring wells MW-7S and MW-34S. MODPATH was used to depict the flow paths of fictitious contaminant particles for each scenario, which are shown in green on the Figures A-3 through A-9. Arrows along the flow paths were placed every 10-years to represent the relative time-frame for contaminant migration. It should be noted that since the model was run at steady state, particles are shown to eventually pass through the sheet pile walls if the groundwater does not flow toward the treatment gates.

3.1. Current Conditions

Figure A-3 shows the groundwater elevation contours for the current funnel and gate configuration. The model shows that there is a stagnation point area near MW-7S and MW-34S as indicated by the slow particles moving through the sheet pile wall and that groundwater near MW-33S may be moving around the end of the sheet pile wall. Particles generated at Gate 1 are shown to migrate toward the eastern gates indicating that this part of the flow system is functioning as intended.

3.2. Excavation at MW-34S

Figure A-4 shows the groundwater elevation contours for the Excavation at MW-34S scenario. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-4) and backfill with sand and ORC. The model shows that there will still be a stagnation area near MW-7S and MW-34S, however, the presence of the higher permeability backfill material may induce localized flow toward the treated excavation area. This scenario does not impact the potential groundwater moving around the end of the sheet pile near MW-33S.

3.3. Small Scale Re-Circulation Cell, Excavation at MW-34S

Figure A-5 shows the groundwater elevation contours for the small scale re-circulation cell and excavation at MW-34S. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-5) and backfill with sand and ORC. In addition, a small re-circulation cell would be installed in the north east portion of the system to help distribute ORC to the dissolved phase plume. An extraction well would be installed near MW-34S and an injection well would be installed near MW-38S. Due to the low permeability soils near this area, pumping/injection would be very low (0.5 gpm). The model shows that this type of circulation cell could adequately distribute ORC throughout the remaining dissolved phase plume, however, there will likely be some groundwater mounding near MW-33S that could increase the amount of flow around the end of the sheetpile wall. Additional costs may include treatment of contaminated groundwater prior to re-injection.

3.4. Groundwater Extraction near Gate 5 and 6, Excavation at MW-34S

Figure A-6 shows the groundwater elevation contours for groundwater extraction near Gates 5 and 6 and excavation at MW-34S. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-6) and backfill with sand and ORC. Two groundwater extraction wells would be installed east of Gates 5 and 6. Due to the low permeability materials, groundwater extraction rates would only be about 0.75 gpm near Gate 5 and 0.25 near Gate 6. The model shows that the groundwater stagnation area near MW-7S and MW-34S still exists, however, flow no longer goes around the end of the sheet pile near MW-33S and groundwater near MW-38S will eventually reach the eastern treatment gates. Since the gradient is very low, it may still take over 30 years for the contaminated groundwater to reach the eastern treatment gates.

3.5. Large Scale Re-Circulation Cell, Excavation at MW-34S

Figure A-7 shows the groundwater elevation contours for the large scale re-circulation cell and excavation at MW-34S. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-7) and backfill with sand and ORC. One extraction well would be installed near Gate 5 and one injection well would be installed near MW-7S to induce flow across the system. Due to the low permeability materials, groundwater extraction/injection rates would be very low (0.25 gpm). The model shows that groundwater near MW-7S and MW-34S would flow toward the eastern treatment gates. Groundwater mounding near MW-33S could increase the amount of flow around the end of the sheet pile wall.

3.6. New Gate North of MW-34S, Excavation at MW-34S

Figure A-8 shows the groundwater elevation contours for a new gate north of MW-34S and excavation at MW-34S. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-8) and backfill with sand and ORC. A new gate with air injection treatment would be installed to the north of MW-34S. The model shows that flow is induced toward the gate from the up-gradient treatment gates, near the area of stagnation at MW-7S, and near MW-33S where groundwater is potentially migrating around the end of the sheet pile.

3.7. New Gate West of MW-7S, Excavation at MW-34S

Figure A-9 shows the groundwater elevation contours for a new gate west of MW-7S and excavation at MW-34S. This scenario includes excavation of NAPL containing soils around MW-34S (shown in red on Figure A-9) and backfill with sand and ORC. A new gate with air injection treatment would be installed to the west of MW-7S. The model shows that flow is induced toward the gate from the area of stagnation and near MW-33S where groundwater is potentially migration around the end of the sheet pile. This new gate configuration shows that groundwater flow from the up-gradient Gates 1 and 2 still flows toward the eastern gates.

4. References

Environmental Modeling Research Laboratory (EMRL), 2005. Groundwater Modeling System (GMS) version 6.5. Brigham Young University, Provo, UT. 2005.

Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G., 2000. MODFLOW-2000, the US Geological Survey modular ground-water model – User guide to modularization concepts and the ground-water flow process; USGS Open File Report 00-92, 121 p. 2000.

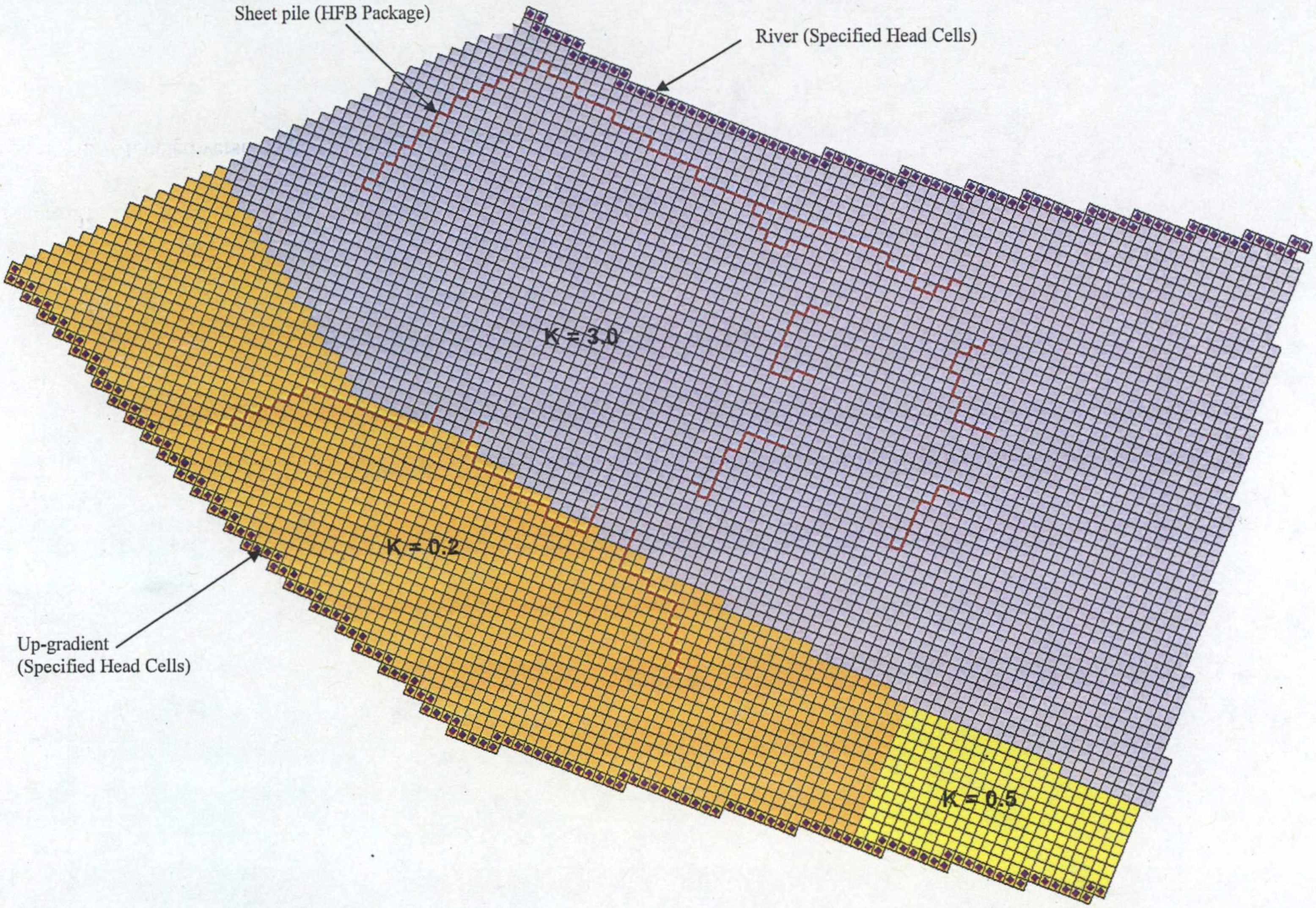


Figure A-1. Model grid and hydraulic conductivity zones.

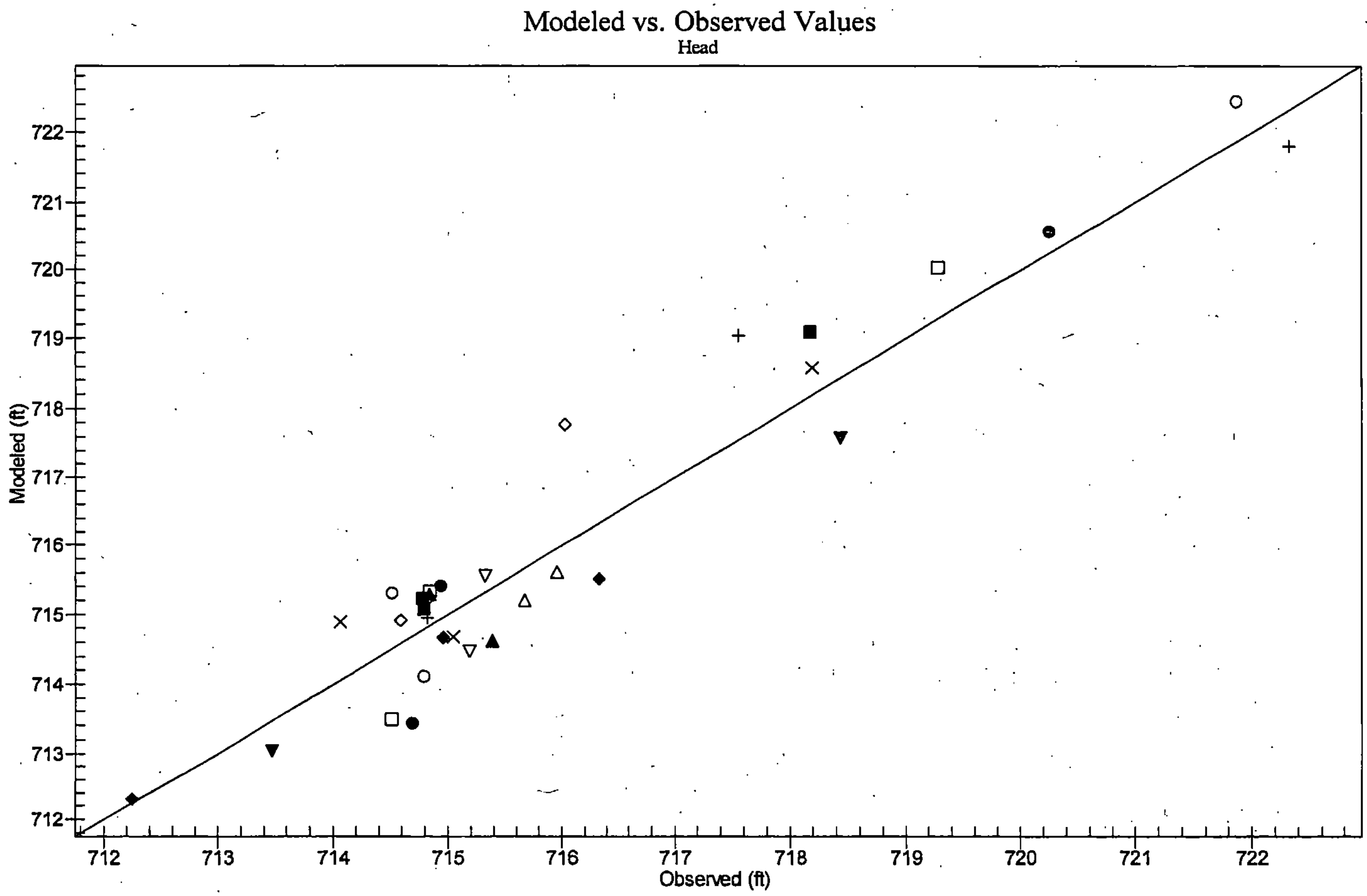


Figure A-2. Modeled versus observed heads.

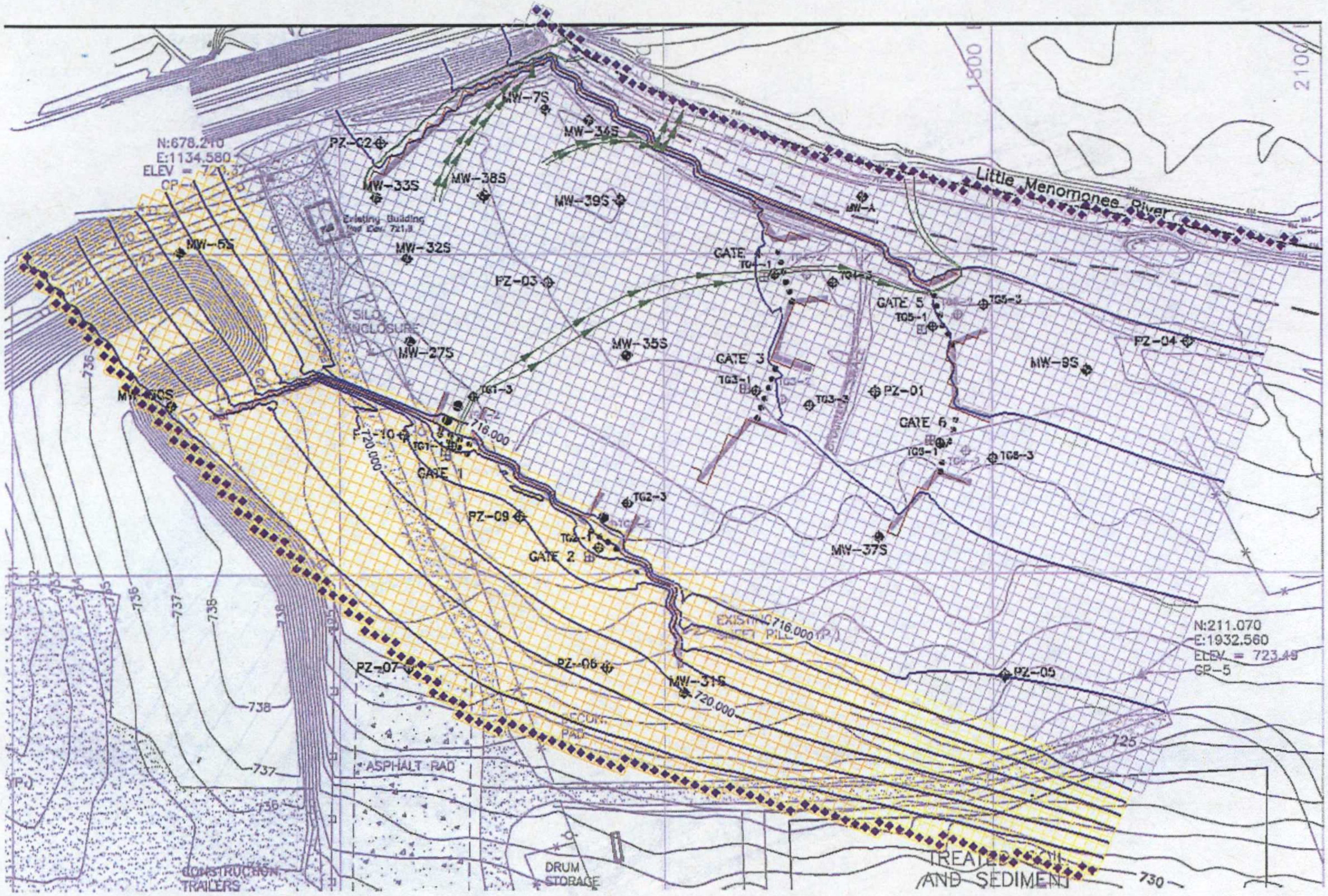


Figure A-3. Current Conditions

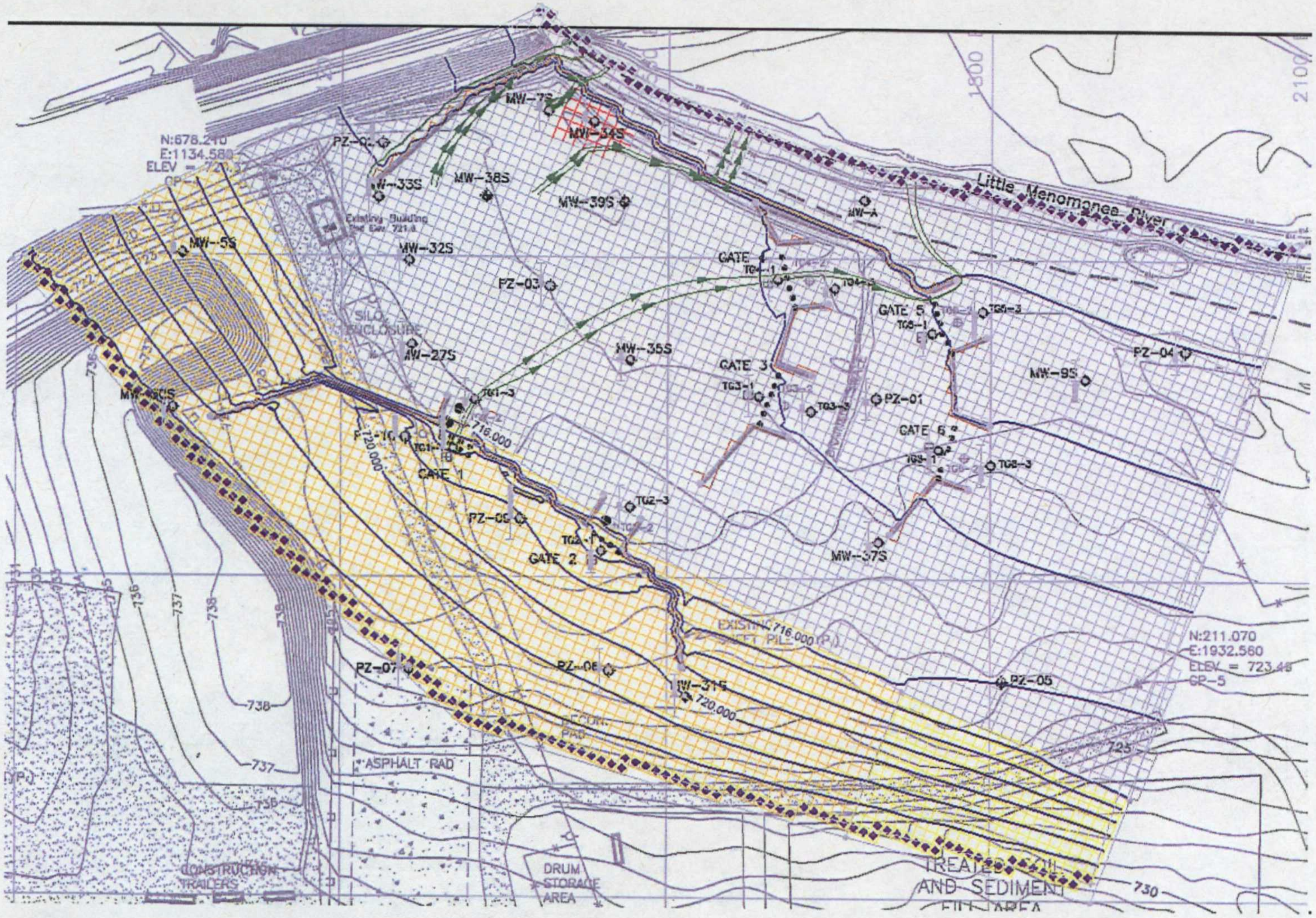


Figure A-4. Excavation at MW-34S.

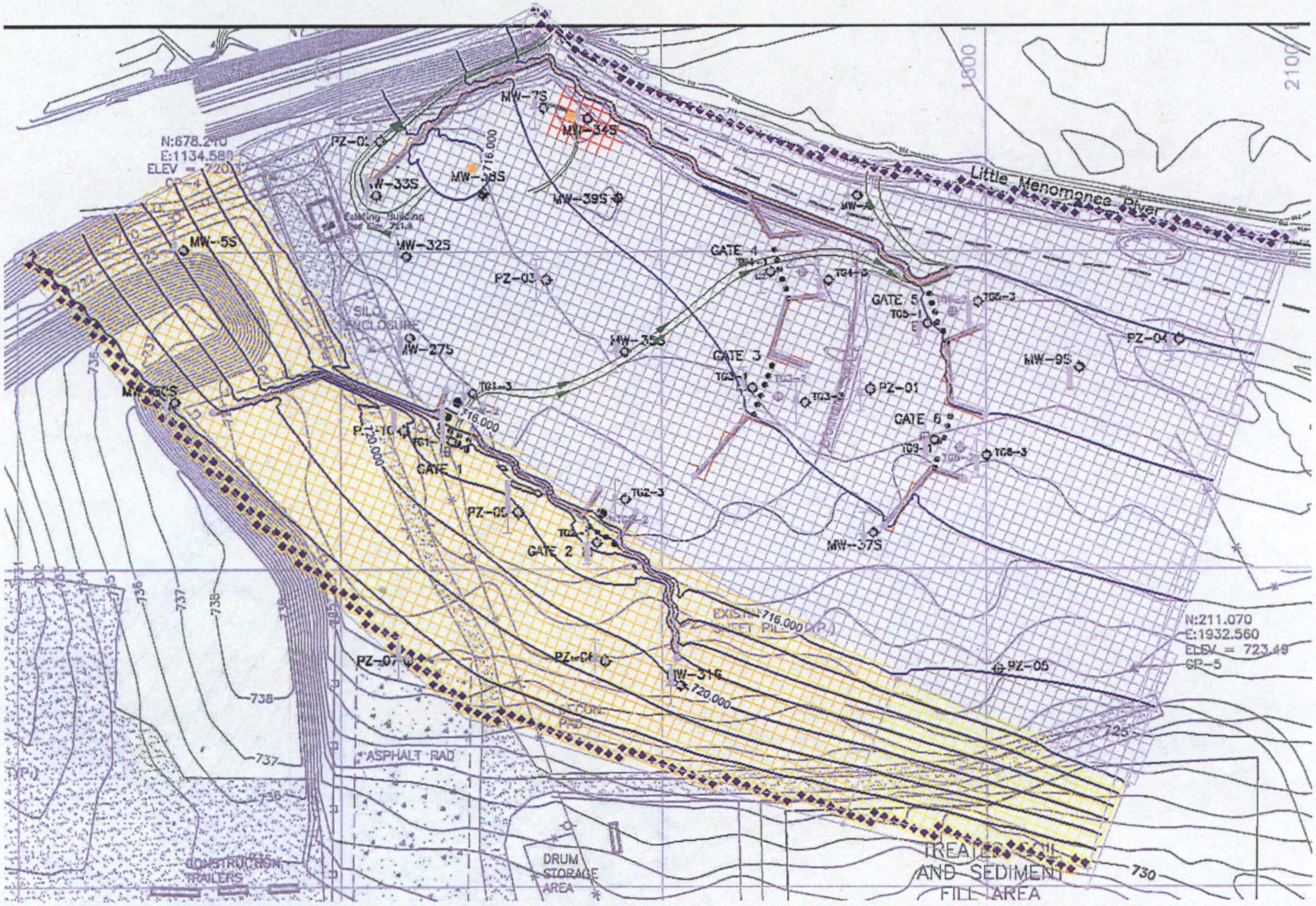


Figure A-5. Small Scale Re-Circulation Cell, Excavation at MW-34S

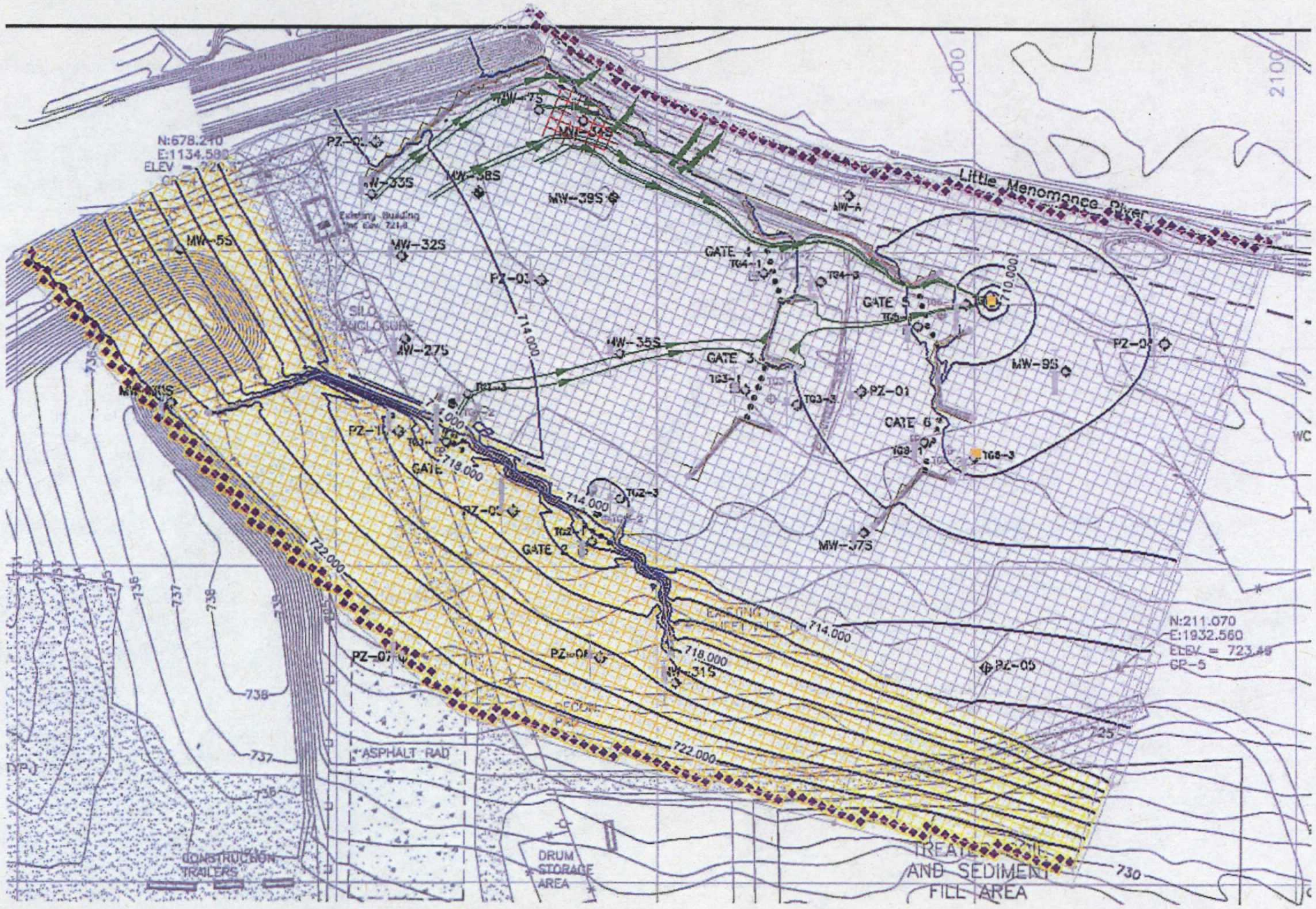


Figure A-6. Groundwater Extraction near Gate 5 and 6, Excavation at MW-34S

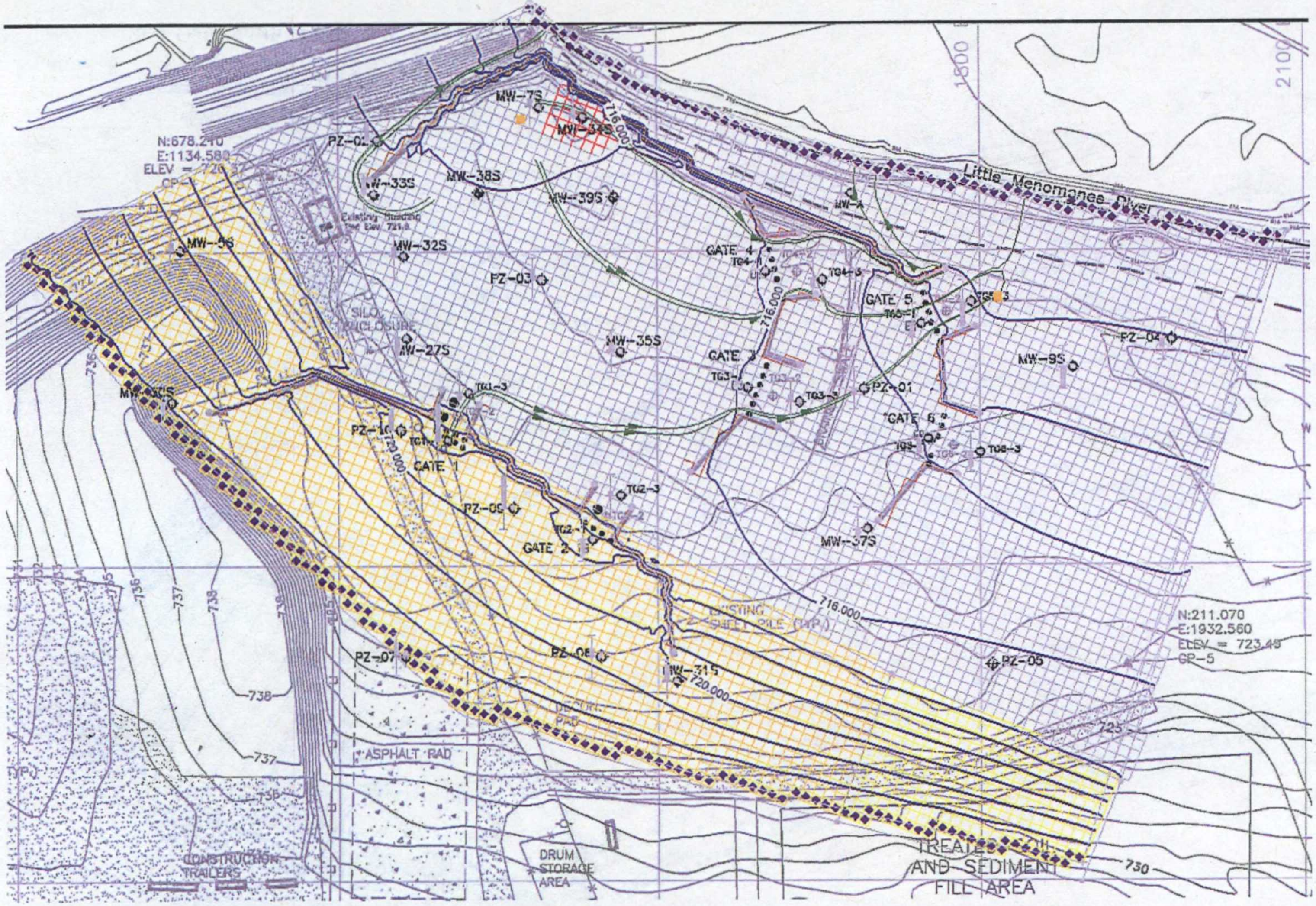


Figure A-7. Large Scale Re-Circulation Cell, Excavation at MW-34S

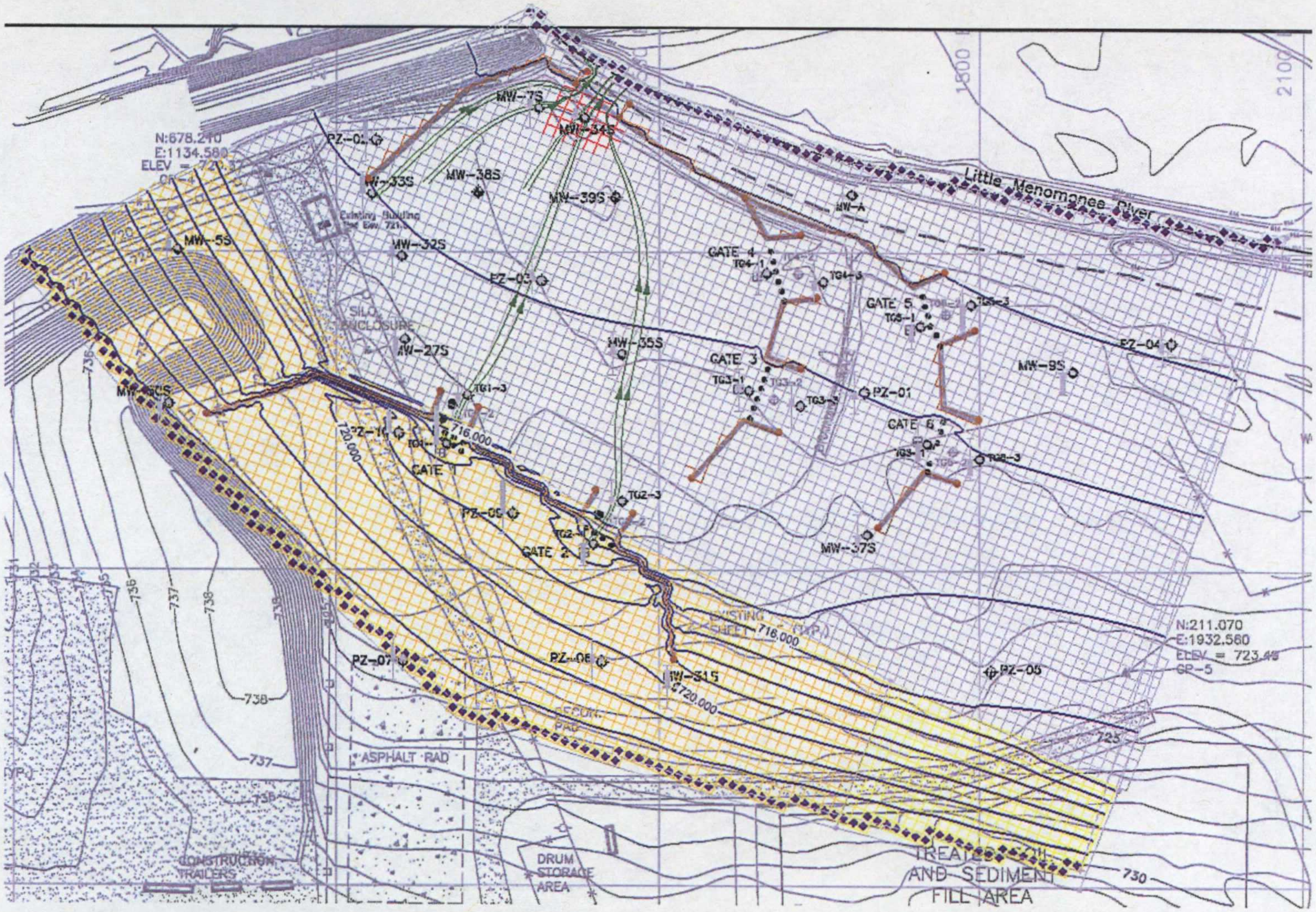


Figure A-8. New Gate North of MW-34S, Excavation at MW-34S

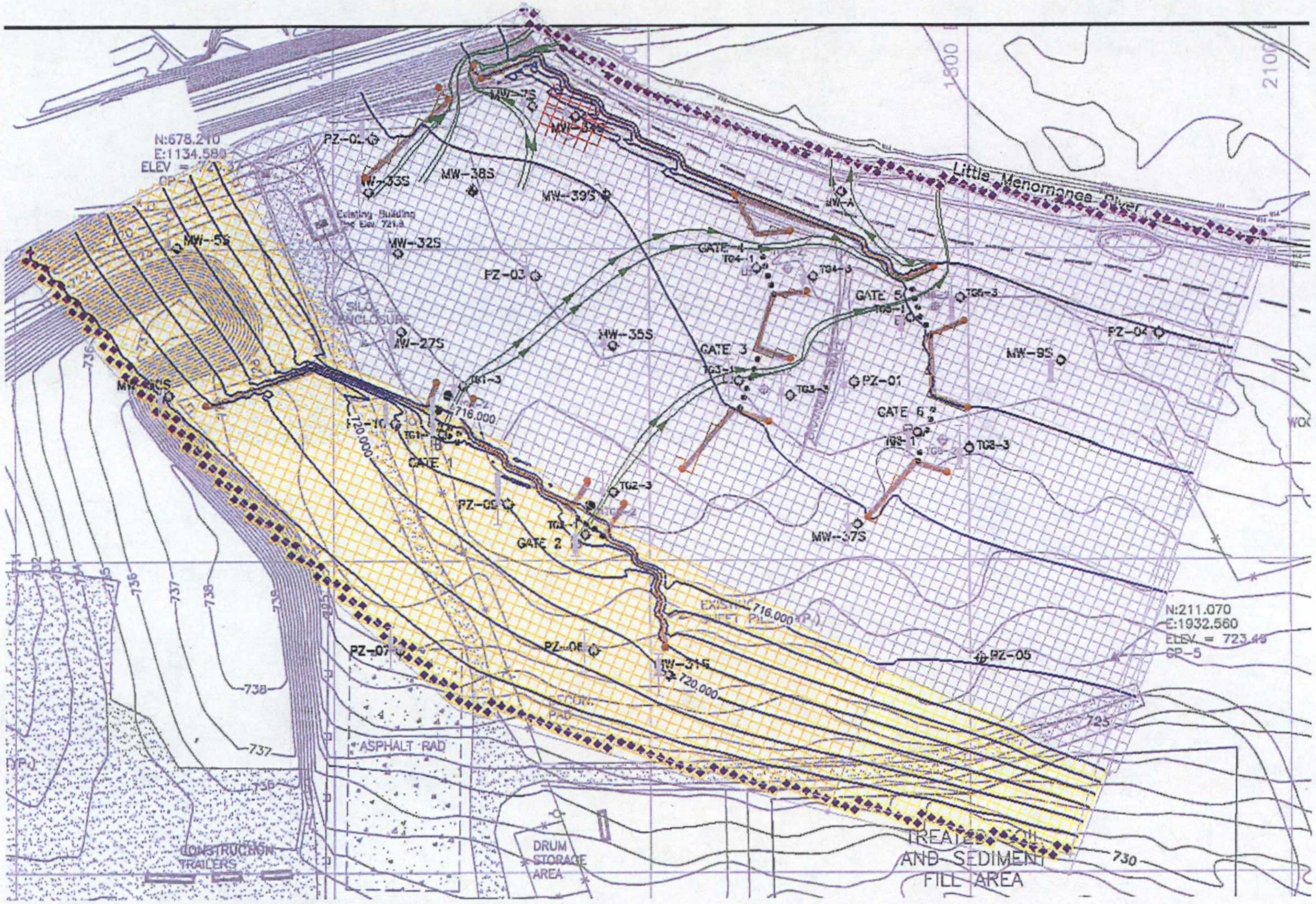


Figure A-9. New Gate West of MW-7S, Excavation at MW-34S

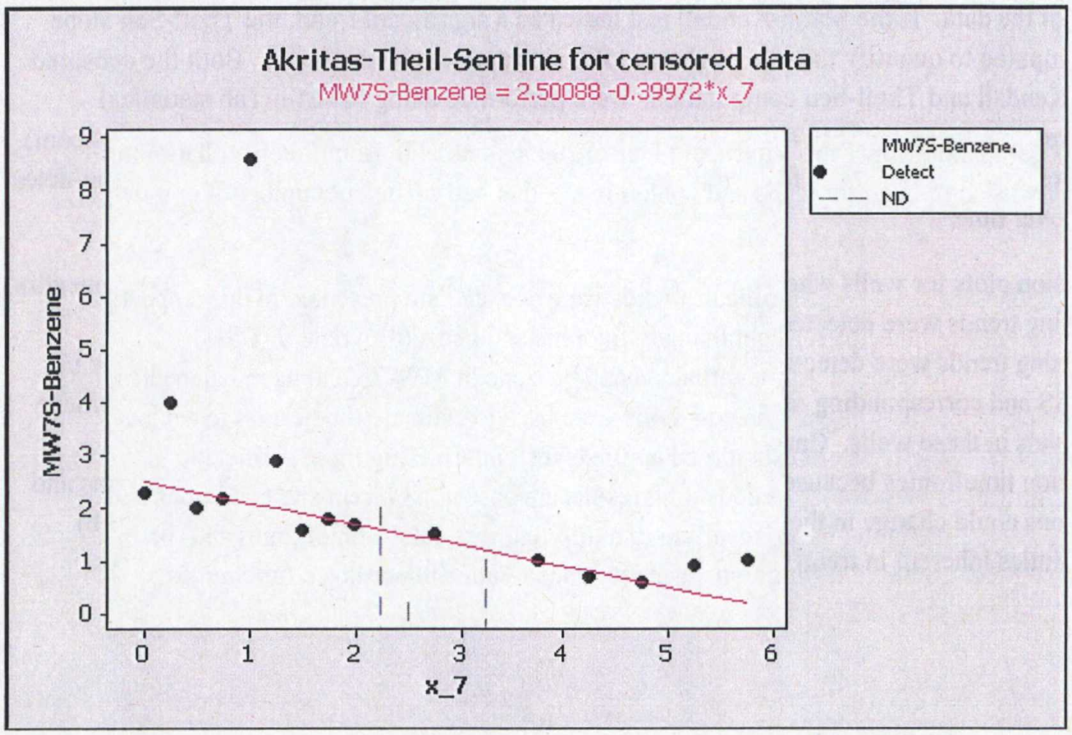
Appendix B

Trend Testing Methods.

Trend presence was determined at the 5% significance level using the censored Mann-Kendall trend test, which is a non-parametric procedure that accommodates datasets with non-detects. The censored Mann-Kendall test looks for trends in rankings of the data, rather than in absolute values of the data. If the Mann-Kendall test indicated a significant trend, the Theil-Sen slope was computed to quantify the rate of change of concentrations in each well. Both the censored Mann-Kendall and Theil-Sen computations were performed using the MiniTab statistical software program using MiniTab scripts from Helsel 2005a (available from PracticalStats.com). Trend testing was completed for wells and contaminants that had sufficient number of non-detect values over time.

Regression plots for wells where significant trends were detected are presented in this Appendix. Increasing trends were detected for naphthalene, fluorene and benzo(a)pyrene in TG1-1. Decreasing trends were detected for naphthalene and benzene in MW-7S and naphthalene in MW-38S and corresponding regression equations were used to estimate timeframes to achieve PAL levels in these wells. Caution should be applied when interpreting these predicted restoration timeframes because (a) trend testing results are based on current site conditions and conditions could change in the future resulting in a different restoration timeframes and (b) uncertainties inherent in trend testing translates into uncertainties in predicted timeframes.

Trend Testing Results.



Predicted Time to PALs: Benzene in MW-7S

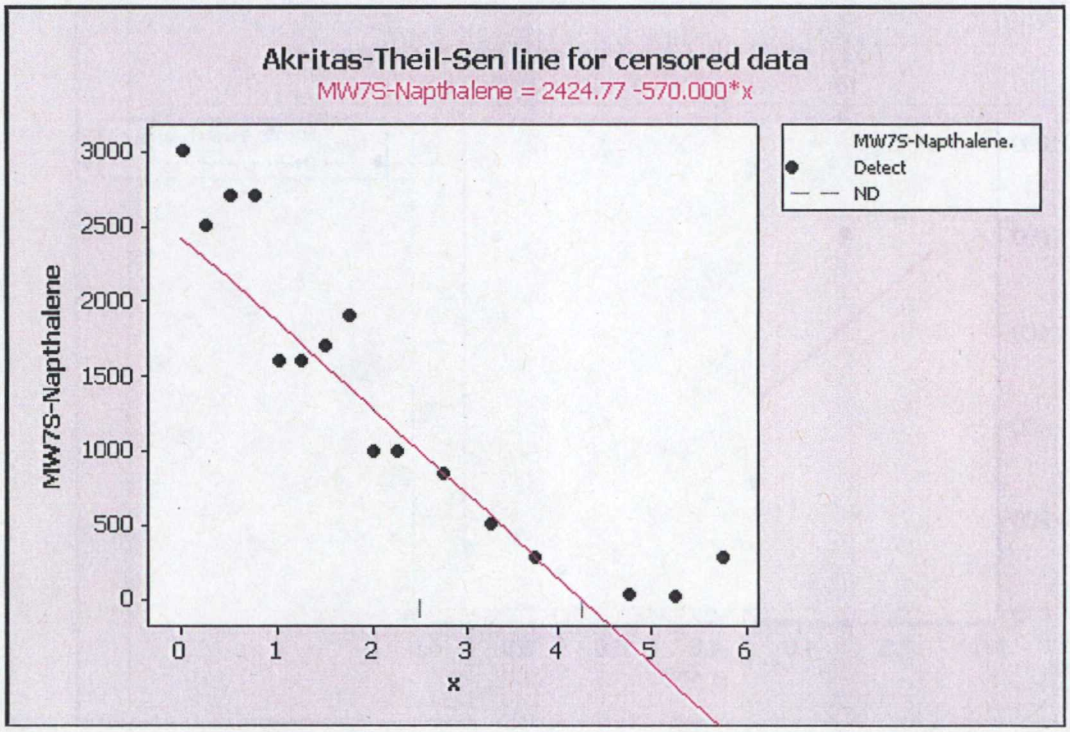
y = 2.500 – 0.3997 x

[Benzene PAL concentration, µg/L] = 2.500 – 0.3997 * [Predicted Time to PAL, years]

[0.5 µg/L] = 2.500 – 0.3997 * [Predicted Time to PAL, years]

[Predicted Time to PAL, years] = {[0.5 µg/L] – 2.500} ÷ {-0.3997}

[Predicted Time to PAL, years] = 5 years



Predicted Time to PAL: Naphthalene in MW7S

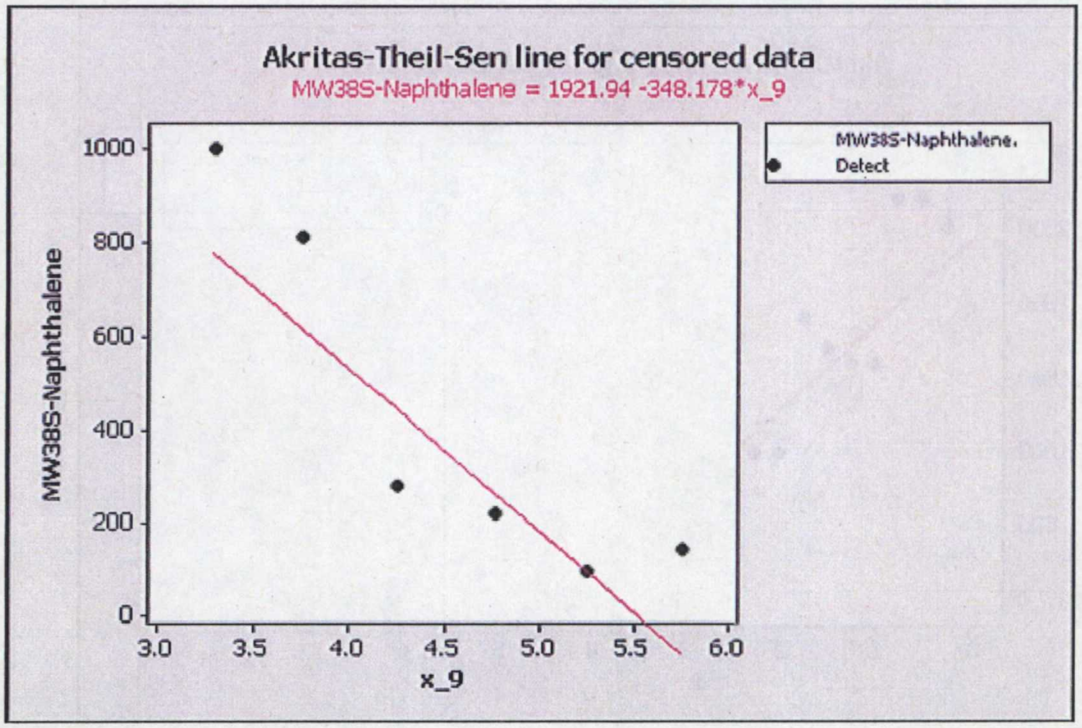
y = 2425 – 570 x

[Naphthalene PAL concentration, µg/L] = 2425 – 570 * [Predicted Time to PAL, years]

[8 µg/L] = 2425 – 570 * [Predicted Time to PAL, years]

[Predicted Time to PAL, years] = {[8 µg/L] – 2425} ÷ {-570}

[Predicted Time to PAL, years] = 4.2 years



Predicted Time to PALs: Naphthalene in MW-38S

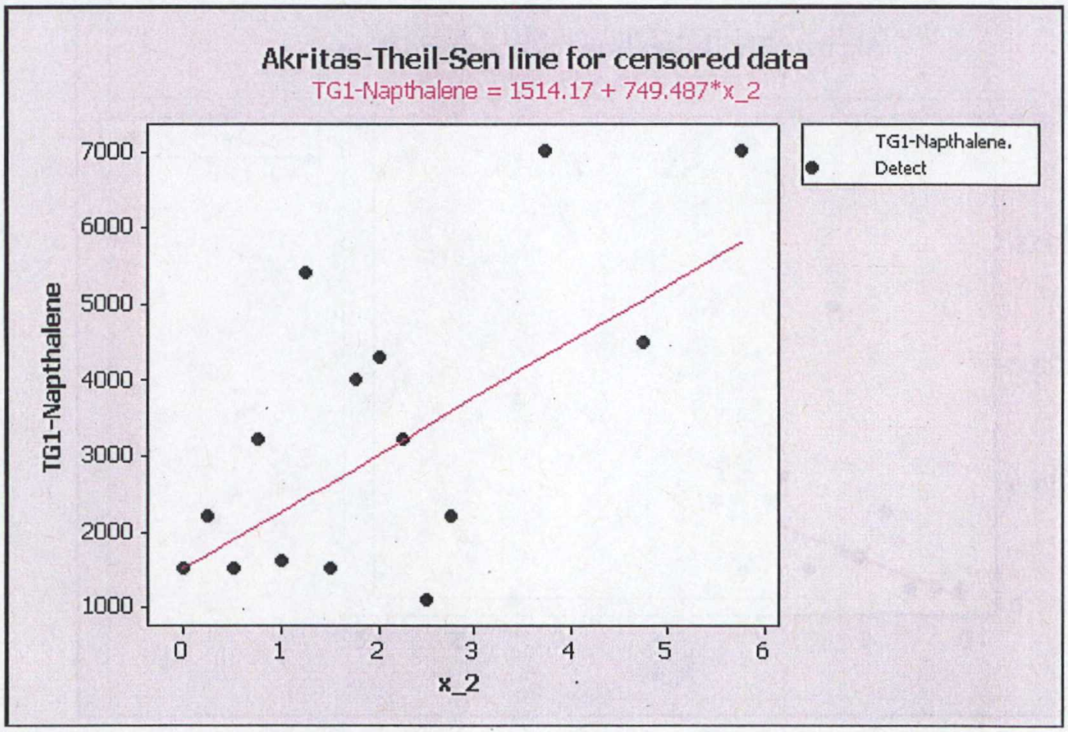
y = 1922 – 348.2 x

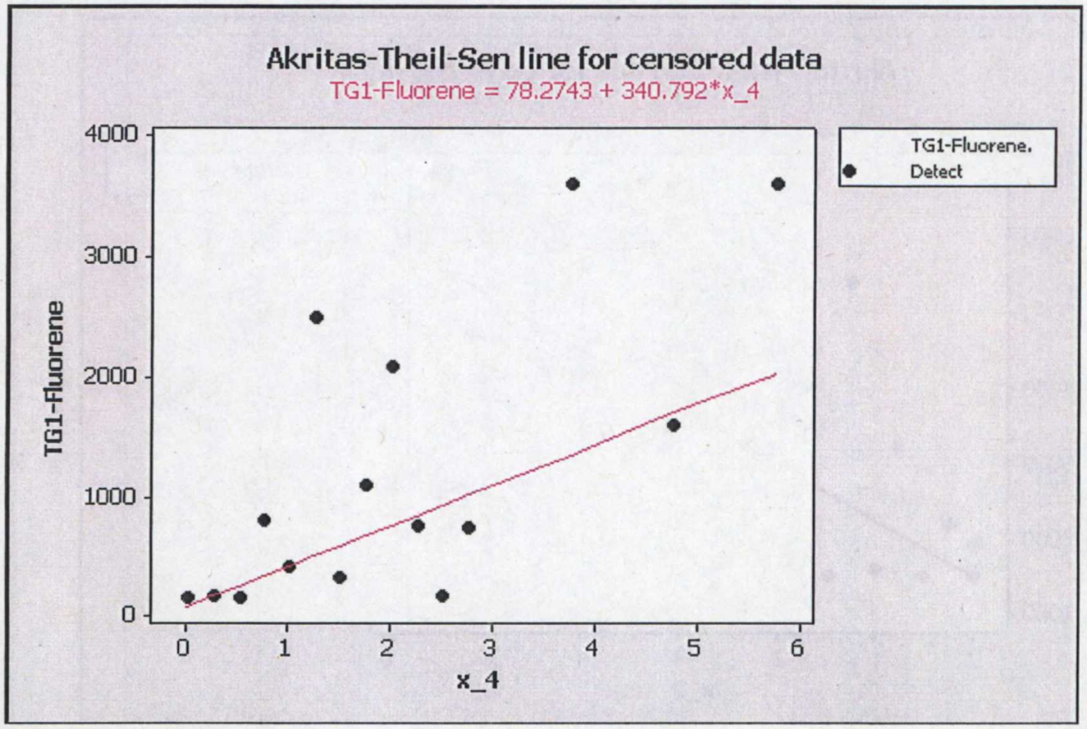
[Benzene PAL concentration, µg/L] = 1922 – 348.2 * [Predicted Time to PAL, years]

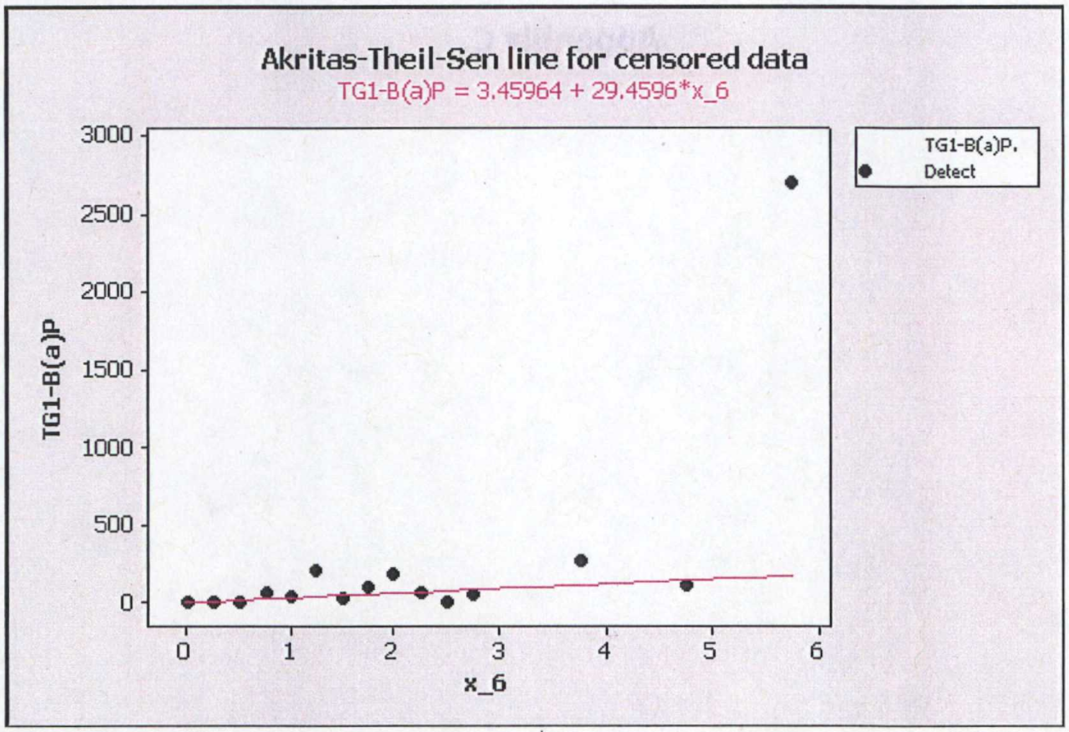
[8 µg/L] = 1922 – 348.2 * [Predicted Time to PAL, years]

[Predicted Time to PAL, years] = {[8 µg/L] – 1922 } ÷ {-348.2}

[Predicted Time to PAL, years] = 5.5 years


Akritas-Theil-Sen line for censored data
TG1-Napthalene = 1514.17 + 749.487*x_2
TG1-Napthalene
x_2
7000
6000
5000
4000
3000
2000
1000
0
1
2
3
4
5
6
TG1-Napthalene,
Detect


Akritas-Theil-Sen line for censored data
TG1-Fluorene = 78.2743 + 340.792*x_4
TG1-Fluorene
x_4
0
1000
2000
3000
4000
0
1
2
3
4
5
6
TG1-Fluorene.
Detect



Akritas-Theil-Sen line for censored data
TG1-B(a)P = 3.45964 + 29.4596*x_6
TG1-B(a)P, Detect
TG1-B(a)P
x_6
3000
2500
2000
1500
1000
500
0
0
1
2
3
4
5
6

Appendix C

constituent	weight percent NAPL	molecular weight, g/mol	mole fraction	single compound solubility in water, ug/L	effective solubility assuming γ = 1
naphthalene	25.1	128.17	0.29	31000	9094
phenanthrene	22.4	178.23	0.19		
acenaphthene	9.2	154.21	0.089		
fluoranthene	8.2	202.25	0.061		
2-methylnaphthale	7.5	142.2	0.079		
fluorene	6.7	166.22	0.060		
dibenzofuran	6.1	168.19	0.054		
pyrene	4.8	202.25	0.036		
anthracene	2.9	178.23	0.024		
benzo(a)anthracer	1.8	228.29	0.012		
check sum	*95*		*0.90*		

equivalent MWT creosote 149.80401

Estimated effective water solubiliyty of naphthalene in groundwater assuming typical creosote weight fraction, where NAPL constituents less than 2 percent were not included (Pacific Sound Resources RI/FS, 1998). A groundwater activity correction factor (gamma) of 1 was used for this estimate but the actual value is less less than 1, which means thae actual effective solublity estimate for naphthalene would be less than 9094 μg/L.

Attachment 2

IC Review Technical Memorandum
(September 2, 2010)

TECHNICAL MEMORANDUM

DATE: **September 2, 2010**

SUBJECT: Moss American – Need for Additional Restrictions

FROM: Ross del Rosario, RPM

TO: File

Discussion

The March 29, 2010 five-year review report for Moss American site described the four institutional controls recorded for the site. Three of these institutional controls are recorded on the former wood treating facility property, while the fourth institutional control applied to the whole site – the former facility and the 5-mile stretch of the Little Menomonee River, along with the floodplain on both banks of the river. Milwaukee County owns most of the downstream areas at the site and recorded the institutional controls which covered the downstream portion of the river and its floodplain on its property. However, during the review, it was discovered that three parcels of land within the river floodplain downstream of the former facility were not covered by those recorded institutional controls because Milwaukee County does not own them. Two of these parcels are owned by the City of Milwaukee and the third by a private homeowner. This technical evaluation focuses on whether additional restrictions will need to be placed on these three parcels, to ensure potential receptors are adequately protected from risks posed by site contaminants.

Findings and Recommendations

Based on information gathered provided below, institutional controls do not need to be recorded on the three downstream parcels of land not covered by the instruments the county recorded This finding was based primarily on information provided in the 1988 remedial investigation (RI) and a review of the institutional controls in place. The following relevant findings were gathered:

- The potential for future use of groundwater is low since the surrounding area is being adequately served by Milwaukee's public water supply. While there is no prohibition on installing a drinking water well in the area, the city's building and zoning code mandates that any building intended for human habitation or occupancy and located adjacent to a sanitary sewer, storm sewer, or water main be connected to the city's public water supply (see Chapter 225 of the city's building and zoning code). All three parcels in question meet the city's criteria for being connected to its water supply. Also, one of the city-owned parcels is zoned park land, so future development is highly unlikely on this particular parcel;

- According to the 1988 RI report, groundwater around the former wood treating facility flows in a northeasterly direction towards the river (see attached Figure 4 of RI). This would suggest that groundwater around the 3 parcels, which are south of the former wood treating facility, are located upgradient of the contaminated groundwater at the former wood treating facility. Consequently, site-related contaminants, with their associated risks, are not expected to be in the groundwater surrounding the three parcels;

- In the exposure assessment portion of the baseline risk assessment (BRA) found in the RI, some potential exposure pathways identified earlier were not determined to be complete pathways. One of these, exposure to humans through consumptive use of the groundwater, was eliminated from consideration for several reasons – there were no drinking water wells in the vicinity, the availability of public water supply, etc. Given the incomplete pathway of groundwater being consumed or in contact with humans, it appears the risks posed by groundwater, especially outside of the former wood treating facility are minimal, at best; and

- Groundwater contamination extends to a maximum depth of 20 feet below ground, limited to a 400-foot wide area near the former processing area of the facility and extending towards the river running through the site. According to the RI, this surficial upper aquifer does not have capacity as a drinking water source. Any drinking water well theoretically will have to be screened at the intermediate or lower aquifers which have not been shown to be contaminated. This is due to presence of sand and clay lenses that are acting as barriers to contaminants migrating downward from the surficial upper aquifer.

<u>Conclusion</u>

For reasons stated above, it is my best professional judgment that contaminants in groundwater at the former wood processing facility do not pose a threat to residents living on the three parcels along the floodplain not covered by the county deed restriction. Thus, additional restrictions for these three parcels are not necessary at this time.

Attachments

Institutional Controls for Moss American (from 3/29/10 Five-Year Review)

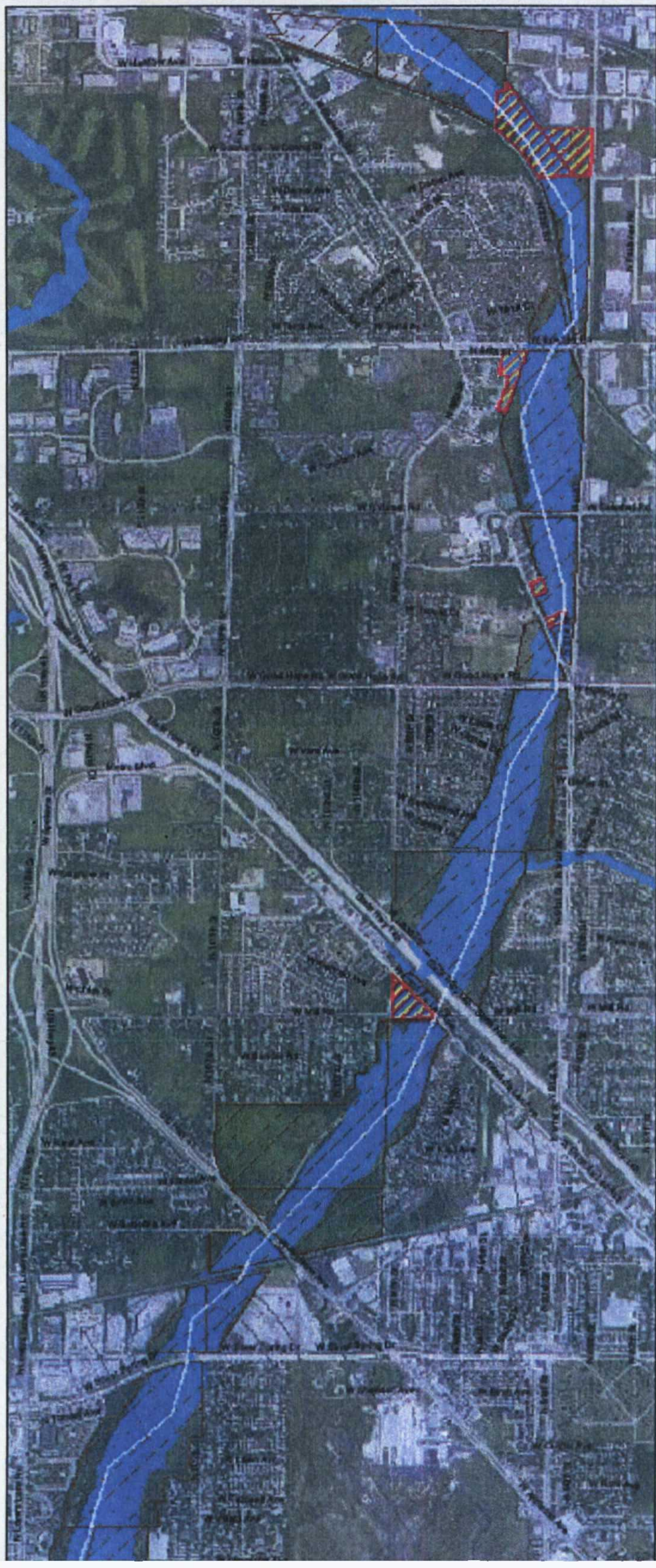
Media, Engineered Controls, & Areas that do not support UU/UE based on current conditions	IC Objective	Title of Institutional Control Instrument Implemented
Former Wood Treating Site – **Soil** Floodplain portion (County-owned)	By limiting usage to recreational use along the river floodplain, it is unnecessary to remediate soil contamination on the property to residential soil cleanup standards and will allow for implementation of the selected floodplain remedy described in the 1990 ROD.	Title: *Deed Restriction and Notice to Future Purchasers*. Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 79313111. Enforceable by EPA, WDNR, and their successors or assigns. Prohibits 1) Excavating or grading of land surface 2) penetrating existing cap(s)/cover(s) 3) Filling on covered areas 4) Construction, installation, or removal of a building, pipe, road, or any structure with a foundation that would sit on the cover 5) Plowing for agricultural cultivation 6) Extraction of gw for consumption or any purpose other than gw monitoring 7) Any activity that may damage any constructed remedy or impair its effectiveness. Limited to recreational use.
Former Wood Treating Site – **Soil** Non-floodplain property owned by the county	Prohibits non-industrial use. Amended from 1996 deed restriction as result of 1998 ROD Amendment and compliance with State law.	Title: *Deed Restriction and Notice to Future Purchasers*. Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 79313110. Enforceable by EPA, WDNR, and their successors or assigns. Limited to industrial use.
Former Wood Treating Site – **Soil** Non-floodplain property owned by the railroad	Prohibits non-industrial use. Amended from 1996 deed restriction as a result of 1998 ROD Amendment and compliance with State law.	Title: *Deed Restriction and Notice to Future Purchasers*. Limited to industrial use. Enforceable by EPA, WDNR, and their successors or assigns
Floodplain downstream from former Wood Treating Site – **Soil**	Prohibits any installation, construction, or removal of structures around areas remediated during response action (i.e., areas rerouted). Prohibits use of area for any activity	Title: *Amended Declaration of Restriction on Use of Real Property* Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931309.

Media, Engineered Controls, & Areas that do not support UU/UE based on current conditions	IC Objective	Title of Institutional Control Instrument Implemented
	that may damage or impair the response action.	
Former Wood Treating Site – **Groundwater**	Prohibits consumption or other uses of groundwater. Note: No one in the area currently is using groundwater. Residents are connected to city water. According to the RI, the contaminated shallow groundwater does not have adequate capacity as a drinking water source.	Title: *Amended Declaration of Restriction on Use of Real Property* Recorded in Milwaukee County Register's Office on June 30, 2000. Reference No. 7931309. Enforceable by EPA, WDNR, and their successors or assigns
Groundwater – Downstream from former wood treating site (focus on 3 parcels of land not owned by the county)	Prohibit groundwater use until cleanup standards are achieved.	(Need is under review)
Surface Water Site-wide	Ensure no inappropriate uses	(Need is under review)
Other Remedy Components	Ensure no interference with remedy components	(Need is under review)

Institutional Control (IC) Review

Implemented Restrictions and Institutional Controls

Superfund
U.S. Environmental Protection Agency



Moss American Kerr-McGee
Milwaukee County, WI

EPA ID# WID039052626

Legend

- Restricted Parcels
- Parcels without Restrictions
- 100- Yr. Flood Plain
- Menomonee River

0 137.5275 550 825 1,100 Meters

GEOS

Produced by Angela [illegible]
[illegible]

CHAPTER 225
PLUMBING AND DRAINAGE

TABLE

SUBCHAPTER 1
STATE RULES AND LOCAL ENFORCEMENT

SUBCHAPTER 2
SEWAGE DISPOSAL SYSTEMS

SUBCHAPTER 3
GAS PIPING SYSTEMS

SUBCHAPTER 4
WELL ABANDONMENT AND WELL OPERATION PERMIT

SUBCHAPTER 1
STATE RULES AND LOCAL ENFORCEMENT

225-01. Adoption of State Law. Except as otherwise provided in this chapter, the city of Milwaukee adopts ss. 145.01, 145.06, 145.11, 145.15(4) and 145.175, Wis. Stats., as amended, and chs. Comm 81 to 87, Wis. Adm. Code, as amended, as part of this code.

225-02. Retroactivity of Various Wisconsin Administrative Code Plumbing Provisions. Sections Comm 82.21, 82.30, 82.31 and 82.41, Wis. Adm. Code, as amended, shall apply retroactively if upon inspection of any part of an existing plumbing system a condition is identified that tends to create a potential health hazard. If such a condition is identified by the department, then the plumbing system or any part thereof shall be repaired, renovated, replaced, or removed in conformity and compliance with ss. Comm 82.21, 82.30, 82.31 and 82.41, Wis. Adm. Code, as amended.

225-1. Administration. 1. ENFORCEMENT. The commissioners of neighborhood services, health and public works, where specified, or their duly authorized representatives, shall enforce this chapter.

2. DUTIES. a. The commissioner of neighborhood services shall:

a-1. Register upon application every master plumber carrying on his or her trade or business in the city.

a-2. Inspect all plumbing and drainage installations, including connections to main sewer.

a-3. Conduct and witness tests as regulated in this chapter.

continues to operate the system in such a manner as to cause the development of any public health nuisance or the pollution of any public watercourse, the commissioner of health shall operate the system and make whatever changes he deems necessary in the system, including reconstruction, repair or alteration to attain its proper operation; or the commissioner of neighborhood services shall cause connection to be made to the sanitary or combined sewer, and the cost of reconstruction, repair or alteration and the cost of operation of the system shall be made at the expense of the city; the cost of the connection to the sanitary or combined sewer and the sums so expended in the abatement or removal of any nuisance or nuisances in such cases shall be a lien in the same manner as any tax upon real estate upon the premises served by the individual sewage disposal system; the sums to be collected in the manner specified in s. 17-12, city charter.

4. Nothing in this subchapter shall be construed so as to take away any of the powers of the city to abate a nuisance by an action under applicable provisions of state law, charter or simple ordinance, in cases where there is the development of any public health nuisance or the pollution of any watercourse.

225-19. Hearings. 1. BY WRITTEN REQUEST. If the commissioner of health refuses to issue a permit for construction or alteration of an individual sewage disposal system, the applicant for the permit may file in the office of the commissioner of health a written request for a public hearing by the commissioner. The commissioner shall hold a public hearing at a time and place designated by him within 20 days of the date on which the written request was filed. The petitioner for the hearing shall be notified of the time and place of the hearing not less than 5 days prior to the date on which the hearing is to be held. The proceedings of such hearings, together with the findings and decision of the commissioner of health, shall be reduced to writing and placed on file in the office of the commissioner, and a copy shall be served on the petitioner by the commissioner of health or by delivery to the petitioner by registered mail, return receipt requested.

2. REVIEW. Any persons, jointly or severally, aggrieved by the decision of the commissioner of health, or any taxpayer, or any officer, department, board or bureau of the city, may seek relief by having the decision reviewed by the circuit court by certiorari, if the petition for the writ is presented to the court within 20 days after the date on which a copy of the hearing proceedings with the commissioner's decision was served on the person who filed the petition for hearing, and if the person aggrieved notifies the commissioner within 10 days after a copy of the hearing proceedings with the commissioner's decision was served on him of his intention to present such petition to the court. Such petition, duly verified, shall set forth that such decision is illegal in whole or in part, specifying the grounds.

225-20. Rules and Regulations. The commissioner of health is authorized to make and adopt written rules and regulations necessary to carry out the provisions of this subchapter. Such rules and regulations shall have the same force and effect as the provisions of this code, and the penalty for violation thereof shall be the same as the penalty for violation of the provisions of this subchapter. A copy of such rules and regulations shall be kept on file in the city clerk's office, in the legislative reference bureau, and in the office of the commissioner of health.

225-21. Inspection and Enforcement. Within 3 days after the commissioner of health issues a permit for the construction or alteration of an individual sewage disposal system, he shall transmit to the commissioner of neighborhood services a copy of the permit. The commissioner of neighborhood services, or an authorized representative, shall make such inspections as necessary to assure that every individual sewage system is constructed, installed or altered in accordance with the requirements set forth in the permit, and the commissioner of neighborhood services may prosecute any person who violates the terms of a valid permit issued by the commissioner of health.

225-22. Municipal Service. To preserve public health, comfort and safety, every building intended for human habitation or occupancy and located adjacent to a sanitary sewer, storm sewer or water main shall be connected to each or all in a manner prescribed in this section.

225-23 Plumbing and Drainage

1.a. Every building shall be provided with a supply of potable water in compliance with this section.

b. All property shall be connected to the water main prior to sale, except as provided in par. c.

c. If a property is not connected to the water main because of an existing well, the owner is not required to connect if a statement concerning the property is recorded by the property owner with the register of deeds stating that there is no connection to the public water main at this time and connection is required by ordinance to be made within 30 days after the sale of such property.

d. All property shall be connected to the public water main within 30 days of sale.

e. All property shall be connected to the public water main immediately if upon inspection the private well proves not to be working properly or if the well proves to be tested unsafe in accordance with s. 225-37-4.

2. When sanitary sewers approved by the Wisconsin department of natural resources and the department of public works become available, the use of a private sewerage system shall be discontinued within the time stipulated by order of the commissioner but not to exceed a period of one year.

a. When public sewers become available to any premises served by a private sewage disposal system, the private sewage system shall be discontinued and the building sewer shall be connected to the public sanitary sewer within the time allotted under sub. 2 except where a hardship can be justified by letter, but not to exceed 30 days after the sale of such properties. Such properties shall be connected to the public sewer immediately if upon inspection the private disposal system proves not to be working properly.

b. A building shall be deemed to have the facility available if the premises on which the building is located has been determined by the commissioner of public works to be served by the respective facility.

225-23. Private Sewage Systems.

1. ADOPTION. This section is adopted pursuant to s. 59.70(5), Wis. Stats.

a. This section shall be subject to the provisions of ch. 145, Wis. Stats., and all subsequent rules and regulations promulgated thereunder regarding private sewage systems.

b. This section shall not be more lenient or more stringent than the rules and regulations promulgated pursuant to ch. 145, Wis. Stats.

2. ISSUING AGENT. The commissioner shall act as the issuing agent and is assigned the duties of administering the private sewage system program.

3. SANITARY PERMIT. a Validity.

a-1. No person may install a private sewage system unless the owner of the property on which the private sewage system is to be installed holds a valid sanitary permit.

a-2. No person may sell at retail a septic tank for installation unless the purchaser holds a valid sanitary permit.

a-3. A sanitary permit is valid for 2 years from the date of issue and renewable for similar periods thereafter.

a-4. A sanitary permit may be transferred from the holder to a subsequent owner of the land, except that the subsequent owner must obtain a new copy of the sanitary permit from the issuing agent.

b. Application Forms. The issuing agent shall use the sanitary permit forms provided by the Wisconsin department of commerce.

c. Application Process. c-1. The applicant shall submit the completed sanitary permit application to the issuing agent.

c-2. The issuing agent shall review the certified soil tester reports for the proposed private sewage systems and verify the report at the proposed site if necessary.

c-3. The issuing agent shall approve or disapprove application for sanitary permits and assist applicants in preparing an approvable application.

c-4. The issuing agent shall issue written notice to each applicant whose sanitary permit application is disapproved. Each notice shall:

c-4-a. State the specific reasons for disapproval and amendments to the application, if any, which would render the application approvable.

c-4-b. Inform the applicant of the right to appeal and the procedures for conducting an appeal to the commission under s. 200-17.

4. FEES. a. The fee for a sanitary permit shall be as specified for a septic system or holding tank under s. 200-33.

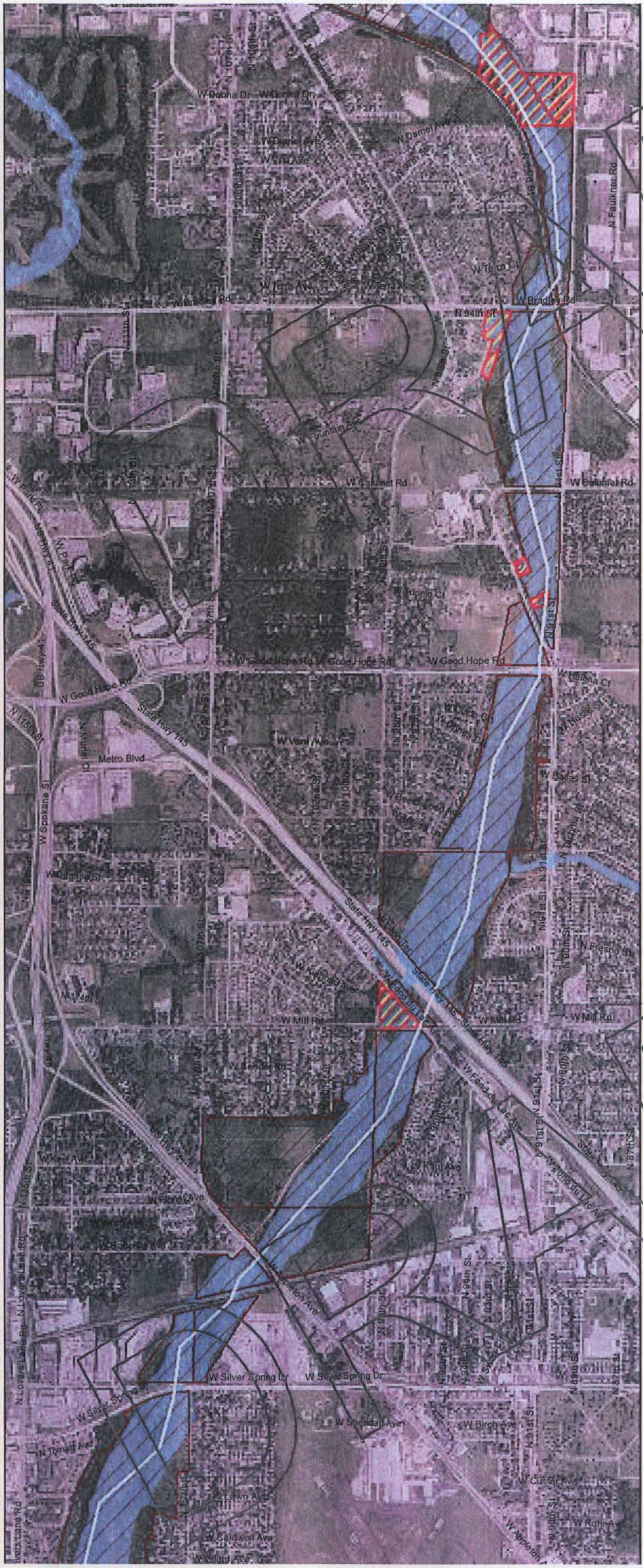
a-1. The city may not charge more than one fee for a sanitary permit or the renewal of a sanitary permit in any 12 month period.

Attachment 3

IC Map

Milwaukee County, WI

EPA ID# WID039052626



Legend

- Restricted Parcels
- Parcels without Restrictions
- 100- Yr. Flood Plain
- Menomonee River

Meters
0 137.5275 550 825 1,100

N

GEOS
Groundwater Evaluation and Optimization System

Attachment 4

Notice of State O & M Responsibility
(March 10, 2011)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

MAR 1 0 2011

SR-6J

Mark Gordon, Supervisor
Wisconsin Dept. of Natural Resources
Remediation and Redevelopment
Policy and Technical Resources Section
101 S Webster Street - RR/5
Madison, WI 53703

Re: Moss-American Superfund Site, Milwaukee, Wisconsin – Remaining Activities

Dear Mr. Gordon:

In light of the recent settlement of the Tronox bankruptcy case involving the Moss American Superfund site in Milwaukee, Wisconsin, our respective agencies are now responsible for carrying out the remaining remedial action work and operation and maintenance (O&M) activities, at this Superfund site. At this juncture, we need to determine and document the responsibility for performing O&M. This involves the operation of the groundwater treatment system (funnel and gate system), annual and semiannual groundwater monitoring, and maintenance activities such as grass cutting and/or fence repairs.

As we discussed in our January 19, 2011 conference call, the key to determining the start of the O&M activities for the groundwater treatment system is when the system became operational and functional (O&F). If this had originally been a fund-lead site, a long-term response action (LTRA) period would have ensued following the O&F determination. The U.S. Environmental Protection Agency would have operated and maintained the groundwater treatment system during the LTRA period. In this case, LTRA would have lasted ten years, because groundwater cleanup objectives were not met in less time. At the end of the LTRA period, the operation of the groundwater treatment system is considered O&M. Our regulations require the State to assume site O&M activities.

In reviewing relevant site information with Tom Wentland of WDNR, we believe that O&F was achieved sometime around January or February of 2001, based on construction completion of the groundwater treatment system in July 2000 and a shakedown period of around 5-6 months. Selecting an O&F date of February 2001 would indicate that O&M for the groundwater treatment system should start March 1, 2011. A written response from WDNR confirming the O&F date no later than February 2001, and start of the O&M period as March 1, 2011, would be appreciated.

In addition, we would like to coordinate with you regarding the remaining remedial action activities at the site. We have approximately $725,000 from the Tronox bankruptcy settlement. In addition, we have approximately $700,000 of remedial action money remaining in the work assignment for previous Fund-lead remedial measures conducted at the site. The State of Wisconsin has already provided their cost share for this remedial action funding through an existing state superfund contract with EPA. Remedial action cost share funding will not be necessary from Wisconsin when/if bankruptcy funding is used to conduct remaining remedial action activities. We are working on determining the expected costs of and schedule for the remaining remedial action activities at the site, which include removing the haul roads and optimizing the groundwater treatment system. This information will be forwarded to you as soon as it is ready; and we can then engage in discussions about conducting the remaining remedial actions and O&M.

I look forward to completion of all Moss American site activities. In the meantime, please feel free to contact me at (312) 353-8826.

Sincerely,

Thomas R. Short, Jr., Chief
Remedial Response Branch 2

cc: Tom Wentland, WDNR

Attachment 5

2013/2014 Site Survey

THE SIGMA GROUP
Single Source. Sound Solutions.

October 2, 2013 Project #13701

Mr. Thomas A. Wentland
Waste Management Engineer
Wisconsin Department of Natural Resources
1155 Pilgrim Road, P.O. Box 408
Plymouth, WI 53073-0408

RE: Groundwater Sampling and Remedial Optimization Evaluation
Former Moss-American Site
8716 North Grandville Road, Milwaukee, Wisconsin

Dear Mr. Wentland:

The Sigma Group, Inc. (Sigma) greatly appreciates the opportunity to perform environmental related services at the former Moss-American facility located at 8716 North Grandville Road, Milwaukee, Wisconsin (the Site). This report presents the data collected during the April 2013 groundwater monitoring activities, provides a thorough evaluation of the existing subsurface conditions, and proposes a strategy to optimize the site remediation in conformance with the Record of Decision (ROD) issued by the United States Environmental Protection Agency (USEPA) for the site.

The following sections provide a brief background of the project site and remediation completed to date, a discussion of the subsurface sampling and site evaluation activities, and a discussion of a potential remedial action to effectively enhance the remediation of the remaining petroleum-related contaminants present at the site.

SITE HISTORY AND REMEDIATION ACTIVITIES

The former Moss-American facility is located in the northwestern section of the City of Milwaukee at the southeast corner of the intersection of West Brown Deer and Granville Roads, at 8716 Granville Road. The 88-acre site includes the former location of the Moss-American creosoting facility, several miles of the Little Menomonee River - a portion of which flows through the eastern half of the site - and adjacent flood plain soils (**Figure 1**). After creosote operations ceased, approximately 23-acres of the site were purchased by the Union Pacific Railroad for loading and storage. The remaining area of approximately 65-acres of land is undeveloped Milwaukee County parkland.

The Little Menomonee River flows approximately 6.5 miles downstream of the former creosoting facility to its confluence with the Menomonee River. Land along the floodplain corridor is owned primarily by the City of Milwaukee, County of Milwaukee and, to a much lesser extent, private owners.

Site creosote operations were conducted from approximately 1921 to 1976. Based on the USEPA document, land usage patterns in the area changed considerably over time. Photos from the 1930s to the 1950s indicate that the creosote plant operated in a relatively sparsely populated setting with several farms surrounded the manufacturing operation. From the 1960s to the present time, residential and commercial use of nearby property increased considerably, and agricultural and farming operations have almost completely phased out. Industrial parks and multi-lane highways traverse the site setting. From 1921 to 1971, the facility discharged wastes to settling ponds that ultimately discharged to the Little Menomonee River. These discharges ceased when the plant diverted its process water discharge to the Milwaukee sanitary sewerage system. Production at the facility ceased in 1976.

In 1983, the facility was proposed for inclusion on the National Priorities List (NPL) pursuant to Section 105 of CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act). Subsequent remedial investigation conducted by the USEPA in late 1980s identified the presence of free product liquids associated with site groundwater. The most of the site soil contamination was associated with former creosote processing areas. Relatively high concentrations of petroleum-related constituents including Poly Aromatic Hydrocarbons (PAH) as well as benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in the upper 10 feet of site soil. Shallow groundwater was also identified with relatively high petroleum related impacts. However, little to no groundwater impacts were identified deeper than 20 feet below ground surface.

Pursuant to the USEPA Record of Decision for the Moss-American Site (dated 1990) and subsequent ROD Amendment (dated 1998), remedial action was implemented at the site. The USEPA led actions included: a) excavation of highly contaminated soils and on-site treatment; b) on-site placement of the treated and lower contaminated soils under an appropriate cover; c) re-vegetation of the excavated areas; d) removal and off-site disposal of highly contaminated sediments from sections of the Little Menomonee River; e) construction of a new channel and redirection of river flow into the new channel; and, f) a groundwater remedy consisting of a funnel-and-gate system with in-situ aerobic treatment of the contaminated groundwater prior to its flow to the river.

The installed groundwater remedial system consisted of sheetpile cutoff walls to prevent flow of contaminated groundwater to the river and several funnel and gate systems for in situ aerobic treatment of groundwater (bio-sparging) prior to flow to the river. The remediation system has been effective in treating the majority of the identified groundwater plume area with the exception of the north-central portion of the plume. Over several years of operation of the funnel and gate system a zone of stagnation appears to have developed within the containment wall. Persistently high concentrations of select PAH compounds have been observed at two locations which include: a) monitoring well MW-34S along the cut-off wall; and b) monitoring well TG1-1 located at Gate 1 of the funnel and gate system. A system performance assessment completed by the US Army Corp of Engineers (USACE) on behalf of the USEPA indicates additional remedial efforts are necessary to address these two areas.

ADDITIONAL DATA COLLECTION AND GROUNDWATER MONITORING

In accordance with the Scope of Work provided by the WDNR, Sigma performed the following activities:

Soil Boring / Monitoring Well Installation – Two Wisconsin Administrative Code (WAC) Chapter NR141 compliant groundwater monitoring wells were installed immediately outside the sheetpile cutoff wall (**Figure 2**) – one located northeast of MW-34S indentified as MW-34S-N and one northwest of MW-7S identified as MW-7S-W. Standard hollow-stem augur drilling methods was used to install these wells. During boring advancement continuous soil sampling was performed for field and laboratory analysis. Soil samples were collected and described on the basis of color, grain size, plasticity, and other characteristics. A description of the observed soil characteristics are summarized on the soil boring logs, included as **Appendix A.**

Following the completion of the soil boring each borehole was completed as a monitoring well. Each well was constructed of 2-in diameter, 10-ft long PVC screen set at a depth of 13 feet below ground and completed with a 2-inch diameter PVC riser and stick-up with protective casing. All drill cuttings generated during the drilling activities were contained in drums and stored at a secure location on-site pending waste characterization and coordination for off-site disposal. **Figure 2** depicts the approximate location of each monitoring well.

Elevation and Location Survey – Following completion of well installation activities, an engineering survey was performed to establish the location and elevation of the newly installed wells with respect to the nearby monitoring wells. In accordance with the RFP two existing wells (MW-38S and MW-39S) were also included in the survey. The survey data was used to generate water level elevations (**Table 1**), update the site map (**Figure 2**) and prepare a groundwater elevation contour map (**Figure 3**).

Well Development – Following the requirements of the WAC Ch. NR141.21, the two newly installed monitoring wells and three existing piezometers (PZ-02, PZ-03, and PZ-10) were developed prior to groundwater sampling to ensure good hydraulic connection with the saturated subsurface materials. Piezometers PZ-07 and PZ-09 were proposed to be developed but obstructions in the well prevented development from occurring. The groundwater generated during the well development process was contained in 55-gallon drums and disposed off-site at the Port Washington Water Treatment facility

Groundwater Monitoring – In accordance with the RFP, Sigma completed one round of groundwater monitoring of the wells listed in **Table 1.** Please note six wells were unable to be sampled due to the presence of obstructions within the well casing or wells could not be located. All the wells were purged and sampled using disposable bailers except five wells. A peristaltic pump and dedicated sampling tubes were used to sample the three peizometers PZ-02, PZ-03 and PZ-10 (due to small well diameter) and two monitoring wells MW-34S and TG1-1 (due to the presence of free phase petroleum product at the bottom of these wells). Special care was taken during sampling of MW-34S and TG1-1 to avoid introducing any free product in the groundwater sample by gently lowering the sampling tubes in the well casing and positioning the tube intake several feet above the bottom of the well and the free product interface.

Groundwater monitoring activities included the collection of water samples and the measurement of field parameters including water levels, dissolved oxygen (DO), oxidation-reduction potential (REDOX), pH, temperature, turbidity, specific conductance, and ferrous iron from all the wells. A total of 35 groundwater samples were collected and submitted to Synergy Environmental Lab, INC. of Appleton, Wisconsin for laboratory analysis of BETX and PAH (EPA Method 8260 and 8270D, respectively). Selected groundwater samples (identified in the RFP) were also submitted to CT Laboratories of Baraboo, Wisconsin and Terra System, Inc. of Claymont, Delaware for bioremediation parameter analyses (microbial enumeration, nitrate-nitrogen, nitrite nitrogen, total kjeldahl nitrogen, ammonia-nitrogen, total phosphate-phosphorous, orthophosphate, biochemical oxygen demand, chemical oxygen demand, and total organic carbon) to help evaluate the biodegradation potential of the residual subsurface impacts. Laboratory analytical reports are included in **Appendix B** and the data are summarized in **Tables 2** through **5**.

SUMMARY OF SITE CONDITIONS

Site Hydrogeology

Based on the two soil borings completed by Sigma shallow subsurface materials consist predominantly of fine-grained silt and clay mixed with occasional sand and gravel. This is consistent with the surficial unit described in the reports provided by the WDNR:

> "The site overlies a surficial water-bearing unit and confining bed. The water-bearing unit consists of a thin mantle of fill, alluvium, and weathered till. This thin layer of material would not yield sufficient water to wells to be classified as a true aquifer. The confining bed is the unweathered till of the Oak Creek Formation.
>
> The surficial unit comprises everything above the confining bed. It includes extensive fill deposits, alluvial deposits along the river, and the weathered few feet of the Oak Creek Formation. The fill is highly variable and has been added to the site at different times for different reasons. Alluvial deposits are associated with the Little Menomonee River. They consist of sand and gravel channel deposits and silt and clay flood deposits. The till is part of the Oak Creek Formation, which consists of glacial till, lacustrine clay, silt and sand, and some glaciofluvial sand and gravel. The till is fine grained, commonly containing 80 to 90 percent silt and clay. The till was generally weathered to a depth of 2 to 10 feet.
>
> The unweathered part of the Oak Creek Formation consists of a confining bed between the surficial water-bearing unit and underlying regional aquifers. The formation is a dense, silty clay till with interbedded lacustrine units. Below the site, the glacial deposits are approximately 150 feet thick and underlain by the dolomite aquifer. The minimum thickness of the confining bed below the site is at least 40 feet."

Review of the groundwater elevation data (**Table 1**) and groundwater elevation contour map (**Figure 3**) indicates the shallow groundwater flow at the Moss-American site is predominantly to the northeast towards the Little Menomonee River. A relatively flat hydraulic gradient (0.005 ft/ft to 0.0067 ft/ft)) is observed inside the sheet-pile area. The hydraulic gradient becomes steeper (0.02 ft/ft to 0.033 ft/ft)) near the upgradient and downgradient locations of the sheet-pile area. A comparison of the April 2013 groundwater flow map with the flow map generated for the September 2010 monitoring event (Groundwater Monitoring Report, Q3 2010 prepared by Weston Solutions, Inc.) indicates a similar groundwater flow pattern.

Soil Conditions

During drilling of monitoring well MW-7S-W, petroleum product sheen was encountered within the soil samples collected at the depth intervals of 4′ to 6′ and 6′ to 8′. Saturated conditions were encountered at a depth of 5′ bgs. No product sheen or oil residue was observed in soil samples collected at deeper depths (8′ to 14′). Based on discussions with the WDNR Project Manager a field decision was made to containerize the soil sample from 4′ to 6′ interval for BTEX and PAH analysis. It is noteworthy that no PID readings or oily sheen was observed at the soil boring completed during the installation of the monitoring well MW-34S-N. Additional soil boring investigation is needed to define the extent of the soil impacts identified at MW-7S-W.

Review of the analytical data from soil boring MW-7S-W indicates the presence of several PAH compounds in excess of the WDNR Residual Contaminant Levels (RCLs) for groundwater pathway and direct contact. The constituents detected exceeding the groundwater RCL standards include Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Fluorene, and Naphthalene (estimated). The constituents detected above the direct contact RCLs include Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene and Phenanthrene. A summary the complete soil analytical results are presented in **Table 2.**

Groundwater Conditions

Groundwater samples collected from 35 monitoring wells and piezometers in April 2013 from on- and off-site locations were analyzed for BTEX and PAHs. The laboratory analytical results are summarized and presented in **Table 3.** The table also includes groundwater quality data obtained during September 2010 groundwater sampling performed by Weston Solutions, Inc.

Free-phase Product – The presence of free-phase product was observed at two well locations: MW-34S and TG1-1. The free-phase product observed at these wells appears to be highly viscous and present at the bottom of the well identifying it as a heavier than water non-aqueous phase liquid (NAPL). No free-phase NAPL product was identified in the other monitoring well MW-7S where product sheen was observed in the past or other monitoring and remediation wells on-site. Nonetheless, the extent of the free phase product does not appear to be well defined and further evaluation is needed.

Newly Installed Monitoring Wells – Groundwater quality data collected from the two newly installed monitoring wells (MW-7S-W and MW-34S-N) located immediately outside the remediation sheet pile do not indicate the presence of any PAH or BTEX compounds in excess of the WAC Ch. NR140 Enforcement Standards (ES). However, two PAH constituents (Fluorene and Naphthalene) were identified above their respective WAC Ch. NR140 Preventive Action Limits (PAL) within the groundwater sample collected from monitoring well MW-7S-W. It is noteworthy that an oily sheen was discovered during monitoring well installation activities at MW-7S-W. The groundwater impact detected within groundwater sample collected from MW-7S-W may be associated the shallow soil impacts observed at this location.

Distribution of PAH Compounds – Of the 35 wells sampled only eight were detected with PAH compounds in excess of the WAC NR140 Groundwater Standards. At four monitoring well locations (MW-7S-W, MW-E, MW-F and MW-H) four PAH compounds were detected above their respective PALs (Fluorene and Naphthalene at MW-7S-W; Benzo(b)fluoranthene at MW-E, MW-F and MW-H; and Chrysene at MW-F and MW-H).

At four other locations (MW-34S, TG1-1, PZ-03 and MW-I) both PALs and ESs for several PAH compounds were exceeded. Free phase product was encountered in two of these locations (MW-34S, TG1-1), therefore, groundwater samples from these wells are expected to have relatively high concentrations of dissolved PAH compounds. The groundwater sample from monitoring well PZ-03 located in the north central portion of the sheet-pile area contains Benzo(a)flouranthene at 1.45 microgram per liter (μg/L) and Chrysene at 1.47 μg/L, both exceeding the respective groundwater ESs.

Two PAH compounds, Benzo(b)fluoranthane and Chrysene, were detected in the groundwater sample from monitoring well MW-I at concentrations exceeding the groundwater ES and PAL, respectively. It is important to note that no PAH compounds were detected at this location during the September 2010 sampling event. Similar low level PAH compounds detected at MW-E, MW-F and MW-H with concentrations at or above the PALs where no PAH were detected in September 2010. Considering the location of these wells (approximately 2 miles downstream along the Little Menomonee River from the source site, see **Figure 1-2**, **Figure 1-3** and **Figure 1-4** by Weston Solutions, Inc. included as **Appendix C**) it is likely that the presence of sediments in the sample may have caused this anomaly. A low flow sampling method could be used in the future to eliminate such anomaly. Also a review of historical groundwater quality data from these locations could provide further clarifications.

***In Situ* Measurements** – *In situ* measurements were collected from all 35 sampling points and the data are summarized and presented in **Table 4.** A review of the data indicates groundwater pH ranges between 6.9 and 7.7 standard units (S. U.). The observed pH range represents a neutral groundwater condition and is conducive to microbial activities. The observed dissolved oxygen (DO) concentrations in groundwater range between 0.49 mg/L and 3.1 mg/L, with lower DO readings observed in wells with PAH impacts and higher DO levels observed in wells further away from the dissolved groundwater plume. Depleted DO levels are indicative of on-going biodegradation of the petroleum constituents dissolved in groundwater. Oxidation-reduction potential (REDOX) measurements observed during the April 2013 monitoring range between -160 mV and +173 mV, with negative values observed at wells with groundwater impacts. Large negative values are indicative of on-going biodegradation. Observed ferrous iron readings range between 0 and 8 mg/L, with higher readings observed in wells with PAH impacts. Ferrous iron is a byproduct of the biodegradation process and as such higher than background readings indicates high level of bioactivity.

Biodegradation Parameters – Nine wells were sampled for biodegradation parameters to evaluate the bioremediation potential of the dissolved plume. These parameters include: microbial enumeration, nitrate-nitrogen, nitrite nitrogen, total kjeldahl nitrogen, ammonia-nitrogen, total phosphate-phosphorous, orthophosphate, biochemical oxygen demand, chemical oxygen demand, and total organic carbon. Biodegradation parameters are summarized and presented in **Table 5.**

The total heterotrophic plate counts reported by CT Laboratories range between 11,000 colony forming units per liter (cfu/L) and 620,000 cfu/L representing low to moderate bacterial populations in the subsurface. A comparison with the September 2010 data indicates a reduction in bacterial populations in six of the nine sample locations. The petroleum degraders plate counts reported by Terra System Inc. range between 120,000 cfu/L and 36,000,000 cfu/L. (Note: petroleum degraders are a subset of the total heterotrophic bacteria and therefore, petroleum degraders plate count is typically lower than the total heterotrophic plate counts. Due to extended incubation time used by Terra System lab, [3 weeks instead of 1 week by CT Lab] during analysis, the significantly higher petroleum degrader population count was reported compared to the total heterotrophic plate count reported by CT Lab). Nonetheless, the presence of moderate bacterial populations indicates on-going bioactivity.

Review of the other biodegradation data presented in **Table 5** also suggests low to moderate bioactivity (low nitrate-nitrogen and relatively low BOD/COD readings).

SUMMARY

Results of the groundwater monitoring completed in April 2013 indicate groundwater conditions have improved at the site. **Figure 4** presents the distribution of the total PAHs detected in groundwater in September 2010 and April 2013. The distribution map was developed using only those PAH compounds with WDNR groundwater standards. A review of the plot indicates:

- Total PAH concentrations have decreased at all on-site sample locations since September 2010;
- Free-phase product is still present at MW-34S and TG1-1, however, no indication of free-phase product was present at MW-7S where an oily-sheen was observed in September 2010.
- Low level groundwater impacts were detected at wells located further downstream along the Little Menomonee River where no PAH impacts were identified in 2010. The presence of sediment in samples may have contributed to this anomaly. Future monitoring should include low flow sampling to evaluate if sediment in the samples is biasing the results.
- The sheet-pile containment and in-situ treatment systems have effectively contained and remediated the majority of the groundwater impacts.
- Based on one round of data from the newly installed wells located immediately outside the sheet-pile area no indication of groundwater plume migration outside the containment area is evident.

- Groundwater quality data from monitoring well MW-33S and piezometers PZ-02 located near the northwest portion of the sheet-pile area show decreasing concentrations of total PAHs; the data also indicate no plume migration around the containment area.

CONCLUSIONS

The following conclusions can be made based on an evaluation of the groundwater quality data obtained from the Moss-America site:

- Free-phase dense NAPL product is still present at depth at two monitoring wells (MW-34S and TG1-1). The lateral extent of the product area appears to be limited, however, further delineation is needed to confirm the product zone is stable.

- A product sheen was identified in a soil sample collected from the water table interface at soil boring location MW-7S-W; relatively low level of groundwater impacts and no soil impacts observed at depth suggests this may be an isolated area of soil impact. Further delineation is needed to confirm the limited extent of soil impact.

- The integrity of the steel sheet-pile containment structure appears to be sound; no leakage through the steel sheeting or plume migration around the containment structure is evident based on one round of data from the two newly installed wells (MW-7S-W and MW-34S-N) and an existing peizometer (PZ-02).

- Reduction in the dissolved PAH concentrations in groundwater appear to be on-going and natural attenuation of the dissolved phase constituents in groundwater away for the free-product area is likely occurring.

- Natural attenuation in groundwater is also evident at downgradient off-site wells located further south along the Little Menomonee River.

- The enhanced bioremediation system operated at the site appears to have mitigated the majority of the groundwater impacts with the exception of the free-phase NAPL at two isolated locations and dissolved PAH impacts at north-central portion (PZ-03) within the sheet-pile containment structure.

REMEDIAL OPTIMIZATION EVALUATION

Based on the above conclusions Sigma recommends the following activities to move the site to case closure:

- Implement the Geoprobe® soil boring program as recommended by the Army Corps of Engineers (USACE Final Report, dated March 2011) to better delineate the lateral and vertical extend of the two free-phase product areas.

- Depending upon the results of the soil boring programs implement additional remedial action to address the free-product areas.

- Implement additional soil boring/hand boring investigation activities to further define the product sheen discovered at MW-7S-W located outside the sheet-pile area.

Depending upon the results of the soil boring investigations a combination of remedial technologies could be implemented to address the two free product areas and groundwater plume and move the site to case closure. Attached **Table 6** presents an array of appropriate and effective remedial technologies to address the identified site conditions. Option 3 is recommended as an appropriate interim action to meet the goal of restoring groundwater quality in the reasonable period of time consistent with NR 140.24(2) Wisconsin Admin. Code requirements. This option includes the following elements:

1) Excavate shallow product sheen area identified at MW-7S (located outside north of the sheet-pile area) and treat excavated materials on-site;
2) Install slurry walls to create secondary containment measures around the two free-phase product areas (MW-34S and TG1-1) by injecting bentonite-cement slurry and creating a low-permeability barrier inside the sheet-pile structure;
3) Install four bio-enhancement wells equipped with iSOC units in the vicinity of PZ-03 to provide an oxygen rich environment and promote enhanced biodegradation of the dissolved PAH plume.
4) Add bio-amendments (PETREX by CL Solutions) for two events to enhance hydrocarbon degrader bacterial population.
5) Implement groundwater monitoring to evaluate on-going RNA of PAH compounds and assess the stability of the free-phase product areas; the following wells and piezometers are to be included in the monitoring program:

PZ-02, PZ-03, PZ-09 & PZ-10;
MW-A, MW-7S, MW-7S-W, MW-9S, MW-27S, MW-32S,
MW-33S, MW-34S, MW-34S-N, MW-37S, MW-38S,
MW-39S, MW-E, MW-F, MW-I, TG1-1, TG1-3, TG2-3,
TG3-3, TG4-3, TG5-3, TG6-3.

6) The groundwater monitoring program will include low flow PAH sampling and measurement of field parameters.

We trust the information provided is satisfactory to WDNR. Please feel free to call Sigma at 414-643-4125 if you have any questions or comments.

Sincerely,

THE SIGMA GROUP, INC.

Mafizul Islam, P.E.
Senior Project Manager

Randy E. Boness, P.G.
Geoscience Group Leader

<u>List of Attachments</u>

FIGURES

Figure 1
Figure 2
Figure 3
Figure 4

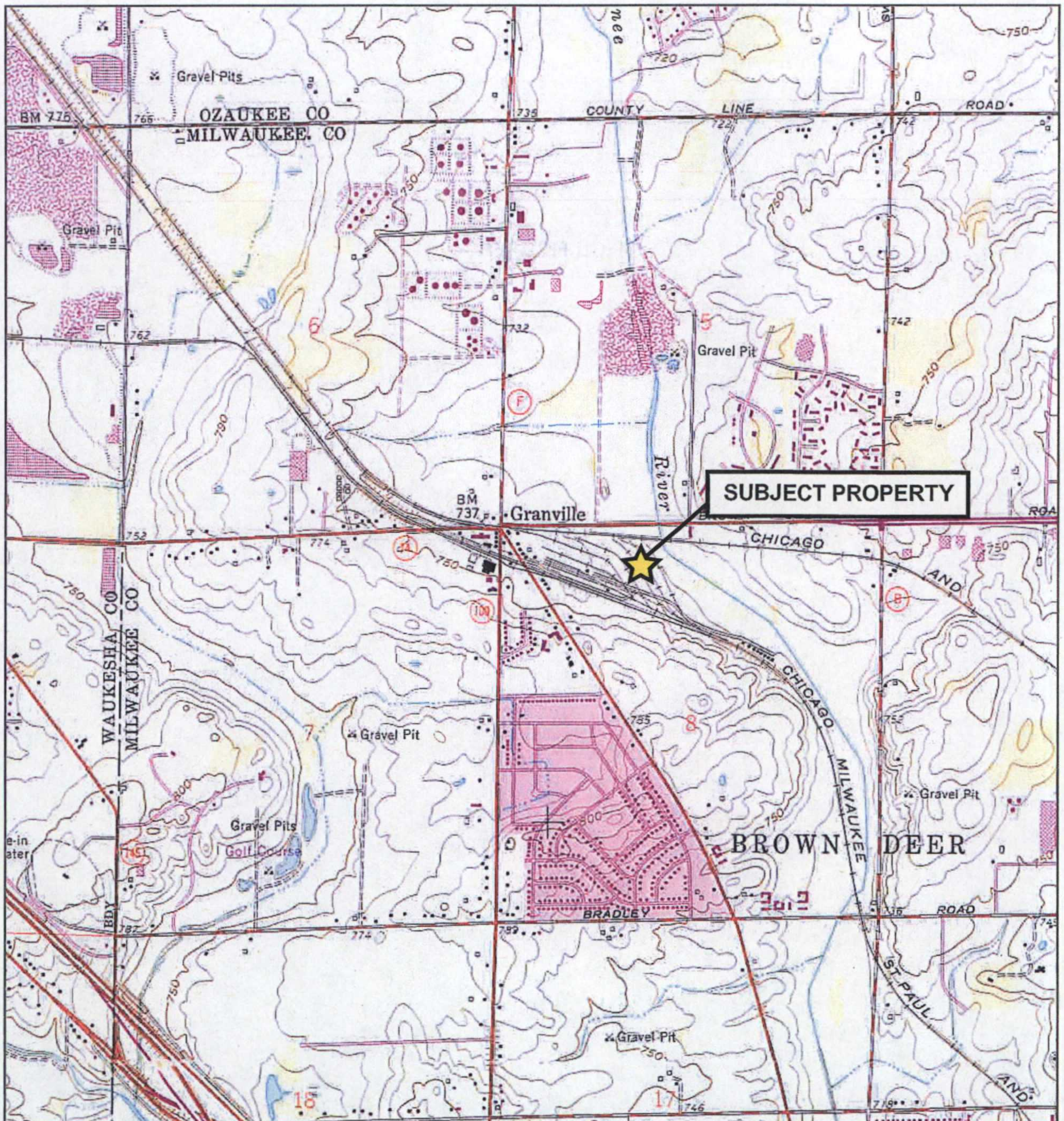
TABLES

Table 1
Table 2
Table 3
Table 4
Table 5

APPENDICES

Appendix A - Soil Boring Logs
Appendix B - Laboratory Analytical Reports
Appendix C - Figures 1-2, 1-3 & 1-4

FIGURES



Scale 1 : 24,000
1 inch = 2,000 feet

Located in the Northwest 1/4 of Section 8, T8N, R21E
USGS Menomonee Falls Quadrangle (1958, photorevised 1971 and 1976)
7.5 minute, 1 : 24,000 Topographic Map Collection

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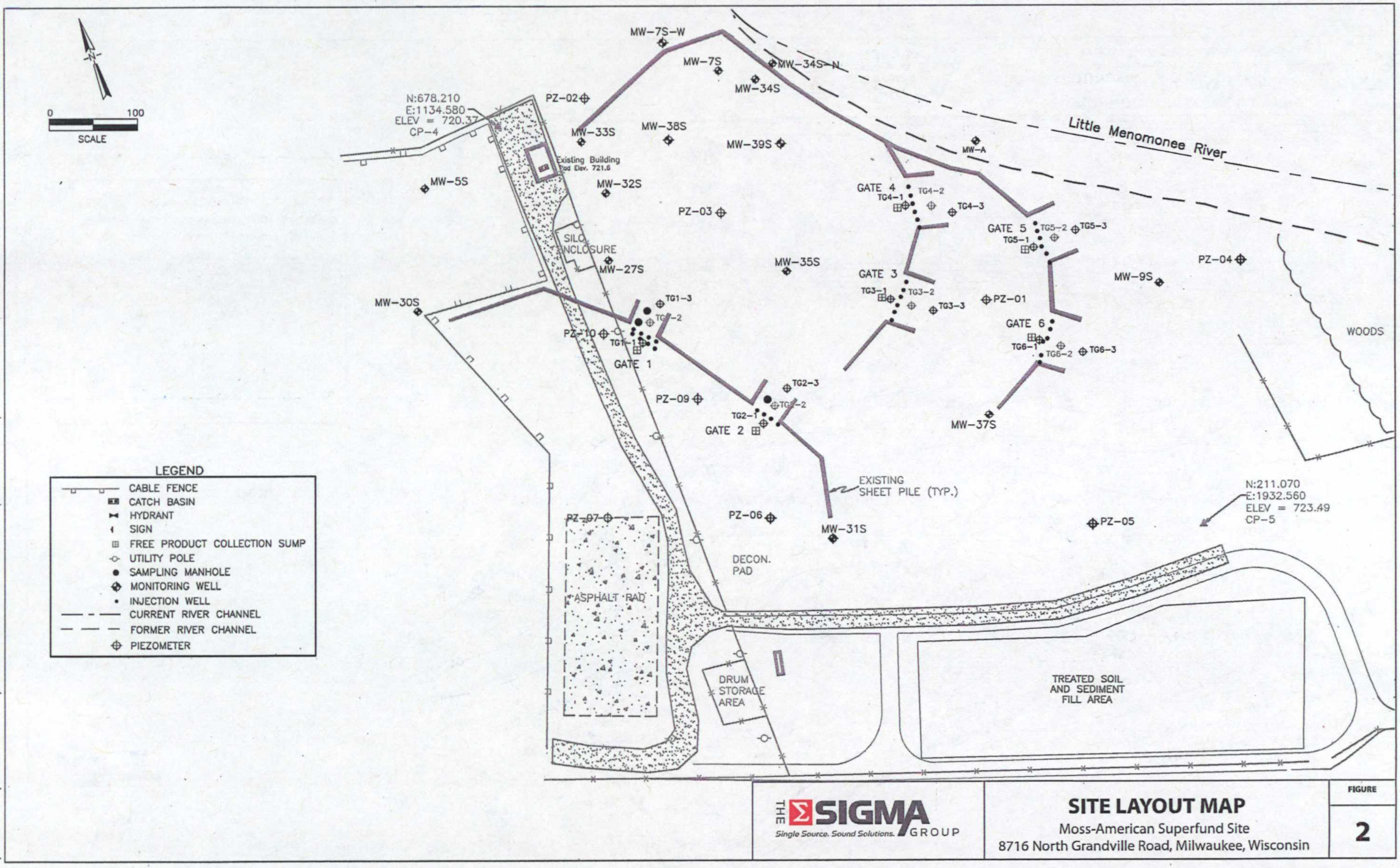
SITE LOCATION MAP

MOSS-AMERICAN SITE
8716 N. GRANDVILLE ROAD
MILWAUKEE, WISCONSIN

FIGURE

1

Project: 13701 | Directory: Figures | Filename: 13701_Fig 1_SLM | Created By: SLO | Date: 03/26/2013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ELEV = 720.37
CP-4
Existing Building
Pad Elev. 721.6
SILO
ENCLOSURE
MW-7S-W
MW-7S
MW-34S-N
MW-34S
PZ-02
MW-33S
MW-38S
MW-39S
MW-A
Little Menomonee River
MW-5S
MW-32S
PZ-03
GATE 4
TG4-1
TG4-2
TG4-3
GATE 5
TG5-1
TG5-2
TG5-3
PZ-04
MW-27S
MW-35S
GATE 3
TG3-1
TG3-2
TG3-3
PZ-01
MW-9S
MW-30S
TG1-3
TG1-2
TG1-1
PZ-10
GATE 1
GATE 6
TG6-1
TG6-2
TG6-3
WOODS
PZ-09
TG2-3
TG2-2
TG2-1
GATE 2
MW-37S
EXISTING
SHEET PILE (TYP.)
N:211.070
E:1932.560
ELEV = 723.49
CP-5
PZ-07
PZ-06
MW-31S
PZ-05
DECON.
PAD
ASPHALT PAD
DRUM
STORAGE
AREA
TREATED SOIL
AND SEDIMENT
FILL AREA
LEGEND
CABLE FENCE
CATCH BASIN
HYDRANT
SIGN
FREE PRODUCT COLLECTION SUMP
UTILITY POLE
SAMPLING MANHOLE
MONITORING WELL
INJECTION WELL
CURRENT RIVER CHANNEL
FORMER RIVER CHANNEL
PIEZOMETER
THE SIGMA GROUP
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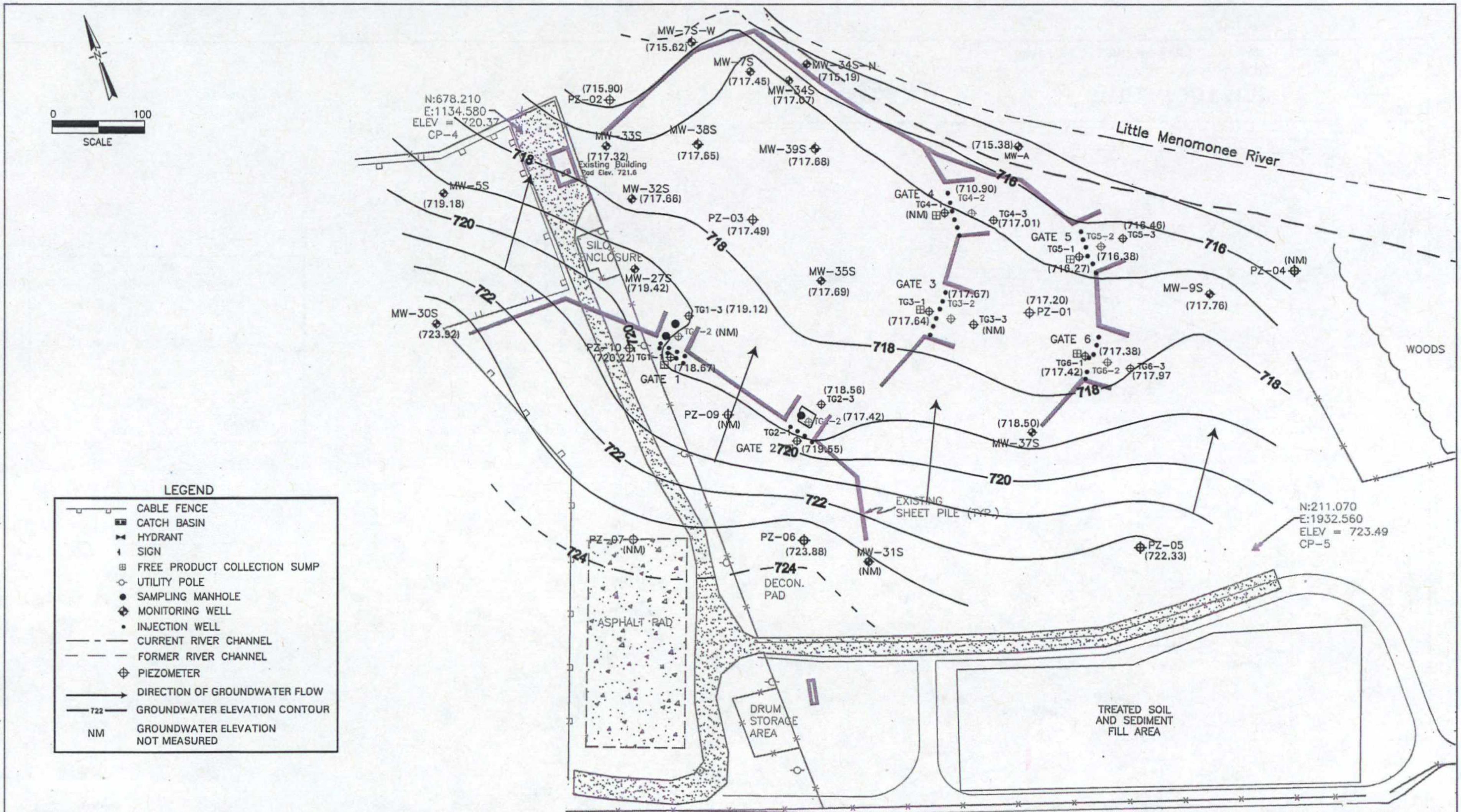
SITE LAYOUT MAP
Moss-American Superfund Site
8716 North Grandville Road, Milwaukee, Wisconsin
FIGURE
2
Project: 13701
Directory: WDNR
Filename: Moss American Site Plan revised.pdf
Created By: JVW
Date: 04/09/2013



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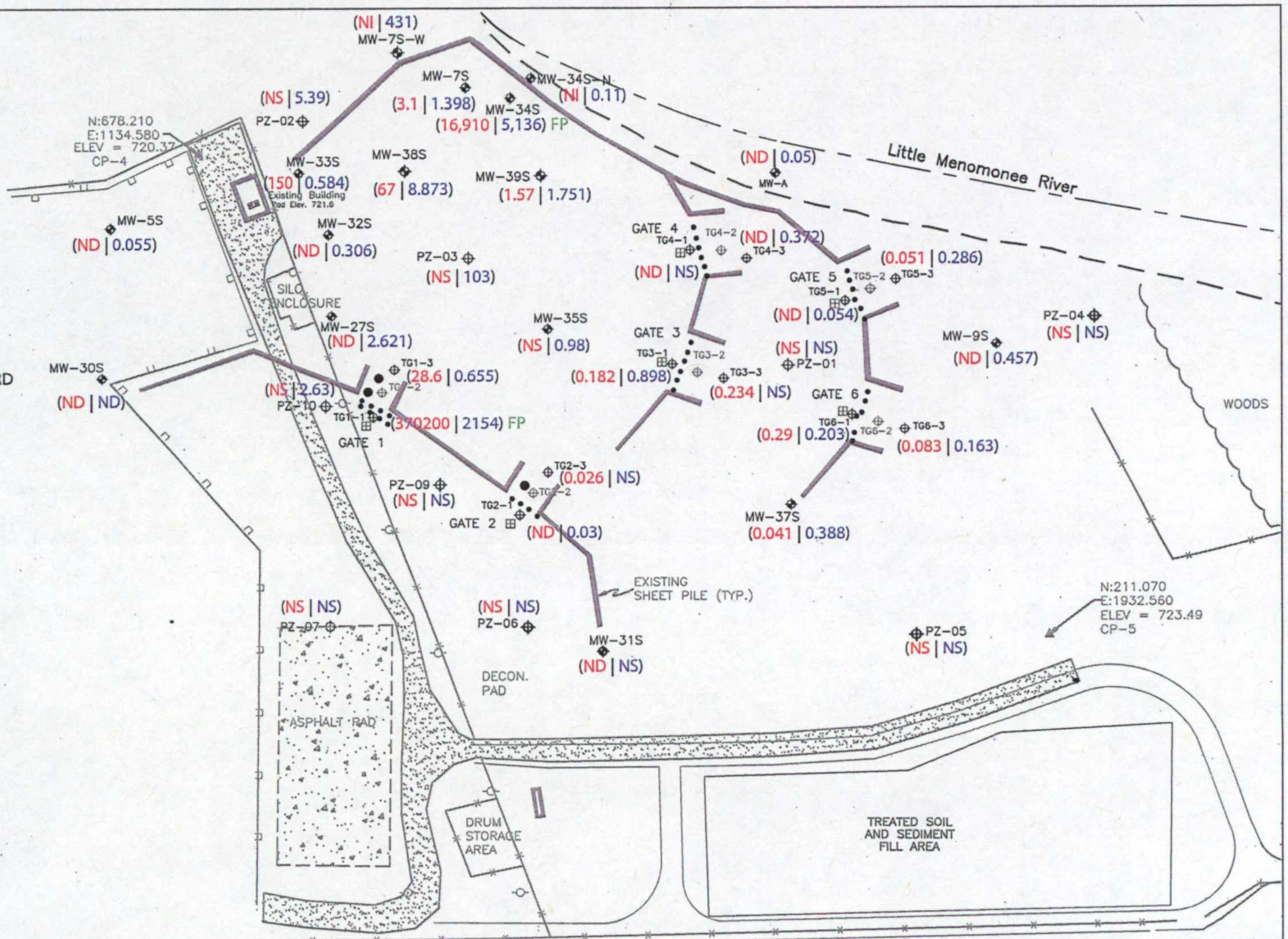
GROUNDWATER CONTOUR MAP
APRIL 2013
Moss-American Superfund Site
8716 North Grandville Road, Milwaukee, Wisconsin

FIGURE 3

Project: 13701 | Directory: WDNR | Filename: Moss American GW contour map.pdf | Created By: JVW | Date: 04/29/2013



NOTE:
TOTAL PAH VALUE IS THE SUMMATION OF ALL DETECTED PAHs WITH WDNR STANDARD

LEGEND

- CABLE FENCE
- CATCH BASIN
- HYDRANT
- SIGN
- FREE PRODUCT COLLECTION SUMP
- UTILITY POLE
- SAMPLING MANHOLE
- MONITORING WELL
- INJECTION WELL
- CURRENT RIVER CHANNEL
- FORMER RIVER CHANNEL
- PIEZOMETER
- ND NONE DETECT
- NS NOT SAMPLED
- NI NOT INSTALLED AT TIME OF SAMPLING
- 123 CONCENTRATION DURING SEPT. 2010 SAMPLING EVENT
- 123 CONCENTRATION DURING APR. 2013 SAMPLING EVENT
- FP FREE PRODUCT ENCOUNTERED DURING BOTH SAMPLING EVENTS

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DISTRIBUTION OF PAH DETECTED IN GROUNDWATER
SEPT 2012 | APR 2013

Moss-American Superfund Site
8716 North Grandville Road, Milwaukee, Wisconsin

FIGURE
4

Project: 13701 | Directory: WDNR | Filename: Moss American PAH Analytical Map.pdf | Created By: JWW | Date: 05/16/2013

TABLES

Table 1
Soil Analytical Data
Moss-American, 8716 N. Grandville Road, Milwaukee, WI
Sigma Project No. 13701

Soil Sample Location:		**MW-7S-W**	Groundwater Pathway RCL [4]	Non-Industrial Direct Contact RCL [5]	Industrial Direct Contact RCL [6]
Sample Depth (feet bgs):		4-6			
Sample Collection Date:		3/28/13			
Depth to Groundwater (feet bgs):		5			
Unsaturated/Smear Zone (U) or Saturated (S):					
Organic Vapor Monitor	ppm		NS	NS	NS
PVOCs & Detected VOCs					
Benzene	µg/kg	<25	5.1	1,490	7,410
Ethylbenzene	µg/kg	<25	1,570	7,470	37,000
Toluene	µg/kg	<25	1,107.2	818,000	818,000
Xylenes (total)	µg/kg	<75	3,940	258,000	258,000
PAHs					
Acenaphthene	µg/kg	47,000	NS	3,440,000	33,000,000
Acenaphthylene	µg/kg	520 J	NS	487,000	487,000
Anthracene	µg/kg	30,700	196,744.2	17,200,000	100,000,000
Benzo(a)anthracene	µg/kg	*11,100*	NS	148	2,110
Benzo(a)pyrene	µg/kg	***2,720***	470	15	211
Benzo(b)fluoranthene	µg/kg	***5,400***	480	148	2,110
Benzo(ghi)perylene	µg/kg	740 J	NS	NS	NS
Benzo(k)fluoranthene	µg/kg	*2,260*	NS	1,480	21,100
Chrysene	µg/kg	**9,300**	145.1	14,800	211,000
Dibenzo(a,h)anthracene	µg/kg	<446	NS	15	211
Fluoranthene	µg/kg	69,000	88,817.9	2,290,000	22,000,000
Fluorene	µg/kg	**47,000**	14,814.8	2,290,000	22,000,000
Indeno(1,2,3-cd)pyrene	µg/kg	**710 J**	NS	148	2,110
1-Methylnaphthalene	µg/kg	13,200	NS	15,600	53,100
2-Methylnaphthalene	µg/kg	<412	NS	229,000	368,000
Naphthalene	µg/kg	**1050 J**	658.7	2,150	26,000
Phenanthrene	µg/kg	*142,000*	NS	115,000	115,000
Pyrene	µg/kg	46,000	54,472.5	1,720,000	16,500,000

Notes:

1. Unsaturated/smear zone versus satured soil conditions based on:
 (1) measured water levels in adjacent/nearby monitoring wells,
 (2) soil moisture conditions recorded on soil boring logs, and/or
 (3) soil moisture contents reported on laboratory analytical reports.
2. Analytical units: µg/kg = micrograms per kilogram (equivalent to parts per billion, ppb)
 mg/kg = milligrams per kilogram (equivalent to parts per million, ppm)
7. NS = no standard established
8. Laboratory flags: "J" = Analyte detected between Limit of Detection and Limit of Quantitation
9. Exceedances:

BOLD = Concentration exceeds Groundwater Pathway RCL

ITALICS = Concentration exceeds Non-Industrial OR Industrial Direct Contact RCL **(unsaturated soil samples only)**

TABLE 2
Water Level Elevation and Product Thickness
MOSS – AMERICAN SUPERFUND SITE
PROJECT NO. 13701

Well ID	Depth of Well (ft.)	Depth of Water (ft.)	Ground Elevation (ft. MSL)	TOC Elevation (ft. MSL)	Groundwater Elevation (ft. MSL)	Depth to Product (ft.)	Product Thickness (ft.)	Diameter (in.)	Well Material	Comment
MW-5S	19.75	5.45	723.41	724.63	719.18	NP	NP	2	Steel	
MW-7S	15.40	4.14	719.47	721.59	717.45	NP	NP	2	Steel	
MW-7S-W	16.85	4.22	716.41	719.84	715.62	NP	NP	2	PVC	free product on probe
MW-9S	15.30	3.90	719.15	721.66	717.76	NP	NP	2	Steel	
MW-27S	17.39	3.68	720.57	723.10	719.42	NP	NP	2	PVC	
MW-30S	14.72	3.42	725.35	727.34	723.92	NP	NP	2	Steel	
MW-31S										can't locate, possibly buried (Tom W.)
MW-32S	14.95	5.13	719.68	722.79	717.66	NP	NP	2	Steel	
MW-33S	14.95	4.49	719.25	721.81	717.32	NP	NP	2	Steel	
MW-34S	14.97	4.45	718.97	721.52	717.07	13.5	1.47	2	Steel	product on well, product at 13.5'
MW-34S-N	18.15	3.52	715.41	718.71	715.19	NP	NP	2	PVC	
MW-35S	14.63	4.06	718.14	721.75	717.69	NP	NP	2	Steel	
MW-37S	15.00	4.80	721.33	723.30	718.50	NP	NP	2	Steel	
MW-38S	18.20	4.09	718.36	721.74	717.65	NP	NP	2	Steel	
MW-39S	17.93	3.42	717.80	721.10	717.68	NP	NP	2	Steel	
TG1-1	15.10	4.65	719.77	723.32	718.67	14	1.10	2	Steel	product at 14.00'
TG1-2			720.06	722.81		NP	NP	2	Steel	
TG1-3	14.62	3.41	719.56	722.53	719.12	NP	NP	2	Steel	
TG2-1	15.00	4.25	720.67	723.80	719.55	NP	NP	2	Steel	
TG2-2	14.80	5.63	720.62	723.05	717.42	NP	NP	2	Steel	
TG2-3	OB	4.05	720.06	722.61	718.56	NP	NP	2	Steel	obstructed at 4.22'
TG3-1	14.60	3.41	719.14	721.05	717.64	NP	NP	2	Steel	
TG3-2	14.25	3.25	718.87	720.92	717.67	NP	NP	2	Steel	
TG3-3	OB	OB	718.35	720.60		NP	NP	2	Steel	obstructed at 3.06'
TG4-1	OB	OB	718.06	721.14		NP	NP	2	Steel	obstructed at 4.23'
TG4-2	14.93	3.85	718.26	720.75	716.90	NP	NP	2	Steel	

TABLE 2
Water Level Elevation and Product Thickness
MOSS – AMERICAN SUPERFUND SITE
PROJECT NO. 13701

Well ID	Depth of Well (ft.)	Depth of Water (ft.)	Ground Elevation (ft. MSL)	TOC Elevation (ft. MSL)	Groundwater Elevation (ft. MSL)	Depth to Product (ft.)	Product Thickness (ft.)	Diameter (in.)	Well Material	Comment
TG4-3	14.28	3.03	718.01	720.04	717.01	NP	NP	2	Steel	
TG5-1	14.65	4.85	717.60	721.12	716.27	NP	NP	2	Steel	
TG5-2	14.80	4.25	718.18	720.63	716.38	NP	NP	2	Steel	
TG5-3	15.02	3.53	718.17	719.99	716.46	NP	NP	2	Steel	
TG6-1	15.02	4.54	719.47	721.96	717.42	NP	NP	2	Steel	
TG6-2	14.23	4.67	719.70	722.05	717.38	NP	NP	2	Steel	
TG6-3	14.65	4.50	719.58	722.47	717.97	NP	NP	2	Steel	
PZ-01	14.90	3.85	718.04	721.05	717.20	NP	NP	1.5	PVC	
PZ-02	14.85	5.94	718.89	721.84	715.90	NP	NP	1.5	PVC	
PZ-03	14.85	4.60	719.00	722.09	717.49	NP	NP	1.5	PVC	
PZ-04	OB	OB	717.30	720.22		NP	NP	1.5	PVC	obstruction at 3.81'
PZ-05	14.82	5.10	724.34	727.43	722.33	NP	NP	1.5	PVC	
PZ-06	13.40	3.91	724.62	727.79	723.88	NP	NP	1.5	PVC	
PZ-07	OB	OB	725.78	728.72		NP	NP	1.5	PVC	obstruction at 4.44'
PZ-09	OB	OB	721.12	724.08		NP	NP	1.5	PVC	obstruction at 3.2'
PZ-10	14.95	4.83	722.04	725.05	720.22	NP	NP	1.5	PVC	
MW-A	11.80	0.77	716.73	716.15	715.38	NP	NP	2	PVC	
MW-B	11.63	0.70	714.92	714.49	713.79	NP	NP	2	PVC	
MW-C	12.50	0.00	714.18	713.82	713.82	NP	NP	2	PVC	well submerged inside flush mount
MW-D	12.00	0.20	716.21	715.85	715.65	NP	NP	2	PVC	
MW-E	18.85	1.17	713.26	712.83	711.66	NP	NP	2	PVC	
MW-F	19.55	1.95	713.52	713.10	711.15	NP	NP	2	PVC	
MW-G	13.83	1.55	713.21	712.75	711.20	NP	NP	2	PVC	
MW-H	18.10	0.00	710.40	710.07	710.07	NP	NP	2	PVC	
MW-I	9.00	1.50	710.27	709.92	708.42	NP	NP	2	PVC	
MW-J	14.75	0.00	710.08	709.85	709.85	NP	NP	2	PVC	well submerged inside flush mount
MW-K	NS	NS	707.13	706.70	NS	NS	NS	2	PVC	well completely submerged under

Notes:
1. NP = no product
2. OB = obstruction
3. NS = not sampled, MW-K not sampled due to being completely submerged under water

Table 3
Groundwater Analytical Data
Moss American - 8716 North Granville Road, Milwaukee, WI
Sigma Project No. 13701

Well Location:		NR 140	NR 140	MW-5S		MW-7S		MW-7S-W	MW-9S		MW-27S		MW-30S		MW-31S	MW-32S		MW-33S		MW-34S	
Date:		ES	PAL	9/27/10	4/4/13	9/28/10	4/4/13	4/5/13	9/30/10	4/4/13	9/27/10	4/4/13	9/28/10	4/4/13	9/29/10	9/27/10	4/4/13	9/28/10	4/4/13	9/28/10	4/4/13
PVOCs & Detected VOCs																					
Benzene	µg/L	5	0.5	<0.2	<0.27	*0.9 J*	0.36 J	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.2	<0.27	<0.2	<0.27	***6.2***	***7***
Ethylbenzene	µg/L	700	140	<0.2	<0.82	0.3 J	<0.82	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.2	<0.82	0.5 J	<0.82	26	28.4
Toluene	µg/L	1,000	200	<0.2	<0.8	<0.2	<0.8	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.2	<0.8	0.3 J	<0.8	1.1	1.39 J
Xylenes, Total	µg/L	10,000	1,000	<0.6	<2.41	1.8 J	1.7 J	1.56 J	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<0.6	<2.41	3.1	<2.41	49	49.2
PAHs																					
Acenaphthene	µg/L	NS	NS	<0.51	<0.021	8.3	5	291	<0.52	0.028 J	<0.52	0.113	<0.53	<0.021	<0.52	<054	<0.021	100	0.66	2100	410
Acenaphthylene	µg/L	NS	NS	<1	<0.02	<8.2	0.17	2.45 J	<1	<0.02	<1	0.022 J	<1.1	<0.02	<1	<1.1	<0.02	<1	<0.02	<200	<20
Anthracene	µg/L	3,000	600	<0.02	0.030 J	<0.022	0.138	183	<0.021	0.048 J	<0.021	0.14	<0.021	0.113	<0.021	<0.022	0.057 J	0.62	0.132	450	88
Benzo(a)anthracene	µg/L	NS	NS	<0.01	<0.025	<0.011	<0.025	<2.5	<0.01	0.025	<0.01	<0.025	<0.011	<0.025	<0.01	<0.011	<0.025	<0.01	<0.025	310	54 J
Benzo(a)pyrene	µg/L	0.2	0.02	<0.01	<0.018	<0.011	<0.018	<1.8	<0.01	<0.018	<0.01	<0.018	<0.011	<0.018	<0.01	<0.011	<0.018	<0.01	<0.018	***120***	<18
Benzo(b)fluoranthene	µg/L	0.2	0.02	<0.0081	<0.02	<0.0086	<0.02	<2	<0.0084	<0.02	<0.0084	<0.02	<0.0084	<0.02	<0.0084	<0.0086	<0.02	<0.0081	<0.02	***100***	***26.1 J***
Benzo(ghi)perylene	µg/L	NS	NS	<0.061	<0.023	<0.065	<0.023	<2.3	<0.063	<0.023	<0.063	<0.023	<0,063	<0.023	<0.063	<0.065	<0.023	<0.061	<0.023	<61	<23
Benzo(k)fluoranthene	µg/L	NS	NS	<0.0081	<0.027	<0.0083	<0.027	<2.7	<0.0084	<0.027	<0.0084	<0.027	<0.0084	<0.027	<0.0084	<0.0086	<0.027	<0.0081	<0.027	59	<27
Chrysene	µg/L	0.2	0.02	<0.061	<0.018	<0.065	<0.018	<1.8	<0.063	<0.018	<0.063	<0.018	<0.063	<0.018	<0.063	<0.065	<0.018	<0.061	<0.018	***340***	***50 J***
Dibenzo(a,h)anthracene	µg/L	NS	NS	<0.02	<0.023	<0.022	<0.023	<2.3	<0.021	<0.023	<0.021	<0.023	<0.021	<0.023	<0.021	<0.022	<0.023	<0.02	<0.023	<23	<23
Fluoranthene	µg/L	400	80	<0.02	<0.026	<0.022	<0.026	14.4	<0.021	<0.026	<0.021	0.037 J	<0.021	<0.026	<0.021	<0.022	<0.026	0.028 J	<0.026	***1800***	*320*
Fluorene	µg/L	400	80	<0.1	<0.02	1.5	0.83	*162*	<0.1	0.029 J	<0.1	0.075	<0.11	<0.02	<0.1	<0.11	<0.02	49	0.251	***1700***	*330*
Indeno(1,2,3-cd)pyrene	µg/L	NS	NS	<0.04	<0.027	<0.043	<0.027	<2.7	<0.042	<0.027	<0.042	<0.027	<0.042	<0.027	<0.042	<0.043	<0.027	<0.04	<0.027	<49	<27
1-Methylnaphthalene	µg/L	NS	NS	NA	<0.019	NA	9.7	136	NA	0.027 J	NA	0.115	NA	<0.019	NA	NA	0.019 J	NA	0.057 J	NA	315
2-Methylnaphthalene	µg/L	NS	NS	NA	<0.016	NA	8.9	15.2	NA	0.041 J	NA	0.222	NA	<0.016	NA	NA	0.025 J	NA	0.025 J	NA	470
Naphthalene	µg/L	100	10	<1	0.025 J	1.6 J	0.43	*64*	<1	0.38	<1	2.34	<1.1	0.024 J	<1	<1.1	0.249	***100***	0.201	***11000***	***4100***
Phenanthrene	µg/L	NS	NS	<0.04	<0.018	<0.043	0.034 J	177	<0.042	0.044 J	0.073 J	0.106	0.046 J	0.029 J	<0.042	<0.043	0.022 J	15	0.08	4600	800
Pyrene	µg/L	250	50	<0.1	<0.025	<0.11	<0.025	7.5 J	<0.1	<0.025	<0.1	0.029 J	<0.11	<0.025	<0.1	<0.11	<0.025	<0.1	<0.025	***1400***	222

Notes:
1. NR 140 ES = Wisconsin Administrative Code, Chapter NR 140 Enforcement Standard
2. NR 140 PAL = Wisconsin Administrative Code, Chapter NR 140 Preventive Action Limit
3. NS = no standard
4. NA = not analyzed
5. µg/L = micrograms per liter (equivalent to parts per billion, ppb)
6. Laboratory flags: "J" = Analyte detected between Limit of Detection and Limit of Quantitation.
7. Exceedances: **BOLD** = Concentration exceeds NR 140 ES
ITALICS = Concentration exceeds NR 140 PAL

Table 3
Groundwater Analytical Data
Moss American - 8716 North Granville Road, Milwaukee, WI
Sigma Project No. 13701

Well Location:		NR 140	NR 140	MW-34S-N	MW-35S	MW-37S		MW-38S		MW-39S		TG1-1		TG1-3		TG2-1		TG2-3	TG3-1		TG3-3
Date:		ES	PAL	4/5/13	9/28/10	9/29/10	4/4/13	9/28/10	4/4/13	9/28/10	4/4/13	9/29/10	4/3/13	9/29/10	4/3/13	9/29/10	4/3/13	9/29/10	9/29/10	4/3/13	9/29/10
PVOCs & Detected VOCs																					
Benzene	µg/L	5	0.5	<0.27	<0.2	<0.2	<0.27	*1.9*	*0.96*	<0.2	<0.27	0.3 J	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.2	<0.27	<0.2
Ethylbenzene	µg/L	700	140	<0.82	<0.2	<0.2	<0.82	0.9 J	1.4 J	<0.2	<0.82	30	18.4	<0.2	<0.82	<0.2	<0.82	<0.2	<0.2	<0.82	<0.2
Toluene	µg/L	1,000	200	<0.8	<0.2	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.2	<0.8	<0.2
Xylenes, Total	µg/L	10,000	1,000	<2.41	<0.6	<0.6	<2.41	0.9 J	1.41 J	<0.6	<2.41	55	31.3	<0.6	<2.41	<0.6	<2.41	<0.6	<0.6	<2.41	<0.6
PAHs																					
Acenaphthene	µg/L	NS	NS	0.059 J	0.6 J	<0.52	0.025 J	4	4.2	3.3	5.8	90000	262	2.9	1.77	<0.58	<0.021	<0.55	<0.54	0.099	<0.52
Acenaphthylene	µg/L	NS	NS	<0.02	<1.1	<1	<0.02	<3.2	0.153	<13	0.127	4000 J	<10	<1	<0.02	<1.2	<0.02	<1.1	<1.1	0.056 J	<1
Anthracene	µg/L	3,000	600	0.023 J	<0.022	<0.021	<0.02	<0.022	0.263	0.13	0.136	***20000***	23.6 J	0.12	0.113	<0.023	0.035 J	<0.022	<0.022	0.189	0.023 J
Benzo(a)anthracene	µg/L	NS	NS	<0.025	0.017 J	<0.01	<0.025	<0.011	0.039 J	<0.011	0.069 J	14000	<12.5	<0.01	0.025 J	<0.012	<0.025	<0.011	<0.011	0.076 J	<0.01
Benzo(a)pyrene	µg/L	0.2	0.02	<0.018	<0.011	0.027 J	<0.018	<0.011	*0.032 J*	<0.044	*0.027 J*	***7300***	<9	<0.01	<0.018	<0.012	<0.018	<0.011	<0.011	*0.04 J*	<0.01
Benzo(b)fluoranthene	µg/L	0.2	0.02	<0.02	<0.0089	0.014 J	<0.02	<0.0089	*0.079*	<0.0085	*0.057 J*	***4900***	<10	<0.0083	<0.02	<0.0093	<0.02	<0.0088	<0.0087	*0.073*	<0.0083
Benzo(ghi)perylene	µg/L	NS	NS	<0.023	<0.067	0.08 J	<0.023	<0.067	0.077	<0.063	<0.023	3000	<11.5	<0.062	<0.023	<0.069	<0.023	<0.066	<0.065	0.065 J	<0.062
Benzo(k)fluoranthene	µg/L	NS	NS	<0.027	<0.0089	0.01 J	<0.027	<0.0089	<0.027	<0.0085	<0.027	2900	<13.5	<0.0083	<0.027	<0.0093	<0.027	<0.0088	<0.0087	0.029 J	<0.0083
Chrysene	µg/L	0.2	0.02	<0.018	<0.067	<0.062	<0.018	<0.067	*0.052 J*	<0.063	*0.054 J*	***14000***	<9	<0.062	<0.018	<0.069	<0.018	<0.066	<0.065	*0.061*	<0.062
Dibenzo(a,h)anthracene	µg/L	NS	NS	<0.023	<0.022	<0.021	<0.023	<0.022	<0.023	<0.021	<0.023	1200	<11.5	<0.021	<0.023	<0.023	<0.023	<0.022	<0.022	<0.023	<0.021
Fluoranthene	µg/L	400	80	<0.026	0.5	<0.021	<0.026	<0.22	0.103	0.19	0.32	***82000***	28.1 J	27	0.155	<0.023	<0.026	0.026 J	0.062 J	0.244	0.061 J
Fluorene	µg/L	400	80	0.034 J	0.12 J	<0.1	0.028 J	<0.11	0.152	1.1	0.73	***75000***	*135*	1.4	0.259	<0.12	<0.02	<0.11	0.12 J	0.068	0.15 J
Indeno(1,2,3-cd)pyrene	µg/L	NS	NS	<0.027	<0.045	<0.041	<0.027	<0.044	0.04 J	<0.042	<0.027	2600	<13.5	<0.041	<0.027	<0.046	<0.027	<0.044	<0.044	0.044 J	<0.042
1-Methylnaphthalene	µg/L	NS	NS	0.055 J	NA	NA	0.025 J	NA	1.99	NA	0.169	NA	169	NA	<0.019	NA	<0.019	NA	NA	<0.019	NA
2-Methylnaphthalene	µg/L	NS	NS	0.039 J	NA	NA	0.044 J	NA	7.9	NA	0.117	NA	164	NA	0.017 J	NA	<0.016	NA	NA	0.017 J	NA
Naphthalene	µg/L	100	10	0.053 J	<1.1	<1	0.36	***67***	8.1	<1.1	0.211	***110000***	***1950***	<1	0.024 J	<1.2	<0.023	<1.1	<1.1	0.024 J	<1
Phenanthrene	µg/L	NS	NS	0.057 J	0.053 J	<0.041	0.037 J	<0.044	0.15	0.056 J	0.252	200000	113	0.59	0.035 J	<0.046	<0.018	<0.044	<0.044	0.069	0.1 J
Pyrene	µg/L	250	50	<0.025	0.36 J	<0.1	<0.025	<0.11	0.092	0.15 J	0.216	***57000***	17.7 J	0.16 J	0.104	<0.12	<0.025	<0.11	<0.11	0.199	<0.1

Table 3
Groundwater Analytical Data
Moss American - 8716 North Granville Road, Milwaukee, WI
Sigma Project No. 13701

Well Location:		NR 140	NR 140	TG4-1	TG4-3		TG5-1		TG5-3		TG6-1		TG6-3		PZ-02	PZ-03	PZ-10	MW-A		MW-B	
Date:		ES	PAL	9/29/10	9/29/10	4/3/13	9/29/10	4/3/13	9/29/10	4/3/13	9/29/10	4/3/13	9/29/10	4/3/13	4/4/13	4/4/13	4/4/13	9/30/10	4/4/13	9/27/10	4/5/13
PVOCs & Detected VOCs																					
Benzene	µg/L	5	0.5	<0.2	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.27	0.44 J	<0.27	<0.2	<0.27	<0.2	<0.27
Ethylbenzene	µg/L	700	140	<0.2	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.82	2.68	<0.82	<0.2	<0.82	<0.2	<0.82
Toluene	µg/L	1,000	200	<0.2	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.8	<0.8	<0.8	<0.2	<0.8	<0.2	<0.8
Xylenes, Total	µg/L	10,000	1,000	<0.6	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<2.41	1.92 J	<2.41	<0.6	<2.41	<0.6	<2.41
PAHs																					
Acenaphthene	µg/L	NS	NS	<0.54	<0.52	<0.021	<0.52	<0.021	<0.52	<0.021	0.63 J	0.232	<0.52	<0.021	79	116	5.2	<0.51	<0.021	<0.53	<0.021
Acenaphthylene	µg/L	NS	NS	<1.1	<1	0.021 J	<1	<0.02	<1	<0.02	<1.1	<0.02	<1	<0.02	1.01 J	0.99 J	0.095	<1	<0.02	<1.1	<0.02
Anthracene	µg/L	3,000	600	<0.022	<0.021	0.127	<0.021	0.054 J	<0.021	0.087	0.023 J	0.031 J	<0.021	0.042 J	<0.4	2.37	0.31	<0.021	0.025 J	<0.021	<0.02
Benzo(a)anthracene	µg/L	NS	NS	<0.011	<0.01	0.033 J	<0.01	<0.025	<0.01	<0.025	<0.011	<0.025	<0.01	<0.025	<0.5	2.03	0.128	<0.01	<0.025	<0.011	<0.025
Benzo(a)pyrene	µg/L	0.2	0.02	<0.011	<0.01	*0.024 J*	<0.01	<0.018	<0.01	<0.018	<0.011	<0.018	<0.01	<0.018	<0.36	***0.71 J***	*0.07*	<0.01	<0.018	<0.011	<0.018
Benzo(b)fluoranthene	µg/L	0.2	0.02	<0.0086	<0.0084	*0.044 J*	<0.0084	<0.02	<0.0083	<0.02	<0.0091	<0.02	<0.0084	<0.02	<0.4	***1.45***	*0.169*	<0.0082	<0.02	<0.0086	<0.02
Benzo(ghi)perylene	µg/L	NS	NS	<0.065	<0.063	0.042 J	<0.063	<0.023	<0.062	<0.023	<0.068	<0.023	<0.063	<0.023	<0.46	<0.46	0.108	<0.062	<0.023	<0.064	<0.023
Benzo(k)fluoranthene	µg/L	NS	NS	<0.0086	<0.0084	<0.027	<0.0084	<0.027	<0.0083	<0.027	<0.0091	<0.07	<0.0084	<0.027	<0.54	<0.54	0.064 J	<0.0082	<0.027	<0.0086	<0.027
Chrysene	µg/L	0.2	0.02	<0.065	<0.063	*0.023 J*	<0.063	<0.018	<0.062	<0.018	<0.068	<0.018	<0.063	<0.018	<0.36	***1.47***	*0.132*	<0.062	<0.018	<0.064	<0.018
Dibenzo(a,h)anthracene	µg/L	NS	NS	<0.022	<0.021	<0.023	<0.021	<0.023	<0.021	<0.023	<0.023	<0.023	<0.021	<0.023	<0.46	<0.46	<0.023	<0.021	<0.023	<0.021	<0.023
Fluoranthene	µg/L	400	80	<0.022	<0.021	0.083 J	<0.021	<0.026	0.051 J	0.096	0.047 J	0.069 J	0.083 J	0.069 J	<0.52	10.7	0.41	<0.021	<0.026	<0.021	<0.026
Fluorene	µg/L	400	80	<0.11	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02	0.22 J	0.048 J	<0.1	<0.02	3.6	33	0.92	<0.1	<0.02	<0.11	<0.02
Indeno(1,2,3-cd)pyrene	µg/L	NS	NS	<0.043	<0.042	<0.027	<0.042	<0.027	<0.041	<0.027	<0.045	<0.027	<0.042	<0.027	<0.54	<0.54	0.071 J	<0.041	<0.027	<0.043	<0.027
1-Methylnaphthalene	µg/L	NS	NS	NA	NA	<0.019	NA	<0.019	NA	<0.019	NA	<0.019	NA	<0.019	0.8 J	47	3.4	NA	<0.019	NA	<0.019
2-Methylnaphthalene	µg/L	NS	NS	NA	NA	<0.016	NA	<0.016	NA	0.020 J	NA	0.019 J	NA	<0.016	<0.32	<0.32	2.82	NA	<0.016	NA	<0.016
Naphthalene	µg/L	100	10	<1.1	<1	<0.023	<1	<0.023	<1	<0.023	<1.1	<0.023	<1	<0.023	1.79	47	0.32	<1	<0.023	<1.1	0.034 J
Phenanthrene	µg/L	NS	NS	<0.043	<0.042	0.037 J	<0.042	0.027 J	<0.041	0.027 J	<0.045	0.025 J	<0.042	0.021 J	<0.36	1.87	1.36	<0.041	0.026 J	<0.043	0.037 J
Pyrene	µg/L	250	50	<0.11	<0.1	0.071 J	<0.1	<0.025	<0.1	0.103	<0.11	0.055 J	<0.1	0.052 J	<0.5	7.1	0.299	<0.1	0.025	<0.11	0.025

Table 3
Groundwater Analytical Data
Moss American - 8716 North Granville Road, Milwaukee, WI
Sigma Project No. 13701

Well Location:		NR 140	NR 140	MW-C		MW-D		MW-E		MW-F		MW-G		MW-H		MW-I		MW-J		MW-K
Date:		ES	PAL	9/27/10	4/5/13	9/27/10	4/5/13	9/30/10	4/5/13	9/30/10	4/5/13	9/30/10	4/5/13	9/28/10	4/5/13	9/28/10	4/5/13	9/28/10	4/5/13	9/28/10
PVOCs & Detected VOCs																				
Benzene	µg/L	5	0.5	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2	<0.27	<0.2
Ethylbenzene	µg/L	700	140	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2	<0.82	<0.2
Toluene	µg/L	1,000	200	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2	<0.8	<0.2
Xylenes, Total	µg/L	10,000	1,000	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6	<2.41	<0.6
PAHs																				
Acenaphthene	µg/L	NS	NS	<0.54	<0.021	<0.55	<0.021	<0.56	<0.021	<0.51	<0.021	<0.51	<0.021	<0.52	<0.021	<0.52	<0.021	<0.54	<0.021	<0.53
Acenaphthylene	µg/L	NS	NS	<1.1	<0.02	<1.1	<0.02	<1.1	<0.02	<1	<0.02	<1	<0.02	<1	<0.02	<1	<0.02	<1.1	<0.02	<1.1
Anthracene	µg/L	3,000	600	<0.022	<0.02	<0.022	<0.02	<0.022	<0.02	<0.021	<0.02	<0.02	<0.02	<0.021	<0.02	<0.021	<0.02	<0.021	<0.02	0.022 J
Benzo(a)anthracene	µg/L	NS	NS	<0.011	<0.025	<0.011	<0.025	<0.011	<0.025	<0.01	0.03 J	<0.01	<0.025	<0.01	0.053 J	<0.01	0.055 J	<0.011	0.026 J	<0.011
Benzo(a)pyrene	µg/L	0.2	0.02	<0.0111	<0.018	<0.011	<0.018	0.02 J	*0.038 J*	<0.01	*0.039 J*	<0.01	<0.018	<0.01	*0.049 J*	<0.01	*0.093*	<0.011	*0.025 J*	<0.011
Benzo(b)fluoranthene	µg/L	0.2	0.02	<0.0087	0.039 J	<0.0088	<0.02	<0.009	*0.063*	<0.0082	*0.065*	<0.0082	<0.02	<0.0083	*0.107*	<0.0084	***0.222***	<0.0086	*0.055 J*	<0.0085
Benzo(ghi)perylene	µg/L	NS	NS	<0.065	0.026 J	<0.066	0.038 J	0.12 J	0.44	<0.062	0.188	<0.061	0.047 J	<0.062	0.107	<0.063	0.152	<0.064	0.054 J	<0.064
Benzo(k)fluoranthene	µg/L	NS	NS	<0.0087	<0.027	<0.0088	<0.027	<0.009	<0.027	<0.0082	<0.027	<0.0082	<0.027	<0.0083	<0.027	<0.0084	0.071 J	<0.0086	<0.027	<0.0085
Chrysene	µg/L	0.2	0.02	<0.065	0.028 J	<0.066	*0.02 J*	<0.067	<0.018	<0.062	*0.06*	<0.061	<0.018	<0.062	*0.082*	<0.063	*0.111*	<0.064	*0.038 J*	<0.064
Dibenzo(a,h)anthracene	µg/L	NS	NS	<0.022	<0.023	<0.022	<0.023	<0.022	<0.023	<0.021	<0.023	<0.02	<0.023	<0.021	<0.023	<0.021	<0.023	<0.021	<0.023	<0.021
Fluoranthene	µg/L	400	80	<0.022	0.052 J	<0.022	<0.026	<0.022	<0.026	<0.021	0.087	<0.02	<0.026	<0.021	0.153	<0.021	0.196	<0.021	0.061 J	<0.021
Fluorene	µg/L	400	80	<0.11	<0.02	<0.11	<0.02	<0.11	<0.02	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02	<0.11	<0.02	<0.11
Indeno(1,2,3-cd)pyrene	µg/L	NS	NS	<0.043	<0.027	<0.044	<0.027	<0.045	0.094	<0.041	0.04 J	<0.041	<0.027	<0.042	0.041 J	<0.042	0.093	<0.043	<0.027	<0.043
1-Methylnaphthalene	µg/L	NS	NS	NA	0.11	NA	<0.019	NA	0.02 J	NA	<0.019	NA	<0.019	NA	<0.019	NA	<0.019	NA	0.025 J	NA
2-Methylnaphthalene	µg/L	NS	NS	NA	<0.016	NA	<0.016	NA	<0.016	NA	<0.016	NA	<0.016	NA	<0.016	NA	<0.016	NA	<0.016	NA
Naphthalene	µg/L	100	10	<1.1	<0.023	<1.1	<0.023	<1.1	<0.023	<1	0.027 J	<1	<0.023	<1	<0.023	<1	<0.023	<1.1	0.032 J	<1.1
Phenanthrene	µg/L	NS	NS	<0.043	0.044 J	<0.044	<0.018	<0.045	0.018 J	<0.041	0.062	<0.041	0.02 J	<0.042	0.044 J	<0.042	0.087	<0.043	0.047 J	<0.043
Pyrene	µg/L	250	50	<0.11	0.046 J	<0.11	<0.025	<0.11	0.034 J	<0.1	0.127	<0.1	0.033 J	<0.1	0.15	<0.1	0.16	<0.11	0.058 J	<0.11

Table 4
Groundwater *In Situ* Measurements
Moss American - 8716 North Grandville Road, Milwaukee, WI
Sigma Project No. 13701

Well Identification	Date	In Situ Measurements				
		pH	Temperature (°C)	Ferrous Iron (mg/l)	Dissolved Oxygen (mg/l)	Redox Potential (mV)
MW-5S	9/27/10	6.57	12.15	NA	11.20	36.1
	4/4/13	7.2	9.0	3.0	2.00	35
MW-7S	9/28/10	6.89	13.12	NA	0.8	-70
	4/4/13	7.1	5.9	3.6	1.40	-15
MW-7S-W	4/5/13	7.2	6.1	0.0	1.9	-182
MW-9S	9/30/10	6.69	13.75	NA	1.7	-21.3
	4/4/13	7.3	5.6	8.0	1.50	-36
MW-27S	9/27/10	6.47	14.51	NA	0.8	-70.1
	4/4/13	7.3	7.5	3.0	1.40	-58
MW-30S	9/28/10	6.72	13.87	NA	0.8	45.5
	4/4/13	7.3	7.6	0.8	1.90	40
MW-31S	9/29/10	6.90	13.37	NA	0.8	-16.1
MW-32S	9/27/10	6.40	16.49	NA	2.4	-57.6
	4/4/13	7.4	6.4	6.8	1.40	-159
MW-33S	9/28/10	6.34	14.60	NA	3.7	-18.2
	4/4/13	6.9	6.5	3.6	1.10	-15
MW-34S	9/28/10	NS	NS	NS	NS	NS
	4/4/13	7.2	6.2	7.0	0.49	-160
MW-34S-N	4/5/13	7.1	6.0	0.0	2.4	131
MW-35S	9/28/10	6.46	16.26	NA	0.8	-38.9
MW-37S	9/29/10	6.71	15.58	NA	3.0	-18.6
	4/4/13	7.7	7.4	0.0	1.30	122
MW-38S	9/28/10	6.87	14.32	NA	1.0	-43.3
	4/4/13	7.0	7.9	2.0	1.10	-33
MW-39S	9/28/10	6.75	16.04	NA	0.4	-48.3
	4/4/13	7.6	6.5	4.2	0.97	-104
TG1-1	9/29/10	NA	NA	NA	NA	NA
	4/3/13	7.2	5.8	4.0	0.85	-120
TG1-3	9/29/10	6.97	16.08	NA	1.68	-124.0
	4/3/13	7.1	5.1	3.6	0.55	-88
TG2-1	9/29/10	6.77	14.23	NA	0.76	-2.5
	4/3/13	7.2	5.2	0.0	0.60	12
TG2-3	9/29/10	6.88	16.63	NA	1.12	-113.6
	4/3/13	NA	NA	NA	NA	NA
TG3-1	9/29/10	6.81	16.75	NA	3.04	-67.1
	4/3/13	7.2	5.6	2.4	1.30	-96
TG3-3	9/29/10	6.79	16.79	NA	1.19	-81.5
	4/3/13	NS	NS	NS	NS	NS
TG4-1	9/29/10	6.97	15.83	NA	5.16	70.4
	4/3/13	NS	NS	NS	NS	NS
TG4-3	9/29/10	7.16	15.96	NA	5.63	-6.3
	4/3/13	7.1	6.2	4.2	0.90	-129
TG5-1	9/29/10	6.89	15.68	NA	5.37	81.0
	4/3/13	7.0	6.1	4.0	1.00	-8
TG5-3	9/29/10	7.08	15.31	NA	1.04	-36.5
	4/3/13	7.1	6.4	1.4	1.00	-14
TG6-1	9/29/10	6.86	16.71	NA	0.72	-110.7
	4/3/13	7.3	5.8	0.0	1.20	-107

Table 4
Groundwater *In Situ* Measurements
Moss American - 8716 North Grandville Road, Milwaukee, WI
Sigma Project No. 13701

Well Identification	Date	In Situ Measurements				
		pH	Temperature (° C)	Ferrous Iron (mg/l)	Dissolved Oxygen (mg/l)	Redox Potential (mV)
TG6-3	9/29/10	6.58	15.76	NA	1.33	-46.4
	4/3/13	7.3	3.8	4.2	1.40	-14
PZ-02	4/4/13	7.0	6.0	4.0	1.00	-12
PZ-03	4/4/13	7.2	6.8	4.0	0.95	-20
PZ-10	4/4/13	7.2	5.8	7.0	1.40	-103
MW-A	9/30/10	6.76	14.09	NA	0.43	-48
	4/5/13	7.3	5.8	4.0	1.70	173
MW-B	9/27/10	6.87	13.58	NA	0.98	19.6
	4/5/13	7.3	4.7	1.0	1.40	27
MW-C	9/27/10	7.01	12.83	NA	1.28	-53.5
	4/5/13	7.3	6.9	2.0	1.20	-31
MW-D	9/27/10	6.71	13.82	NA	1.64	-87.6
	4/5/13	7.4	5.7	4.0	1.80	75
MW-E	9/30/10	7.16	12.57	NA	NA	NA
	4/5/13	7.5	7.5	0.0	1.10	-10
MW-F	9/30/10	7.04	13.59	NA	2.57	85.4
	4/5/13	7.4	8.2	3.6	1.24	-60
MW-G	9/30/10	6.85	14.32	NA	2.25	83.9
	4/5/13	7.2	7.3	0.0	3.00	-10
MW-H	9/28/10	7.05	13.13	NA	1.47	8.4
	4/5/13	7.3	7.3	4.0	1.60	-30
MW-I	9/28/10	7.08	15.07	NA	1.50	-52.4
	4/5/13	7.7	4.8	0.0	3.10	-40
MW-J	9/28/10	7.14	11.69	NA	2.16	1.1
	4/5/13	7.3	7.3	0.0	2.90	46
MW-K	9/28/10	7.03	16.82	NA	2.03	108.4

Notes:
1. ° C = degrees Celcius
2. mg/l = milligrams per liter (equivalent to parts per million, ppm)
3. mV = millivolts
4. NA = not analyzed
5. NS = not sampled (obstructions occurred in TG2-3 and TG4-1 preventing sampling on 4/3/13)

Table 5
Groundwater Bioremediation Data
Moss American - 8716 North Grandville Road, Milwaukee, WI
Sigma Project No. 13701

Well Identification	Date	Nitrate-Nitrogen	Nitrite-Nitrogen	Total Kjeldahl Nitrogen	Ammonia-Nitrogen	Total Phosphate-Phosphorous	Orthophosphate	Biochemical Oxygen Demand	Chemical Oxygen Demand	Total Organic Carbon	Heterotrophic Plate Count[a]	Sub-Petroleum Degraders[b]
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	cfu/L	cfu/L
TG1-1	9/29/10	<0.04	<0.015	<1.3	0.79	<0.25	<0.03	29.2	415.0	11.4	3,690,000	1,850,000
	4/3/13	<0.08	<0.04	1.6	0.4	<0.13	<0.18	7.0	51.0	14.0	300,000	160,000
TG1-3	9/29/10	<0.04	<0.015	1.9	1.9	<0.25	<0.03	<3.6	28.5	10.8	6,300,000	100,000
	4/3/13	0.17	<0.04	1.8	0.93	0.31	<0.18	7.2	66.0	14.0	250,000	130,000
TG2-1	9/29/10	<0.04	<0.015	<0.5	0.37 *	<0.25	<0.03	<1.4	7.1 *	2.3	610,000	240,000
	4/3/13	<0.08	<0.04	<0.4	<0.04	0.16	<0.18	<2.0	<13	5.6	550,000	8,000,000
TG2-3	9/29/10	<0.04	<0.015	0.84 *	<0.2	<0.25	<0.03	<2	19.0	6.6	160,000	360,000
	4/3/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TG3-1	9/29/10	<0.04	<0.015	1.2	<0.2	0.28 *	<0.03	<2.1	28.1	11.1	40,000	80,000
	4/3/13	0.21	<0.04	0.85	0.32	1.6	<0.18	3.5	42.0	24.0	500,000	22,000,000
TG3-3	9/29/10	<0.04	<0.015	2.1	1.7	<0.25	<0.03	8.3	25.3	8.5	300,000	20,000
	4/3/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TG4-1	9/29/10	<0.04	<0.015	0.51 *	0.25 *	<0.25	0.072 *	<1.5	22.1	8.8	180,000	30,000
	4/3/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TG4-3	9/29/10	<0.04	<0.015	1.0	0.68	<0.25	<0.03	<1.6	23.3	9.1	810,000	430,000
	4/3/13	0.19	<0.04	0.78	0.44	0.29	<0.18	<2.0	20.0	13	66,000	2,000,000
TG5-1	9/29/10	<0.04	<0.015	0.71 *	<0.2	<0.25	0.1	<1.6	11.9	4.6	540,000	<10,000
	4/3/13	<0.08	<0.04	<0.4	<0.04	0.17	<0.18	<2.0	16	7.5	120,000	3,800,000
TG5-3	9/29/10	<0.04	<0.015	1.2	0.9	<0.25	<0.03	<1.3	14.2	5.0	1,680,000	<10,000
	4/3/13	0.18	<0.04	1.1	0.3	0.17	<0.18	2.0	15.0	13.0	11,000	1,000,000
TG6-1	9/29/10	<0.04	<0.015	3	2.2	0.34	<0.03	<2.6	28.9	12	220,000	60,000
	4/3/13	0.18	<0.04	1.3	0.64	0.14	<0.18	4.7	19	4.2	620,000	36,000,000
TG6-3	9/29/10	<0.04	<0.015	0.9 *	0.53 *	<0.25	<0.03	<1.3	14.2	6.8	<10,000	<10,000
	4/3/13	0.19	<0.04	0.66	0.38	0.18	<0.18	<2.0	38	20	150,000	120,000

Notes:
1. cfu/L = colony forming units per liter
2. mg/L = milligrams per liter (equivalent to parts per million, ppm)
3. Laboratory flags:
   * = Analyte detected between Limit of Detection and Limit of Quantitation.
4. NS = not sampled due to obstruction in well
5. [a] = analysis was completed by CT Laboratories using an incubation period of one week
6. [b] = analysis was completed by Terra System, Inc. using an incubation period of three weeks

APPENDIX A

SOIL BORING AND WELL CONSTRUCTION LOGS

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
8716 N. Grandville Road	-	MW-7S-W

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Brian GESTRA	3/28/2013	3/28/2013	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VN621		MW-7S-W	Feet MSL	Feet MSL	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N
NW 1/4 of NW 1/4 of Section 8, T 8 N, R 21 E
Lat ___° ___' ___"
Long ___° ___' ___"
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Milwaukee	41	Milwaukee

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 13	9 1 1 3	1	TOPSOIL and grass, dk brown, moist, partially frozen	ML			0						
				SILT, med and dk brown, very dense, moist										
2 SS	24 7	2 2 2 5	2, 3		ML			0						
3 SS	24 10	22 20 26 12	4, 5	COARSE SAND and GRAVEL, med brown/grey, loose, wet, product Water at approx. 5'	SW			0						Lab sample (4-6')
4 SS	24 15	2 7 9 4	6, 7	SILT, lt brown/tan, med dense, wet, slight product	ML			0						
				med grey/brown										
5 SS	24 15	3 6 10 15	8, 9	SILT with trace small gravel, med grey/brown, med dense, med plasticity, wet				0						
6 SS	24 20	4 6 7 10	10, 11	lt brown/tan, very dense	ML			0						
7 SS	24 19	b 8 15 13	12, 13					0						
			14	End of boring at 14'. Monitoring well MW-7S-W installed with bottom of casing at 13'.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
B Osmusch	Sigma Environmental Services, Inc. 1300 W. Canal St Milwaukee, WI 53233	Tel: 414-643-4200 Fax: 414-643-4210

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
8716 N. Grandville Road	-	MW-34S-N

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Brian GESTRA	3/28/2013	3/28/2013	hollow stem auger

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VN622		MW-34S-N	Feet MSL	Feet MSL	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N
NW 1/4 of NW 1/4 of Section 8, T 8 N, R 21 E
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E
Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Milwaukee	41	Milwaukee

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 11	3 2 1 1	1	TOPSOIL and grass, dk brown, very dense, moist, partially frozen	ML									
				SILT, lt and dk brown, soft, moist to wet	ML			0						
2 SS	24 0	1 WOH	2, 3											
3 SS	24 4	1 WOH	4, 5	SILT with slight CLAY, med grey/brown, very soft, wet Water at approx. 5-7'	CL-ML			0						
4 SS	24 7	4 3 4 5	6, 7	SILT with trace small gravel, med grey, slightly dense, wet				0						
5 SS	24 20	3 4 WOH	8, 9	lt brown/grey	ML			0						
6 SS	24 16	3 4 4 8	10, 11	lt grey no gravel				0						
7 SS	24 19	3 3 6 10	12, 13	COARSE SAND, loose, wet	SP			0						
			14	SILT with trace small gravel, med grey/brown/red, med dense, wet	ML									
				End of boring at 14'. Monitoring well MW-34S-N installed with bottom of casing at 13'.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: B Orzusik

Firm: Sigma Environmental Services, Inc.
1300 W. Canal St Milwaukee, WI 53233
Tel: 414-643-4200
Fax: 414-643-4210

State of Wisconsin
Department of Natural Resources

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☒ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

Facility/Project Name: 8716 N. Grandville Road	Local Grid Location of Well: ____ ft. ☐N. ☐S. ____ ft. ☐E. ☐W.	Well Name: MW-7S-W
Facility License, Permit or Monitoring No.: -	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. __°__'__" Long. __°__'__" or	Wis. Unique Well No.: VN621 / DNR Well Number:
Facility ID:	St. Plane ____ ft. N, ____ ft. E. S/C/N	Date Well Installed: 03/28/2013
Type of Well: Well Code 11/mw	Section Location of Waste/Source: NW 1/4 of NW 1/4 of Sec. 8, T. 8 N, R. 21 ☒E ☐W	Well Installed By: (Person's Name and Firm) Brian, GESTRA
Distance from Waste/Source: ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number:	

A. Protective pipe, top elevation ______ ft. MSL
B. Well casing, top elevation ______ ft. MSL
C. Land surface elevation ______ ft. MSL
D. Surface seal, bottom ______ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☒ SW ☒ SP ☐
SM ☐ SC ☐ ML ☒ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ 5 0
Hollow Stem Auger ☒ 4 1
Other ☐ __

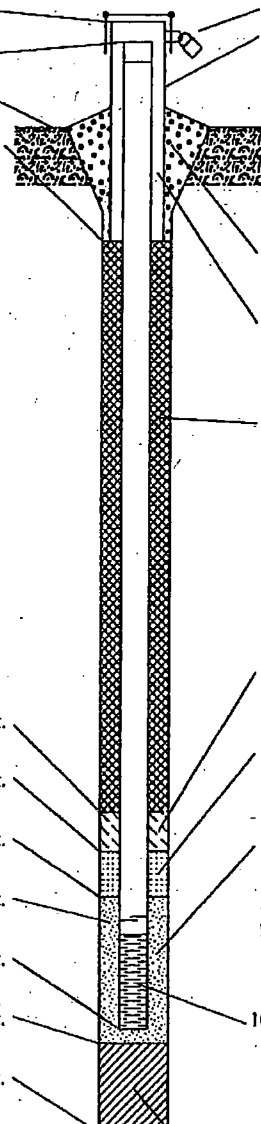
15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1
Drilling Mud ☐ 0 3 None ☒ 9 9

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required):

E. Bentonite seal, top ______ ft. MSL or 0.0 ft.
F. Fine sand, top ______ ft. MSL or 1.0 ft.
G. Filter pack, top ______ ft. MSL or 2.0 ft.
H. Screen joint, top ______ ft. MSL or 3.0 ft.
I. Well bottom ______ ft. MSL or 13.0 ft.
J. Filter pack, bottom ______ ft. MSL or 13.0 ft.
K. Borehole, bottom ______ ft. MSL or 14.0 ft.
L. Borehole, diameter 8.3 in.
M. O.D. well casing 2.25 in.
N. I.D. well casing 2.00 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 4.0 ft.
   c. Material: Steel ☒ 0 4; Other ☐ __
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ______
3. Surface seal: Bentonite ☒ 3 0; Concrete ☐ 0 1; Other ☐ __
4. Material between well casing and protective pipe: Bentonite ☒ 3 0; Other ☐ __
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 3 3
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 3 5
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐ 3 1
   d. ____% Bentonite . . . Bentonite-cement grout ☐ 5 0
   e. ____Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ 0 1; Tremie pumped ☐ 0 2; Gravity ☒ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 3 2
   c. ______ Other ☐ __
7. Fine sand material: Manufacturer, product name & mesh size
   a. #4000
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. #5
   b. Volume added ______ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 2 3; Flush threaded PVC schedule 80 ☐ 2 4; Other ☐ __
10. Screen material: PVC
   a. Screen Type: Factory cut ☒ 1 1; Continuous slot ☐ 0 1; Other ☐ __
   b. Manufacturer ______
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ 1 4; Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm	
B Orzusett	Sigma Environmental Services, Inc. 1300 W. Canal St Milwaukee, WI 53233	Tel: 414-643-4200 Fax: 414-643-4210

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

Route To: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☒ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 7-98

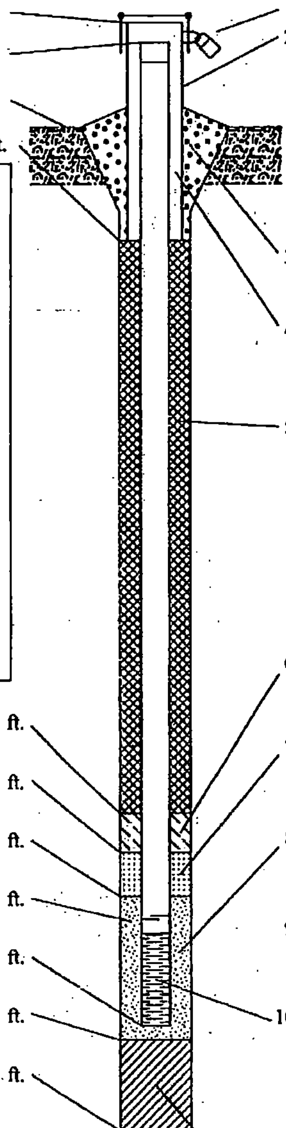
Facility/Project Name: 8716 N. Grandville Road	Local Grid Location of Well: ____ ft. ☐N. ☐S. ____ ft. ☐E. ☐W.	Well Name: MW-34S-N
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No.: VN622 / DNR Well Number:
Facility ID	St. Plane ____ ft. N, ____ ft. E. S/C/N	Date Well Installed: 03/28/2013
Type of Well: Well Code 11/mw	Section Location of Waste/Source: NW 1/4 of NW 1/4 of Sec. 8, T. 8 N, R. 21 ☒E ☐W	Well Installed By: (Person's Name and Firm) Brian GESTRA
Distance from Waste/Source ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation ____ ft. MSL
B. Well casing, top elevation ____ ft. MSL
C. Land surface elevation ____ ft. MSL
D. Surface seal, bottom ____ ft. MSL or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☒
SM ☐ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No
14. Drilling method used: Rotary ☐ 5 0; Hollow Stem Auger ☒ 4 1; Other ☐ __
15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1 Drilling Mud ☐ 0 3 None ☒ 9 9
16. Drilling additives used? ☐ Yes ☒ No
Describe ____
17. Source of water (attach analysis, if required): ____

E. Bentonite seal, top ____ ft. MSL or 0.0 ft.
F. Fine sand, top ____ ft. MSL or 1.0 ft.
G. Filter pack, top ____ ft. MSL or 2.0 ft.
H. Screen joint, top ____ ft. MSL or 3.0 ft.
I. Well bottom ____ ft. MSL or 13.0 ft.
J. Filter pack, bottom ____ ft. MSL or 13.0 ft.
K. Borehole, bottom ____ ft. MSL or 14.0 ft.
L. Borehole, diameter 8.3 in.
M. O.D. well casing 2.25 in.
N. I.D. well casing 2.00 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 4.0 ft.
   c. Material: Steel ☒ 0 4; Other ☐ __
   d. Additional protection? ☐ Yes ☒ No
   If yes, describe: ____
3. Surface seal: Bentonite ☒ 3 0; Concrete ☐ 0 1; Other ☐ __
4. Material between well casing and protective pipe: Bentonite ☒ 3 0; Other ☐ __
5. Annular space seal: a. Granular/Chipped Bentonite ☒ 3 3
   b. ____ Lbs/gal mud weight... Bentonite-sand slurry ☐ 3 5
   c. ____ Lbs/gal mud weight... Bentonite slurry ☐ 3 1
   d. ____ % Bentonite... Bentonite-cement grout ☐ 5 0
   e. ____ Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ 0 1; Tremie pumped ☐ 0 2; Gravity ☒ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 3 2
   c. ____ Other ☐ __
7. Fine sand material: Manufacturer, product name & mesh size
   a. #4000
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. #5
   b. Volume added ____ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 2 3; Flush threaded PVC schedule 80 ☐ 2 4; Other ☐ __
10. Screen material: PVC
   a. Screen Type: Factory cut ☒ 1 1; Continuous slot ☐ 0 1; Other ☐ __
   b. Manufacturer ____
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ 1 4; Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: B Orzusell
Firm: Sigma Environmental Services, Inc. 1300 W. Canal St Milwaukee, WI 53233 Tel: 414-643-4200 Fax: 414-643-4210

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APPENDIX B

LABORATORY ANALYTICAL REPORTS

Synergy Environmental Lab, INC.

1990 Prospect Ct., Appleton, WI 54914 *P 920-830-2455 * F 920-733-0631

STACY OSZUSCIK/MAFISUL ISLAM
SIGMA ENVIRONMMENTAL
1300 W. CANAL STREET
MILWAUKEE, WI 53233

Report Date *16-Apr-13*

Project Name MOSS-AMERICA **Invoice #** E24979
Project # 13701

Lab Code 5024979A
Sample ID COMPOSITE 1
Sample Matrix Soil
Sample Date 3/28/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Inorganic										
Metals										
TCLP Arsenic	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Barium	0.87	mg/l	0.15		1	6010B		4/9/2013	ESC	1
TCLP Cadmium	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Chromium	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Copper	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Lead	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Mercury	< 0.001	mg/l	0.001		1	7470A		4/8/2013	ESC	1
TCLP Nickel	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Selenium	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Silver	< 0.05	mg/l	0.05		1	6010B		4/9/2013	ESC	1
TCLP Zinc	0.13	mg/l	0.05		1	6010B		4/9/2013	ESC	1
Organic										
PCB'S										
PCB-1016	< 0.0065	mg/kg	0.0065	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1221	< 0.0054	mg/kg	0.0054	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1232	< 0.0042	mg/kg	0.0042	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1242	< 0.0032	mg/kg	0.0032	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1248	< 0.0032	mg/kg	0.0032	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1254	< 0.0047	mg/kg	0.0047	0.017	1	EPA 8082A		4/9/2013	ESC	1
PCB-1260	< 0.0049	mg/kg	0.0049	0.017	1	EPA 8082A		4/9/2013	ESC	1
TCLP SVOC's										
TCLP o-Cresol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP m & p-Cresol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP 1,4-Dichlorobenzene	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP 2,4-Dinitrotoluene	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Hexachlorobenzene	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Hexachlorobutadiene	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Hexachloroethane	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Nitrobenzene	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Pentachlorophenol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP Phenol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1

Project Name MOSS-AMERICA **Invoice #** E24979
Project # 13701

Lab Code 5024979A
Sample ID COMPOSITE 1
Sample Matrix Soil
Sample Date 3/28/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
TCLP Pyridine	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP 2,4,6-Trichlorophenol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP 2,4,5-Trichlorophenol	< 0.1	mg/l	0.1		1	8270C		4/10/2013	ESC	1
TCLP VOC's										
TCLP Benzene	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Carbon Tetrachloride	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Chlorobenzene	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Chloroform	< 0.25	mg/l	0.25		1	8260B		4/6/2013	ESC	1
TCLP 1,2-Dichloroethane	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP 1,1-Dichloroethene	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Methyl Ethyl Ketone	< 0.5	mg/l	0.5		1	8260B		4/6/2013	ESC	1
TCLP Tetrachloroethene	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Trichloroethene	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
TCLP Vinyl Chloride	< 0.05	mg/l	0.05		1	8260B		4/6/2013	ESC	1
Wet Chemistry										
General										
Free Liquid	None				1	9095A		4/11/2013	ESC	1
Reactive Cyanide	< 0.125	mg/kg	0.125	0.125	1	9012B		4/8/2013	ESC	1
Reactive Sulfide	49	mg/kg	25	25	1	EPA 9034		4/5/2013	ESC	1
Specific Gravity	2.1	g/cm3			1	2710F		4/4/2013	ESC	1
Solids, Total %	85.4	%			1	2540G		4/6/2013	ESC	1
pH	8.4	su			1	EPA 9045D		4/9/2013	ESC	1
Chlorides	60	mg/kg	0.8	10	1	9056		4/5/2013	ESC	1
Flash Point	> 170	Deg. F			1	D93		4/9/2013	ESC	1

Lab Code 5024979B
Sample ID MW-7S-W (4-6')
Sample Matrix Soil
Sample Date 3/28/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
General										
General										
Solids Percent	92.4	%			1	5021		4/4/2013	MDK	1
Organic										
BTEX										
Benzene	< 25	ug/kg	7.9	25	1	GRO95/8021		4/5/2013	CJR	1
Ethylbenzene	< 25	ug/kg	7.7	25	1	GRO95/8021		4/5/2013	CJR	1
Toluene	< 25	ug/kg	8.4	27	1	GRO95/8021		4/5/2013	CJR	1
m&p-Xylene	< 50	ug/kg	16	50	1	GRO95/8021		4/5/2013	CJR	1
o-Xylene	< 25	ug/kg	10	32	1	GRO95/8021		4/5/2013	CJR	1
PAH SIM										
Acenaphthene	47000	ug/kg	436	1386	20	M8270D	4/4/2013	4/5/2013	MDK	1
Acenaphthylene	520 "J"	ug/kg	384	1218	20	M8270D	4/4/2013	4/5/2013	MDK	1
Anthracene	30700	ug/kg	390	1242	20	M8270D	4/4/2013	4/5/2013	MDK	1
Benzo(a)anthracene	11100	ug/kg	458	1458	20	M8270D	4/4/2013	4/5/2013	MDK	1
Benzo(a)pyrene	2720	ug/kg	348	1106	20	M8270D	4/4/2013	4/5/2013	MDK	1
Benzo(b)fluoranthene	5400	ug/kg	392	1246	20	M8270D	4/4/2013	4/5/2013	MDK	1
Benzo(g,h,i)perylene	740 "J"	ug/kg	454	1444	20	M8270D	4/4/2013	4/5/2013	MDK	1
Benzo(k)fluoranthene	2260	ug/kg	432	1376	20	M8270D	4/4/2013	4/5/2013	MDK	1
Chrysene	9300	ug/kg	362	1154	20	M8270D	4/4/2013	4/5/2013	MDK	1
Dibenzo(a,h)anthracene	< 446	ug/kg	446	1420	20	M8270D	4/4/2013	4/5/2013	MDK	1
Fluoranthene	69000	ug/kg	422	1344	20	M8270D	4/4/2013	4/5/2013	MDK	1
Fluorene	47000	ug/kg	444	1412	20	M8270D	4/4/2013	4/5/2013	MDK	1
Indeno(1,2,3-cd)pyrene	710 "J"	ug/kg	478	1522	20	M8270D	4/4/2013	4/5/2013	MDK	1
1-Methyl naphthalene	13200	ug/kg	414	1316	20	M8270D	4/4/2013	4/5/2013	MDK	1
2-Methyl naphthalene	< 412	ug/kg	412	1308	20	M8270D	4/4/2013	4/5/2013	MDK	1

Project Name MOSS-AMERICA **Invoice #** E24979
Project # 13701

Lab Code 5024979B
Sample ID MW-7S-W (4-6')
Sample Matrix Soil
Sample Date 3/28/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Naphthalene	1050 "J"	ug/kg	442	1404	20	M8270D	4/4/2013	4/5/2013	MDK	1
Phenanthrene	142000	ug/kg	448	1422	20	M8270D	4/4/2013	4/5/2013	MDK	1
Pyrene	46000	ug/kg	462	1472	20	M8270D	4/4/2013	4/5/2013	MDK	1

"J" Flag: Analyte detected between LOD and LOQ LOD Limit of Detection LOQ Limit of Quantitation

Code	*Comment*
1	Laboratory QC within limits.

ESC denotes sub contract lab - Certification #998093910

All solid sample results reported on a dry weight basis unless otherwise indicated. All LOD's and LOQ's are adjusted for dilutions but not dry weight. Subcontracted results are denoted by SUB in the analyst field.

Authorized Signature

CHAIN OF CUSTODY RECORD

Synergy Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № 457

Page 1 of 1

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Lab I.D. #
Account No. :
Quote No.:
Project #: 13701
Sampler: (signature) S Oszuscik

Project (Name / Location): Moss-America / 8716 N. Grandville Rd, MKE, WI

Reports To: Stacy Oszuscik + Mafizul Islam	Invoice To: Mafizul Islam
Company The Sigma Group	Company SAME
Address 1300 W. Canal St.	Address
City State Zip MKE, WI 53233	City State Zip
Phone 414-643-4200	Phone
FAX 414-643-4210	FAX

Analysis Requested / Other Analysis

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	Protocol B	BTEX								PID/FID
5024979 A	Composite 1	3-28	3pm	X		N	6	Soil	—													X									0
B	MW-75-W (4-6')	3-29	9am		X	N	2	Soil	—						X								X									0

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

Note: product was seen and smelt in sample MW-75-W (4-6')

Sample Integrity - To be completed by receiving lab.
Method of Shipment: Dunham
Temp. of Temp. Blank. ___ °C On Ice X
Cooler seal intact upon receipt: X Yes ___ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
S Oszuscik	9:20 am	3-29-13	X held for weekend - Easter		
S Oszuscik	7:30 am	4-1-13			

Received in Laboratory By: Mark Kuns Time: 8:30 Date: 4-2-13

CT LABORATORIES
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CT Laboratories LLC • 1230 Lange Ct • Baraboo, WI 53913
608-356-2760 • www.ctlaboratories.com

ANALYTICAL REPORT

SIGMA
MAFIZUL ISLAM
1300 W CANAL STREET
MILWAUKEE, WI 53233

Project Name: MOSS AMERICAN
Project Phase:
Contract #: 2582
Project #: 13701
Folder #: 96399
Purchase Order #: 13701

Arrival Temperature: See COC
Report Date: 4/29/2013
Date Received: 4/4/2013
Reprint Date: 4/29/2013

CT LAB Sample#: 280995 Sample Description: TG1-3 Sampled: 4/3/2013 1012

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	**7.2**	mg/L	2.0	N/A	1		4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**66**	mg/L	13	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**1.8**	mg/L	0.40	1.4	1		4/9/2013 15:00	4/11/2013 12:46	LJS	ASTM D3590
Total Phosphorus	**0.31**	mg/L	0.13 *	0.43	1			4/10/2013 16:35	EJC	EPA 365.1
Heterotrophic Plate Count	**250000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.93**	mg/L	0.040	0.14	1	M		4/12/2013 12:10	MML	SM 4500-NH3H
Total Organic Carbon	**14**	mg/L	0.40	1.2	1			4/8/2013 19:48	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.17**	mg/L	0.080 *	0.28	1			4/4/2013 12:03	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 12:03	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 12:03	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES
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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 280997 Sample Description: TG2-1 Sampled: 4/3/2013 1025

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	<2.0	mg/L	2.0	N/A	1		4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	<13	mg/L	13	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	<0.40	mg/L	0.40	1.4	1		4/9/2013 15:00	4/11/2013 12:50	LJS	ASTM D3590
Total Phosphorus	**0.16**	mg/L	0.13	0.43	1			4/10/2013 16:42	EJC	EPA 365.1
Heterotrophic Plate Count	**550000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	<0.040	mg/L	0.040	0.14	1			4/12/2013 12:13	MML	SM 4500-NH3H
Total Organic Carbon	**5.6**	mg/L	0.40	1.2	1			4/8/2013 20:01	BMS	EPA 9060A
Nitrate Nitrogen Total	<0.080	mg/L	0.080	0.28	1			4/4/2013 12:22	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 12:22	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 12:22	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

CT LAB Sample#: 280998 Sample Description: TG3-1 Sampled: 4/3/2013 1100

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	**3.5**	mg/L	2.0	N/A	1		4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**42**	mg/L	13	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**0.85**	mg/L	0.40	1.4	1		4/9/2013 15:00	4/11/2013 12:51	LJS	ASTM D3590
Total Phosphorus	**1.6**	mg/L	0.13	0.43	1			4/10/2013 16:44	EJC	EPA 365.1
Heterotrophic Plate Count	**500000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.32**	mg/L	0.040	0.14	1			4/12/2013 12:14	MML	SM 4500-NH3H

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES

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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 280998 Sample Description: TG3-1 Sampled: 4/3/2013 1100

Analyte	Result	Units	LOD		LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Total Organic Carbon	**24**	mg/L	0.40		1.2	1			4/8/2013 20:14	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.21**	mg/L	0.080	*	0.28	1			4/4/2013 12:40	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040		0.12	1			4/4/2013 12:40	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18		0.59	1			4/4/2013 12:40	MML	EPA 300.0
Sub Lab Results											
Petroleum Deg. Count	**ATTACHED**		N/A		N/A	1			4/29/2013 00:00	PML	

CT LAB Sample#: 280999 Sample Description: TG4-3 Sampled: 4/3/2013 1305

Analyte	Result	Units	LOD		LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results											
BOD 5-Day	<2.0	mg/L	2.0		N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**20**	mg/L	13	*	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**0.78**	mg/L	0.40	*	1.4	1		4/9/2013 15:00	4/11/2013 12:52	LJS	ASTM D3590
Total Phosphorus	**0.29**	mg/L	0.13	*	0.43	1			4/10/2013 16:46	EJC	EPA 365.1
Heterotrophic Plate Count	**66000**	cfu/L	20.0			1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.44**	mg/L	0.040		0.14	1			4/12/2013 12:16	MML	SM 4500-NH3H
Total Organic Carbon	**13**	mg/L	0.40		1.2	1			4/8/2013 20:53	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.19**	mg/L	0.080	*	0.28	1			4/4/2013 12:59	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040		0.12	1			4/4/2013 12:59	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18		0.59	1			4/4/2013 12:59	MML	EPA 300.0
Sub Lab Results											
Petroleum Deg. Count	**ATTACHED**		N/A		N/A	1			4/29/2013 00:00	PML	

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES
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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 281000 Sample Description: TG5-1 Sampled: 4/3/2013 1258

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	<2.0	mg/L	2.0	N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**16**	mg/L	13 *	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	<0.40	mg/L	0.40	1.4	1		4/9/2013 15:00	4/11/2013 12:56	LJS	ASTM D3590
Total Phosphorus	**0.17**	mg/L	0.13 *	0.43	1			4/10/2013 16:48	EJC	EPA 365.1
Heterotrophic Plate Count	**120000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	<0.040	mg/L	0.040	0.14	1			4/12/2013 12:17	MML	SM 4500-NH3H
Total Organic Carbon	**7.5**	mg/L	0.40	1.2	1			4/8/2013 21:48	BMS	EPA 9060A
Nitrate Nitrogen Total	<0.080	mg/L	0.080	0.28	1			4/4/2013 13:17	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 13:17	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 13:17	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

CT LAB Sample#: 281001 Sample Description: TG5-3 Sampled: 4/3/2013 1250

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	**2.0**	mg/L	2.0	N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**15**	mg/L	13 *	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**1.1**	mg/L	0.40 *	1.4	1		4/9/2013 15:00	4/11/2013 12:57	LJS	ASTM D3590
Total Phosphorus	**0.17**	mg/L	0.13 *	0.43	1			4/10/2013 16:50	EJC	EPA 365.1
Heterotrophic Plate Count	**11000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.30**	mg/L	0.040	0.14	1			4/12/2013 12:22	MML	SM 4500-NH3H

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES

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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 281001 Sample Description: TG5-3 Sampled: 4/3/2013 1250

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Total Organic Carbon	**13**	mg/L	0.40	1.2	1			4/8/2013 22:00	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.18**	mg/L	0.080 *	0.28	1			4/4/2013 13:36	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 13:36	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 13:36	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

CT LAB Sample#: 281002 Sample Description: TG6-1 Sampled: 4/3/2013 1230

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	**4.7**	mg/L	2.0	N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**19**	mg/L	13 *	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**1.3**	mg/L	0.40 *	1.4	1		4/9/2013 15:00	4/11/2013 12:58	LJS	ASTM D3590
Total Phosphorus	**0.14**	mg/L	0.13 *	0.43	1			4/10/2013 16:56	EJC	EPA 365.1
Heterotrophic Plate Count	**620000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.64**	mg/L	0.040	0.14	1			4/12/2013 12:23	MML	SM 4500-NH3H
Total Organic Carbon	**4.2**	mg/L	0.40	1.2	1			4/8/2013 22:13	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.18**	mg/L	0.080 *	0.28	1			4/4/2013 13:54	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 13:54	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 13:54	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES

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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 281003 Sample Description: TG6-3 Sampled: 4/3/2013 1240

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	<2.0	mg/L	2.0	N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**38**	mg/L	13 *	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**0.66**	mg/L	0.40 *	1.4	1		4/9/2013 15:00	4/11/2013 12:59	LJS	ASTM D3590
Total Phosphorus	**0.18**	mg/L	0.13 *	0.43	1			4/10/2013 16:59	EJC	EPA 365.1
Heterotrophic Plate Count	**150000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.38**	mg/L	0.040	0.14	1			4/12/2013 12:24	MML	SM 4500-NH3H
Total Organic Carbon	**20**	mg/L	0.40	1.2	1			4/8/2013 22:24	BMS	EPA 9060A
Nitrate Nitrogen Total	**0.19**	mg/L	0.080 *	0.28	1			4/4/2013 14:13	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 14:13	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 14:13	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

CT LAB Sample#: 281004 Sample Description: TG1-1 Sampled: 4/3/2013 1407

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Inorganic Results										
BOD 5-Day	**7.0**	mg/L	2.0	N/A	1	Q	4/4/2013 17:00	4/9/2013 14:09	LJS	SM 5210B
Total COD	**51**	mg/L	13	42	1		4/15/2013 12:00	4/15/2013 17:35	LJS	EPA 410.4
Total Kjeldahl Nitrogen	**1.6**	mg/L	0.40	1.4	1		4/9/2013 15:00	4/11/2013 13:01	LJS	ASTM D3590
Total Phosphorus	<0.13	mg/L	0.13	0.43	1			4/10/2013 17:01	EJC	EPA 365.1
Heterotrophic Plate Count	**300000**	cfu/L	20.0		1			4/4/2013 12:00	CES	SM 9215D
Ammonia Nitrogen Total	**0.40**	mg/L	0.040	0.14	1			4/12/2013 12:25	MML	SM 4500-NH3H

Solid sample results reported on a Dry Weight Basis

CT LABORATORIES
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SIGMA
Project Name: MOSS AMERICAN
Project #: 13701
Project Phase:

Contract #: 2582
Folder #: 96399

CT LAB Sample#: 281004 Sample Description: TG1-1 Sampled: 4/3/2013 1407

Analyte	Result	Units	LOD	LOQ	Dilution	Qualifier	Prep Date/Time	Analysis Date/Time	Analyst	Method
Total Organic Carbon	**14**	mg/L	0.40	1.2	1			4/8/2013 22:37	BMS	EPA 9060A
Nitrate Nitrogen Total	<0.080	mg/L	0.080	0.28	1			4/4/2013 14:31	MML	EPA 300.0
Nitrite Nitrogen Total	<0.040	mg/L	0.040	0.12	1			4/4/2013 14:31	MML	EPA 300.0
Orthophosphate Total	<0.18	mg/L	0.18	0.59	1			4/4/2013 14:31	MML	EPA 300.0
Sub Lab Results										
Petroleum Deg. Count	**ATTACHED**		N/A	N/A	1			4/29/2013 00:00	PML	

Solid sample results reported on a Dry Weight Basis

Notes: * Indicates Value in between the LOD (limit of detection) and the LOQ (limit of quantitation).

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without written approval of this laboratory. The Chain of Custody is attached.

Submitted by: Pat M. Letterer
Project Manager
608-356-2760

QC Qualifiers

Code	Description
B	Analyte detected in the associated Method Blank.
C	Toxicity present in BOD sample.
D	Diluted Out.
E	Safe, No Total Coliform detected.
F	Unsafe, Total Coliform detected, no E. Coli detected.
G	Unsafe, Total Coliform detected and E. Coli detected.
H	Holding time exceeded.
J	Estimated value.
L	Significant peaks were detected outside the chromatographic window.
M	Matrix spike and/or Matrix Spike Duplicate recovery outside acceptance limits.
N	Insufficient BOD oxygen depletion.
O	Complete BOD oxygen depletion.
P	Concentration of analyte differs more than 40% between primary and confirmation analysis.
Q	Laboratory Control Sample outside acceptance limits.
R	See Narrative at end of report.
S	Surrogate standard recovery outside acceptance limits due to apparent matrix effects.
T	Sample received with improper preservation or temperature.
U	Analyte concentration was below detection limit.
V	Raised Quantitation or Reporting Limit due to limited sample amount or dilution for matrix background interference.
W	Sample amount received was below program minimum.
X	Analyte exceeded calibration range.
Y	Replicate/Duplicate precision outside acceptance limits.
Z	Specified calibration criteria was not met.

Current CT Laboratories Certifications

Illinois NELAP ID# 002413
Kansas NELAP ID# E-10368
Kentucky ID# 0023
Pennsylvania NELAP ID# 68-04201
New Jersey NELAP ID# WI001
North Carolina ID# 674
Wisconsin (WDNR) Chemistry ID# 157066030
Wisconsin (DATCP) Bacteriology ID# 105-289
DoD-ELAP A2LA Cert # 3317.013
Alaska ID # UST-099
Louisiana ID # 115843
Virginia ID# 460203
ISO/IEC 17025-2005 A2LA Cert # 3317.01
GA EPD Stipulation ID 115843, Exp 6-30-13

Terra Systems INCORPORATED

April 26, 2013

Dennis Linley
CT Laboratories
1230 Lange Ct.
Baraboo, WI 53913

RE: Hydrocarbon-Utilizer Count Report for Moss-American Samples Collected from 1300 W. Canal Street, Milwaukee, WI on April 3, 2013

Dear Dennis

Attached is the analytical report for hydrocarbon-utilizing microbial counts for the Moss-American Samples collected from 1300 W. Canal Street, Milwaukee, WI site on April 3, 2013. The samples were received at Terra Systems, Inc. on April 4, 2013. The counts of diesel-utilizing bacteria ranged from low to moderate, 1.2×10^2 in TG6-3 to 3.6×10^4 colony-forming units (CFU/mL) in TG6-1. The groundwater contains low to moderate numbers of microorganisms capable of degrading hydrocarbon contaminants under aerobic conditions.

Please let us know if you have any questions about these microbial counts or if I can be of further assistance on this project.

Sincerely,
TERRA SYSTEMS, INC.

Michael D Lee, PhD.

Michael D. Lee, Ph.D.
Vice-President Research and Development

130 Hickman Road • Suite 1 • Claymont Delaware 19703 • 302-798-9553 • Fax 302-798-9554
• www.terrasystems.net

Dennis Linley
CT Laboratories
1230 Lange Ct.
Baraboo, WI 53913

Sample Collected: April 3, 2013
Sample Received: April 4, 2013
Sample Location: Sigma Environmental Moss-American

HYDROCARBON-UTILIZERS
MINERAL AGAR

DESCRIPTION	MATRIX	RESULT
TG1-1	Groundwater	1.6×10^2 CFU/mL
TG1-3	Groundwater	1.3×10^2 CFU/mL
TG2-1	Groundwater	8.0×10^3 CFU/mL
TG3-1	Groundwater	2.2×10^4 CFU/mL
TG4-3	Groundwater	2.0×10^3 CFU/mL
TG5-1	Groundwater	3.8×10^3 CFU/mL
TG5-3	Groundwater	1.0×10^3 CFU/mL
TG6-1	Groundwater	3.6×10^4 CFU/mL
TG6-3	Groundwater	1.2×10^2 CFU/mL

Diesel vapors supported the growth of hydrocarbon-utilizing bacteria that were plated on Noble Agar, a washed agar with very low organic content, which was amended with inorganic nutrients.

Respectfully submitted,

Michael D Lee, PhD.

Michael D. Lee, Ph.D.
Laboratory Manager
Terra Systems, Inc.

TERRA SYSTEMS, INC.
130 Hickman Road, Suite 1, Claymont, DE 19703 phone 302-798-9553 fax 302-798-9554

Chain of Custody

Client: SIGMA ENVIRONMENTAL Project Name: MOSS-AMERICAN

Project Description: MOSS-AMERICAN Project Manager/Contact: MAFIZUL ISLAM

Location: 1300 W. CANAL ST. MILWAUKEE, WI 53233 Phone: 414-643-4125

Sampler: TOM McCOY

Lot:

Parameters for Analysis

Date	Time	Sample Identification	Sample Technique	Matrix	Preservative	Container Type	Number of Containers	Sub Petroleum Degraders									Remarks
4/3/13	10:12	TG1-3		GW	None	100ml sterile	1	X									
4/3/13	10:25	TG2-1		GW	None		1	X									
4/3/13	11:00	TG3-1		GW	None		1	X									
4/3/13	13:05	TG4-3		GW	None		1	X									
4/3/13	12:58	TG5-1		GW	None		1	X									
4/3/13	12:50	TG5-3		GW	None		1	X									
4/3/13	12:30	TG6-1		GW	None		1	X									
4/3/13	12:40	TG6-3		GW	None		1	X									
4/3/13	14:07	TG1-1		GW	None		1	X									

Relinquished by (signature)	Date/time	Received by (signature)	Date/time
[signature]	4/3/13 16:30	[signature]	4/4/13 10:00

Shipped to:

Date/time:

Carrier/Airbill number:

Cooler Temperature: °C pH: Comments:

Rev. 2/2013

CHAIN OF CUSTODY

Page 1 of 1

Company: Sigma Environmental
Project Contact: Mafizul Islam
Telephone: 414-643-4125
Project Name: Moss-American
Project #: 13701
Location: Milwaukee, WI
Sampled By: Tom McCoy

CT LABORATORIES

1230 Lange Court, Baraboo, WI 53913
608-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Folder #: 96399
Company: SIGMA
Project: MOSS AMERICAN
Logged By: JLS PM: PM

Program:
QSM RCRA SDWA NPDES
Solid Waste Other ______

PO # 13701

Report To:
EMAIL: mislam@thesigmagroup.com
Company: Sigma Environmental
Address: 1300 W. Canal Street
Milwaukee, WI 53233

Invoice To:*
EMAIL:
Company: same
Address:

*Party listed is responsible for payment of invoice as per CT Laboratories' terms and conditions

Client Special Instructions

Matrix:
GW – groundwater SW - surface water WW - wastewater DW - drinking water
S - soil/sediment SL - sludge A - air M - misc/waste

Turnaround Time
Normal RUSH*
Date Needed: ______
Rush analysis requires prior CT Laboratories' approval
Surcharges:
24 hr 200%
2-3 days 100%
4-9 days 50%

ANALYSES REQUESTED — Fill in Spaces with Bottles per Test

Collection Date	Collection Time	Matrix	Grab/Comp	Sample # (1,2,3, etc)	Sample ID Description	Filtered? Y/N	BOD	Heterotrophic	COD	TOC	NH3	TKN	T Phos	Anions IC Tot 300.0							Total # Containers	Designated MS/MSD	CT Lab ID # Lab use only
4/3/13	10:12	GW		1	TG1-3	N	X	X	X	X	X	X	X	X							5		280995
4/3/13	10:25	GW		2	TG2-1	N	X	X	X	X	X	X	X	X							5		280997
4/3/13	11:00	GW		3	TG3-1	N	X	X	X	X	X	X	X	X							5		280998
4/3/13	13:05	GW		8	TG4-3	N	X	X	X	X	X	X	X	X							5		280999
4/3/13	12:58	GW		7	TG5-1	N	X	X	X	X	X	X	X	X							5		281000
4/13/13	12:50	GW		6	TG5-3	N	X	X	X	X	X	X	X	X							5		281001
4/13/13	12:30	GW		4	TG6-1	N	X	X	X	X	X	X	X	X							5		281002
4/3/13	12:40	GW		5	TG6-3	N	X	X	X	X	X	X	X	X							5		281003
4/3/13	14:07	GW		9	TG1-1	N	X	X	X	X	X	X	X	X							5		281004

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	4/3/13 16:30		
Received by:	Date/Time	Received for Laboratory by: [signature]	Date/Time 4/4/13 1008

Lab Use Only
Ice Present (Yes) No
Temperature 6.2
Cooler # 5124, 5224

4/4/13 0955

CT Laboratories Terms and Conditions

Where a purchaser (Client) places an order for laboratory, consulting or sampling services from CT Laboratories (CTL), CTL shall provide the ordered services pursuant to these Terms and Conditions, and the related Quotation, or as agreed in a negotiated contract. In the absence of a written agreement to the contrary, the Order constitutes an acceptance by the Client of CTL's offer to do business under these Terms and Conditions, and an agreement to be bound by these Terms and Conditions. No contrary or additional terms and conditions expressed in a Client's document shall be deemed to become a part of the contract created upon acceptance of these Terms and Conditions, unless accepted by CTL in advance of the start of the project and in writing.

1. ORDERS AND RECEIPT OF SAMPLES (Sample Acceptance Policy)

1.1 The Client may place the Order (i.e., specify a Scope of Work) either by submitting a purchase order to CTL in writing, by telephone (confirmed in writing) or by negotiated contract. Whichever option the Client selects for placing the Order, the Order shall not be valid unless it contains sufficient specification to enable CTL to carry out the Client's requirements. It is the policy of CT Laboratories that samples not meeting the acceptance criteria, outlined in the NELAC standards and Section 5.8.3.2 of the DOD QSM, will not be accepted by the laboratory or will be qualified on the final report. All samples submitted to the laboratory must: (1) be accompanied by proper, full and complete documentation, including sample identification, location, date and time of collection, the collector's name, type of preservation (if any), type of sample, any special comments concerning the sample and any additional pertinent fields on the chain-of-custody. In the absence of any of the required information, the laboratory will attempt to contact the client to obtain the information; if unable to obtain the necessary information, the final report will be qualified. (2) be labeled appropriately with a unique sample identification written with indelible ink on water resistant labels. If the laboratory cannot determine the identity of a sample, it will be rejected and the client will be contacted for further instructions or resampling. (3) be in an appropriate sample container. If the container is inappropriate, the client will be contacted for further instructions or resampling. If analysis is possible, the final report will be qualified. CT Laboratories can provide a sampling guide containing approved containers and preservations for analytical methods requested. (4) adhere to specified holding times. If samples are received with less than ½ the holding time remaining for the requested test, CT Laboratories will make its best effort to analyze the samples and notify the client. If holding times are exceeded, the final report will be qualified. (5) contain adequate sample volume to perform the necessary testing. If sufficient volume is not present, the sample will be rejected and the client will be contacted for further instructions or resampling. If samples show signs of damage, contamination or inadequate preservation, the client will be notified. If analysis can be performed, the final report will be qualified. If not, the samples will be rejected and the client notified for further instructions or resampling.

1.2 CT Laboratories must be supplied with complete written disclosure of the known or suspected presence of any hazardous substances, as defined by applicable federal or state law. Where any samples which were not accompanied by the required disclosure, cause interruptions in the lab's ability to process work due to contamination of instruments or work areas, the Client will be responsible for the costs of clean up and recovery.

1.3 Prior to Sample Acceptance, the entire risk of loss or damage to samples remains with the Client. In no event will CTL have any responsibility or liability for the action or inaction of any carrier shipping or delivering any sample to or from CTL's premises. Client is responsible to assure that any sample containing any hazardous substance which is to be delivered to CTL's premises will be packaged, labeled, transported and delivered properly and in accordance with applicable laws.

2. PAYMENT TERMS

2.1 Services performed by CTL will be in accordance with prices quoted and later confirmed in writing or as stated in the Price Schedule. Invoices may be submitted to Client upon completion of any sample delivery group. Payment in advance is required for all Clients except those whose credit has been established with CTL. For Clients with approved credit, payment terms are net 30 days from the date of invoice by CTL. All overdue payments are subject to an additional interest and service charge of one and one-half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees are charged or billed directly to the Client. The billing of a third party will not be accepted without a statement, signed by the third party that acknowledges and accepts payment responsibility. CTL may suspend work and withhold delivery of data under this order at any time in the event Client fails to make timely payment of its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees. CTL reserves the right to refuse to proceed with work at any time based upon an unfavorable Client credit report.

3. CHANGE ORDERS, TERMINATION

3.1 Changes to the Scope of Work, price, or result delivery date may be initiated by CTL after Sample Acceptance due to any condition which conflicts with analytical, QA or other protocols warranted in these Terms and Conditions. CTL will not proceed with such changes until an agreement with the Client is reached on the amount of any cost, schedule change or technical change to the Scope of Work, and such agreement is documented in writing.

3.2 Changes to the Scope of Work, including but not limited to increasing or decreasing the work, changing test and analysis specification or acceleration in the performance of the work may be initiated by the Client after sample acceptance. Such a change will be documented in writing and may result in a change in cost and turnaround time commitment. CTL's acceptance of such changes is contingent upon technical feasibility and operational capacity.

3.3 Suspension or termination of all or any part of the work may be initiated by the Client. CTL will be compensated consistent with Section 2 of these Terms and Conditions. CTL will complete all work in progress and be paid in full for all work completed.

4. WARRANTIES AND LIABILITY

4.1 Where applicable, CTL will use analytical methodologies which are in substantial conformity with published test methods. CTL has implemented these methods in its Laboratory Quality Manuals and referenced Standard Operating Procedures and where the nature or composition of the sample requires it, CTL reserves the right to deviate from these methodologies as necessary or appropriate, based on the reasonable judgment of CTL, which deviations, if any, will be made on a basis consistent with recognized standards of the industry and/or CTL's Laboratory Quality Manuals. Client may request that CTL perform according to a mutually agreed Quality Assurance Project Plan (QAPP). In the event that samples arrive prior to agreement on a QAPP, CTL will proceed with analyses under its standard Quality Manuals then in effect, and CTL will not be responsible for any resampling or other charges if work must be repeated to comply with a subsequently finalized QAPP.

4.2 CTL shall start preparation and/or analysis within holding times provided that Sample Acceptance occurs within 48 hours of sampling or 1/2 of the holding time for the test, whichever is less. Where resolution of inconsistencies leading to Sample Acceptance does not occur within this period, CTL will use its best efforts to meet holding times and will proceed with the work provided that, in CTL's judgment, the chain-of-custody or definition of the Scope of Work provide sufficient guidance. Reanalysis of samples to comply with CTL's Quality Manuals will be deemed to have met holding times provided the initial analysis was performed within the applicable holding time. Where reanalysis demonstrates that sample matrix interference is the cause of failure to meet any Quality Manual requirements, the warranty will be deemed to have been met.

4.3 CTL warrants that it possesses and maintains all licenses and certifications which are required to perform services under these Terms and Conditions provided that such requirements are specified in writing to CTL prior to Sample Acceptance. CTL will notify the Client in writing of any decertification or revocation of any license, or notice of either, which affects work in progress.

4.4 The warranty obligations set forth in Sections 4.1, 4.2 and 4.3 are the sole and exclusive warranties given by CTL in connection with any services performed by CTL or any Results generated from such services, and CTL gives and makes NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. No representative of CTL is authorized to give or make any other representation or warranty or modify this warranty in any way.

4.5 Client's sole and exclusive remedy for the breach of warranty in connection with any services performed by CTL, will be limited to repeating any services performed, contingent on the Client's providing, at the request of CTL and at the Client's expense, additional sample(s) if necessary. Any reanalysis requested by the Client generating Results consistent with the original Results will be at the Client's expense. If resampling is necessary, CTL's liability for resampling costs will be limited to actual cost or one hundred or one hundred fifty dollars ($150) per sample, whichever is less.

4.6 CTL's liability for any and all causes of action arising hereunder, whether based in contract, tort, warranty, negligence or otherwise, shall be limited to the lesser amount of compensation for the services performed or $100,000. All claims, including those for negligence, shall be deemed waived unless suit thereon is filed within one year after CTL's completion of the services. Under no circumstances, whether arising in contract, tort (including negligence), or otherwise, shall CTL be responsible for loss of use, loss of profits, or for any special, indirect, incidental or consequential damages occasioned by the services performed or by application or use of the reports prepared.

4.7 In no event shall CTL have any responsibility or liability to the Client for any failure or delay in performance by CTL which results, directly or indirectly, in whole or in part, from any cause or circumstance beyond the reasonable control of CTL. Such causes and circumstances shall include, but not be limited to, acts of God, acts of Client, acts or orders of any governmental authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, equipment breakdown, matrix interference or unknown highly contaminated samples that impact instrument operation, unavailability of supplies from usual suppliers, difficulties or delays in transportation, mail or delivery services, or any other cause beyond CTL's reasonable control.

5. RESULTS, WORK PRODUCT

5.1 Data or information provided to CTL or generated by services performed under this agreement shall only become the property of the Client upon receipt in full by CTL of payment for the whole Order. Ownership of any analytical method, QA/QC protocols, software programs or equipment developed by CTL for performance of work will be retained by CTL, and Client shall not disclose such information to any third party.

5.2 Data and sample materials provided by Client or at Client's request, and the result obtained by CTL shall be held in confidence (unless such information is generally available to the public or is in the public domain or Client has failed to pay CTL for all services rendered or is otherwise in breach of these Terms and Conditions), subject to any disclosure required by law or legal process.

5.3 Should the Results delivered by CTL be used by the Client or Client's client, even though subsequently determined not to meet the warranties described in these Terms and Conditions, then the compensation will be adjusted based upon mutual agreement. In no case shall the Client unreasonably withhold CTL's right to independently defend its data.

5.4 CTL reserves the right to subcontract services ordered by the Client to another laboratory or laboratories, if, in CTL's sole judgment, it is reasonably necessary, appropriate or advisable to do so, and with the Client's permission. CTL will in no way be liable for any subcontracted services and all applicable warranties, guarantees and insurance are those of the subcontracted laboratory.

5.5 CTL shall dispose of the Client's samples 30 days after the analytical report is issued, unless instructed to store them for an alternate period of time or to return such samples to the Client, in a manner consistent with U.S. Environmental Protection Agency regulations or other applicable Federal, state or local requirements. Any samples for projects that are canceled or not accepted, or for which return was requested, will be returned to the Client at their own expense. CTL reserves the right to return to the Client any sample or unused portion of a sample that is not within CTL's permitted capability or the capabilities of CTL's designated waste disposal vendor(s).

5.6 Unless a different time period is agreed to in any order under these Terms and Conditions, CTL agrees to retain all records for five (5) years.

5.7 In the event that CTL is required to respond to legal process related to services for Client, Client agrees to reimburse CTL for hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6. INSURANCE

6.1 CTL shall maintain in force during the performance of services under these Terms and Conditions, Workers' Compensation and Employer's Liability Insurance in accordance with the laws of the states having jurisdiction over CTL's employees who are engaged in the performance of the work. CTL shall also maintain during such period, Comprehensive General and Contractual Liability (limit of $2,000,000 per occurrence/ aggregate), Comprehensive Automobile Liability, owned and hired, ($1,000,000 combined single limit), and Professional/Pollution Liability Insurance (limit of $5,000,000 per occurrence/aggregate). Any Client required changes to these limits or conditions may result in a change in cost to the Client.

7. AUDIT

7.1 Upon prior notice to CTL, the Client may audit and inspect CTL's records and accounts covering reimbursable costs related to work done for the Client, for a period of one (1) year after completion of the work. The purpose of any such audit shall be only for verification of such costs, and CTL shall not be required to provide access to cost records where prices are expressed as fixed fees or published unit prices

Synergy Environmental Lab, INC.

1990 Prospect Ct., Appleton, WI 54914 *P 920-830-2455 * F 920-733-0631

MAFIZUL ISLAM
SIGMA ENVIRONMMENTAL
1300 W. CANAL STREET
MILWAUKEE, WI 53233.

Report Date *12-Apr-13*

Project Name MOSS-AMERICAN **Invoice #** E25001
Proiect # 13701

Lab Code 5025001A
Sample ID TG1-3
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/8/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/8/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/8/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/8/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/8/2013	CJR	1
PAH SIM										
Acenaphthene	1.77	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.113	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.025 "J"	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.155	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.259	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.017 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.024 "J"	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.035 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.104	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN | **Invoice #** E25001
Project # 13701

Lab Code 5025001B
Sample ID TG2-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/8/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/8/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/8/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/8/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/8/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.035 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	< 0.018	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001C
Sample ID TG3-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	0.099	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.056 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.189	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.076 "J"	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.04 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.073	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.065 "J"	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	0.029 "J"	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	0.061	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.244	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.068	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.044 "J"	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.017 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.024 "J"	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001C
Sample ID TG3-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Phenanthrene	0.069	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.199	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001D
Sample ID TG4-3
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.021 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.127	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.033 "J"	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.024 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.044 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.042 "J"	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	0.023 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.083 "J"	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.037 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.071 "J"	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001E
Sample ID TG5-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.054 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001E
Sample ID TG5-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.027 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001F
Sample ID TG5-3
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.087	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.096	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.020 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.027 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.103	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001G
Sample ID TG6-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001G
Sample ID TG6-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
PAH SIM										
Acenaphthene	0.232	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.031 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.069 "J"	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.048 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.019 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.025 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.055 "J"	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001H
Sample ID TG6-3
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.042 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.069 "J"	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.021 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.052 "J"	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN
Project # 13701

Invoice # E25001

Lab Code 50250011
Sample ID TG1-1
Sample Matrix Water
Sample Date 4/3/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	18.4	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	19.9	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	11.4	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	262	ug/l	10.5	34	500	M8270D	4/9/2013	4/12/2013	MDK	1
Acenaphthylene	< 10	ug/l	10	31.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Anthracene	23.6 "J"	ug/l	10	32	500	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)anthracene	< 12.5	ug/l	12.5	39	500	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)pyrene	< 9	ug/l	9	29	500	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(b)fluoranthene	< 10	ug/l	10	31.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(g,h,i)perylene	< 11.5	ug/l	11.5	37.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(k)fluoranthene	< 13.5	ug/l	13.5	43.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Chrysene	< 9	ug/l	9	29	500	M8270D	4/9/2013	4/12/2013	MDK	1
Dibenzo(a,h)anthracene	< 11.5	ug/l	11.5	36	500	M8270D	4/9/2013	4/12/2013	MDK	1
Fluoranthene	28.1 "J"	ug/l	13	42	500	M8270D	4/9/2013	4/12/2013	MDK	1
Fluorene	135	ug/l	10	31.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 13.5	ug/l	13.5	42.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
1-Methyl naphthalene	169	ug/l	9.5	30.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
2-Methyl naphthalene	164	ug/l	8	26	500	M8270D	4/9/2013	4/12/2013	MDK	1
Naphthalene	1950	ug/l	11.5	37.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Phenanthrene	113	ug/l	9	29.5	500	M8270D	4/9/2013	4/12/2013	MDK	1
Pyrene	17.7 "J"	ug/l	12.5	40	500	M8270D	4/9/2013	4/12/2013	MDK	1

Lab Code 5025001J
Sample ID PZ-02
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	79	ug/l	0.42	1.36	20	M8270D	4/9/2013	4/12/2013	MDK	1
Acenaphthylene	1.01 "J"	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Anthracene	< 0.4	ug/l	0.4	1.28	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)anthracene	< 0.5	ug/l	0.5	1.56	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)pyrene	< 0.36	ug/l	0.36	1.16	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(b)fluoranthene	< 0.4	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(g,h,i)perylene	< 0.46	ug/l	0.46	1.5	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(k)fluoranthene	< 0.54	ug/l	0.54	1.74	20	M8270D	4/9/2013	4/12/2013	MDK	1
Chrysene	< 0.36	ug/l	0.36	1.16	20	M8270D	4/9/2013	4/12/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.46	ug/l	0.46	1.44	20	M8270D	4/9/2013	4/12/2013	MDK	1
Fluoranthene	< 0.52	ug/l	0.52	1.68	20	M8270D	4/9/2013	4/12/2013	MDK	1
Fluorene	3.6	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.54	ug/l	0.54	1.7	20	M8270D	4/9/2013	4/12/2013	MDK	1
1-Methyl naphthalene	0.8 "J"	ug/l	0.38	1.22	20	M8270D	4/9/2013	4/12/2013	MDK	1
2-Methyl naphthalene	< 0.32	ug/l	0.32	1.04	20	M8270D	4/9/2013	4/12/2013	MDK	1
Naphthalene	1.79	ug/l	0.46	1.5	20	M8270D	4/9/2013	4/12/2013	MDK	1

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Sample ID PZ-02
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Phenanthrene	< 0.36	ug/l	0.36	1.18	20	M8270D	4/9/2013	4/12/2013	MDK	1
Pyrene	< 0.5	ug/l	0.5	1.6	20	M8270D	4/9/2013	4/12/2013	MDK	1

Lab Code 5025001K
Sample ID MW-33S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	0.66	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.132	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.251	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.057 "J"	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.025 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.201	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.08	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001L
Sample ID MW-32S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.057 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1

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	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.019 "J"	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.025 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.249	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.022 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001M
Sample ID MW-38S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	0.96	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	1.4 "J"	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	1.41 "J"	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	4.2	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.153	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.263	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.039 "J"	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.032 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.079	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.077	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	0.052 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.103	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.152	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.04 "J"	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	1.99	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	7.9	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	8.1	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.15	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.092	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001N
Sample ID MW-39S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1

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Lab Code 5025001N
Sample ID MW-39S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
PAH SIM										
Acenaphthene	5.8	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.127	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.136	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.069 "J"	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.027 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.057 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	0.054 "J"	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.32	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.73	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.169	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.117	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.211	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.252	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.216	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001O
Sample ID PZ-03
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	0.44 "J"	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	2.68	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	1.92 "J"	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	116	ug/l	0.42	1.36	20	M8270D	4/9/2013	4/12/2013	MDK	1
Acenaphthylene	0.99 "J"	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Anthracene	2.37	ug/l	0.4	1.28	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)anthracene	2.03	ug/l	0.5	1.56	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(a)pyrene	0.71 "J"	ug/l	0.36	1.16	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(b)fluoranthene	1.45	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(g,h,i)perylene	< 0.46	ug/l	0.46	1.5	20	M8270D	4/9/2013	4/12/2013	MDK	1
Benzo(k)fluoranthene	< 0.54	ug/l	0.54	1.74	20	M8270D	4/9/2013	4/12/2013	MDK	1
Chrysene	1.47	ug/l	0.36	1.16	20	M8270D	4/9/2013	4/12/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.46	ug/l	0.46	1.44	20	M8270D	4/9/2013	4/12/2013	MDK	1
Fluoranthene	10.7	ug/l	0.52	1.68	20	M8270D	4/9/2013	4/12/2013	MDK	1
Fluorene	33	ug/l	0.4	1.26	20	M8270D	4/9/2013	4/12/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.54	ug/l	0.54	1.7	20	M8270D	4/9/2013	4/12/2013	MDK	1
1-Methyl naphthalene	47	ug/l	0.38	1.22	20	M8270D	4/9/2013	4/12/2013	MDK	1
2-Methyl naphthalene	< 0.32	ug/l	0.32	1.04	20	M8270D	4/9/2013	4/12/2013	MDK	1
Naphthalene	47	ug/l	0.46	1.5	20	M8270D	4/9/2013	4/12/2013	MDK	1
Phenanthrene	1.87	ug/l	0.36	1.18	20	M8270D	4/9/2013	4/12/2013	MDK	1
Pyrene	7.1	ug/l	0.5	1.6	20	M8270D	4/9/2013	4/12/2013	MDK	1

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Lab Code 5025001P
Sample ID MW-7S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	0.36 "J"	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	1.7 "J"	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	5.0	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.17	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.138	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.83	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	9.7	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	8.9	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.43	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.034 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001Q
Sample ID MW-34S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	7.0	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	28.4	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	1.39 "J"	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	34	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	15.2	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	410	ug/l	21	68	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 20	ug/l	20	63	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	88	ug/l	20	64	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	54 "J"	ug/l	25	78	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 18	ug/l	18	58	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	26.1 "J"	ug/l	20	63	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 23	ug/l	23	75	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 27	ug/l	27	87	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	50 "J"	ug/l	18	58	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 23	ug/l	23	72	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	320	ug/l	26	84	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	330	ug/l	20	63	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 27	ug/l	27	85	1000	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	315	ug/l	19	61	1000	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	470	ug/l	16	52	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	4100	ug/l	23	75	1000	M8270D	4/9/2013	4/11/2013	MDK	1

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Lab Code 5025001Q
Sample ID MW-34S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Phenanthrene	800	ug/l	18	59	1000	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	222	ug/l	25	80	1000	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001R
Sample ID MW-27S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	0.113	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	0.022 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.14	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	0.037 "J"	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.075	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.115	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.222	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	2.34	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.106	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	0.029 "J"	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001S
Sample ID MW-37S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	0.025 "J"	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1

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Lab Code 5025001S
Sample ID MW-37S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.028 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.025 "J"	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.044 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.36	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.037 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001T
Sample ID MW-9S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1
PAH SIM										
Acenaphthene	0.028 "J"	ug/l	0.021	0.068	1	M8270D	4/9/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Anthracene	0.048 "J"	ug/l	0.02	0.064	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/9/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/9/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/9/2013	4/11/2013	MDK	1
Fluorene	0.029 "J"	ug/l	0.02	0.063	1	M8270D	4/9/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/9/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.027 "J"	ug/l	0.019	0.061	1	M8270D	4/9/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.041 "J"	ug/l	0.016	0.052	1	M8270D	4/9/2013	4/11/2013	MDK	1
Naphthalene	0.38	ug/l	0.023	0.075	1	M8270D	4/9/2013	4/11/2013	MDK	1
Phenanthrene	0.044 "J"	ug/l	0.018	0.059	1	M8270D	4/9/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/9/2013	4/11/2013	MDK	1

Lab Code 5025001U
Sample ID PZ-10
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/9/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/9/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/9/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/9/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/9/2013	CJR	1

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Lab Code 5025001U
Sample ID PZ-10
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
PAH SIM										
Acenaphthene	5.2	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	0.095	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	0.34	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.128	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.07	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.169	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.108	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	0.064 "J"	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.132	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.41	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	0.92	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.071 "J"	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	3.4	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	2.82	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.32	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	1.36	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.299	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 5025001V
Sample ID MW-30S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	0.113	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	6
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	6
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	6
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	6
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	6
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	6
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	6
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	6
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.024 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.029 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001W
Sample ID MW-5S
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	0.030 "J"	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.025 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	< 0.018	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 5025001X
Sample ID MW-A
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	0.025 "J"	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001X
Sample ID MW-A
Sample Matrix Water
Sample Date 4/4/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Phenanthrene	0.026 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 5025001Y
Sample ID MW-B
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.034 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.037 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 5025001Z
Sample ID MW-C
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.039 "J"	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.026 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 5025001Z
Sample ID MW-C
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.028 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.052 "J"	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.11	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.044 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.046 "J"	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001AA
Sample ID MW-D
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.038 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.02 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	< 0.018	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001BB
Sample ID MW-E
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001BB
Sample ID MW-E
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.038 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.063	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.44	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.094	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.02 "J"	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.018 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.034 "J"	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001CC
Sample ID MW-F
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.03 "J"	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.039 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.065	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.188	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.06	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.087	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.04 "J"	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.027 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.062	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.127	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001DD
Sample ID MW-G
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.047 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.02 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.033 "J"	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001EE
Sample ID MW-H
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.053 "J"	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.049 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.107	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.107	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.082	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.153	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.041 "J"	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001EE
Sample ID MW-H
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Phenanthrene	0.044 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.15	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001FF
Sample ID MW-I
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.055 "J"	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.093	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.222	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.152	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	0.071 "J"	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.111	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.196	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	0.093	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	< 0.019	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.087	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.16	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001GG
Sample ID MW-J
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1
PAH SIM										
Acenaphthene	< 0.021	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	< 0.02	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	0.026 "J"	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	0.025 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	0.055 "J"	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	0.054 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001GG
Sample ID MW-J
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	0.038 "J"	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	0.061 "J"	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.025 "J"	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	< 0.016	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.032 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.047 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	0.058 "J"	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

Lab Code 525001HH
Sample ID DUPLICATE #1
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Lab Code 525001II
Sample ID DUPLICATE #2
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Lab Code 525001JJ
Sample ID DUPLICATE #3
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001KK
Sample ID DUPLICATE #4
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Lab Code 525001LL
Sample ID EQUIP BLANK
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Lab Code 525001MM
Sample ID TB
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/10/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/10/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/10/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/10/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/10/2013	CJR	1

Lab Code 525001NN
Sample ID MW-7S-W
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/11/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/11/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/11/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/11/2013	CJR	1
o-Xylene	1.56 "J"	ug/l	0.81	2.6	1	GRO95/8021		4/11/2013	CJR	1
PAH SIM										
Acenaphthene	291	ug/l	2.1	6.8	100	M8270D	4/10/2013	4/12/2013	MDK	1
Acenaphthylene	2.45 "J"	ug/l	2	6.3	100	M8270D	4/10/2013	4/12/2013	MDK	1
Anthracene	183	ug/l	2	6.4	100	M8270D	4/10/2013	4/12/2013	MDK	1
Benzo(a)anthracene	< 2.5	ug/l	2.5	7.8	100	M8270D	4/10/2013	4/12/2013	MDK	1
Benzo(a)pyrene	< 1.8	ug/l	1.8	5.8	100	M8270D	4/10/2013	4/12/2013	MDK	1
Benzo(b)fluoranthene	< 2	ug/l	2	6.3	100	M8270D	4/10/2013	4/12/2013	MDK	1

Project Name MOSS-AMERICAN **Invoice #** E25001
Project # 13701

Lab Code 525001NN
Sample ID MW-7S-W
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Benzo(g,h,i)perylene	< 2.3	ug/l	2.3	7.5	100	M8270D	4/10/2013	4/12/2013	MDK	1
Benzo(k)fluoranthene	< 2.7	ug/l	2.7	8.7	100	M8270D	4/10/2013	4/12/2013	MDK	1
Chrysene	< 1.8	ug/l	1.8	5.8	100	M8270D	4/10/2013	4/12/2013	MDK	1
Dibenzo(a,h)anthracene	< 2.3	ug/l	2.3	7.2	100	M8270D	4/10/2013	4/12/2013	MDK	1
Fluoranthene	14.4	ug/l	2.6	8.4	100	M8270D	4/10/2013	4/12/2013	MDK	1
Fluorene	162	ug/l	2	6.3	100	M8270D	4/10/2013	4/12/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 2.7	ug/l	2.7	8.5	100	M8270D	4/10/2013	4/12/2013	MDK	1
1-Methyl naphthalene	136	ug/l	1.9	6.1	100	M8270D	4/10/2013	4/12/2013	MDK	1
2-Methyl naphthalene	15.2	ug/l	1.6	5.2	100	M8270D	4/10/2013	4/12/2013	MDK	1
Naphthalene	64	ug/l	2.3	7.5	100	M8270D	4/10/2013	4/12/2013	MDK	1
Phenanthrene	177	ug/l	1.8	5.9	100	M8270D	4/10/2013	4/12/2013	MDK	1
Pyrene	7.5 "J"	ug/l	2.5	8	100	M8270D	4/10/2013	4/12/2013	MDK	1

Lab Code 52500100
Sample ID MW-34S-N
Sample Matrix Water
Sample Date 4/5/2013

	Result	Unit	LOD	LOQ	Dil	Method	Ext Date	Run Date	Analyst	Code
Organic										
BTEX										
Benzene	< 0.27	ug/l	0.27	0.85	1	GRO95/8021		4/11/2013	CJR	1
Ethylbenzene	< 0.82	ug/l	0.82	2.6	1	GRO95/8021		4/11/2013	CJR	1
Toluene	< 0.8	ug/l	0.8	2.6	1	GRO95/8021		4/11/2013	CJR	1
m&p-Xylene	< 1.6	ug/l	1.6	5.2	1	GRO95/8021		4/11/2013	CJR	1
o-Xylene	< 0.81	ug/l	0.81	2.6	1	GRO95/8021		4/11/2013	CJR	1
PAH SIM										
Acenaphthene	0.059 "J"	ug/l	0.021	0.068	1	M8270D	4/10/2013	4/11/2013	MDK	1
Acenaphthylene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Anthracene	0.023 "J"	ug/l	0.02	0.064	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)anthracene	< 0.025	ug/l	0.025	0.078	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(a)pyrene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(b)fluoranthene	< 0.02	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(g,h,i)perylene	< 0.023	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Benzo(k)fluoranthene	< 0.027	ug/l	0.027	0.087	1	M8270D	4/10/2013	4/11/2013	MDK	1
Chrysene	< 0.018	ug/l	0.018	0.058	1	M8270D	4/10/2013	4/11/2013	MDK	1
Dibenzo(a,h)anthracene	< 0.023	ug/l	0.023	0.072	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluoranthene	< 0.026	ug/l	0.026	0.084	1	M8270D	4/10/2013	4/11/2013	MDK	1
Fluorene	0.034 "J"	ug/l	0.02	0.063	1	M8270D	4/10/2013	4/11/2013	MDK	1
Indeno(1,2,3-cd)pyrene	< 0.027	ug/l	0.027	0.085	1	M8270D	4/10/2013	4/11/2013	MDK	1
1-Methyl naphthalene	0.055 "J"	ug/l	0.019	0.061	1	M8270D	4/10/2013	4/11/2013	MDK	1
2-Methyl naphthalene	0.039 "J"	ug/l	0.016	0.052	1	M8270D	4/10/2013	4/11/2013	MDK	1
Naphthalene	0.053 "J"	ug/l	0.023	0.075	1	M8270D	4/10/2013	4/11/2013	MDK	1
Phenanthrene	0.057 "J"	ug/l	0.018	0.059	1	M8270D	4/10/2013	4/11/2013	MDK	1
Pyrene	< 0.025	ug/l	0.025	0.08	1	M8270D	4/10/2013	4/11/2013	MDK	1

"J" Flag: Analyte detected between LOD and LOQ LOD Limit of Detection LOQ Limit of Quantitation

Code	***Comment***
1	Laboratory QC within limits.
6	The surrogate recovery not within established limits.

All solid sample results reported on a dry weight basis unless otherwise indicated. All LOD's and LOQ's are adjusted for dilutions but not dry weight. Subcontracted results are denoted by SUB in the analyst field.

Authorized Signature Michael [signature]

CHAIN OF CUSTODY RECORD

Synergy
Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № .773
Page 1 of 5

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Lab I.D. #
Account No. : | Quote No.:
Project #: 13701
Sampler: (signature) [signature]
Project (Name / Location): Moss-American Milwaukee, WI
Reports To: Mafizul Islam
Company: Sigma Environmental
Address: 1300 West Canal Street
City State Zip: Milwaukee, WI 53233
Phone: 414-643-4125
FAX: 414-643-4210

Invoice To: Same
Company
Address
City State Zip
Phone
FAX

Analysis Requested / Other Analysis

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	BTEX									PID/FID
5025001 A	TG1-3	4/3/13	10:12			N	4	GW	HCL						X							X									
B	TG2-1	4/3/13	10:25			N	4	GW	HCL						X							X									
C	TG3-1	4/3/13	11:00			N	4	GW	HCL						X							X									
D	TG4-3	4/3/13	13:05			N	4	GW	HCL						X							X									
E	TG5-1	4/3/13	12:58			N	4	GW	HCL						X							X									
F	TG5-3	4/3/13	12:50			N	4	GW	HCL						X							X									
G	TG6-1	4/3/13	12:30			N	4	GW	HCL						X							X									
H	TG6-3	4/3/13	12:40			N	4	GW	HCL						X							X									
I	TG1-1	4/3/13	14:07			N	4	GW	HCL						X							X									
J	PZ-02	4/4/13	10:45			N	4	GW	HCL						X							X									

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

Sample Integrity - To be completed by receiving lab.
Method of Shipment: Dunham
Temp. of Temp. Blank ___ °C On Ice: ✓
Cooler seal intact upon receipt: ✓ Yes ___ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
[signature]	14:30	4/5/13			

Received in Laboratory By: [signature] Time: 10:00 Date: 4-6-13

CHAIN OF CUSTODY RECORD

Synergy
Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № 774
Page 2 of 5

Lab I.D. #	
Account No. :	Quote No.:
Project #: 13701	
Sampler: (signature) [signature]	

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Project (Name / Location): Moss-American Milwaukee, WI

Reports To: Mafizul Islam	Invoice To: Same
Company Sigma Environmental	Company
Address 1300 West Canal Street	Address
City State Zip Milwaukee, WI 53233	City State Zip
Phone 414-643-4125	Phone
FAX 414-643-4210	FAX

Analysis Requested / Other Analysis

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	BTEX	PID/FID
5025001 K	MW-33S	4/4/13	11:45			N	4	GW	HCL						X							X	
L	MW-32S	4/4/13	11:35			N	4	GW	HCL						X							X	
M	MW-38S	4/4/13	11:15			N	4	GW	HCL						X							X	
N	MW-39S	4/4/13	11:25			N	4	GW	HCL						X							X	
O	PZ-03	4/4/13	11:05			N	4	GW	HCL						X							X	
P	MW-7S	4/4/13	10:55			N	4	GW	HCL						X							X	
Q	MW-34S	4/4/13	11:20			N	4	GW	HCL						X							X	
R	MW-27S	4/4/13	12:11			N	4	GW	HCL						X							X	
S	MW-37S	4/4/13	12:53			N	4	GW	HCL						X							X	
		4/4/13				N	4	GW	HCL						X							X	

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

Sample Integrity - To be completed by receiving lab.
Method of Shipment : Dunham
Temp. of Temp. Blank. ____ °C On Ice: ✓
Cooler seal intact upon receipt: ____ Yes ____ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
[signature]	1413	4/5/13			

Received in Laboratory By: [signature] Time: 10:00 Date: 4-6-13

CHAIN OF CUSTODY RECORD

Synergy

Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № 3775

Page 3 of ~~4~~ 5

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Lab I.D. #

Account No.:

Quote No.:

Project #: 13701

Sampler: (signature) [signature]

Project (Name / Location): Moss-American Milwaukee, WI

Reports To: Mafizul Islam

Company Sigma Environmental

Address 1300 West Canal street

City State Zip Milwaukee, WI 53233

Phone 414-643-4125

FAX 414-643-4210

Invoice To: Same

Company

Address

City State Zip

Phone

FAX

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	BTEX	PID/FID
502500 1T	MW-9S	4/4/13	13:10			N	4	GW	HCL						X							X	
u	PZ-10	4/4/13	13:30			N	4	GW	HCL						X							X	
v	MW-30S	4/4/13	14:00			N	4	GW	HCL						X							X	
w	MW-5S	4/4/13	14:05			N	4	GW	HCL						X							X	
x	MW-A	4/4/13	15:05			N	4	GW	HCL						X							X	
y	MW-B	4/5/13	9:25			N	4	GW	HCL						X							X	
z	MW-C	4/5/13	9:55			N	4	GW	HCL						X							X	
525001 AA	MW-D	4/5/13	10:40			N	4	GW	HCL						X							X	
BB	MW-E	4/5/13	11:06			N	4	GW	HCL						X							X	
CC	MW-F	4/5/13	11:32			N	4	GW	HCL						X							X	

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

Sample Integrity - To be completed by receiving lab.

Method of Shipment: Dhenbran

Temp. of Temp. Blank. ___ °C On Ice: ✓

Cooler seal intact upon receipt: ✓ Yes ___ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
[signature]	14:30	4/5/13			

Received in Laboratory By: [signature] Time: 10:00 Date: 4-6-13

CHAIN OF CUSTODY RECORD

Synergy
Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № 3776
Page 4 of 5

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Lab I.D. #
Account No. : | Quote No.:
Project #: 13701
Sampler: (signature)
Project (Name / Location): Moss-American Milwaukee, WI

Reports To: Mafizul Islam	Invoice To:
Company Sigma Environmental	Company same
Address 1300 West Canal Street	Address
City State Zip Milwaukee, WI 53233	City State Zip
Phone 414-643-4125	Phone
FAX 414-643-4210	FAX

Analysis Requested / Other Analysis

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	BTEX									PID/ FID
502S001DD	MW-G	4/5/13	11:58			N	4	GW	HCL						X							X									
EE	MW-H	4/5/13	12:20			N	4	GW	HCL						X							X									
FF	MW-I	4/5/13	12:46			N	4	GW	HCL						X							X									
GG	MW-J	4/5/13	13:10			N	4	GW	HCL						X							X									
HH	DUPLICATE #1	4/4/13	—			N	3	GW	HCL													X									
II	DUPLICATE #2	4/4/13	—			N	3	GW	HCL													X									
JJ	DUPLICATE #3	4/5/13	—			N	3	GW	HCL													X									
KK	DUPLICATE #4	4/5/13	—			N	3	GW	HCL													X									
LL	EQUIP. BLANK	4/5/13	—			N	2	—	HCL													X									
MM	TRIP BLANK	—	—			N	2	—	HCL													X									

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

Sample Integrity - To be completed by receiving lab.
Method of Shipment : [illegible]
Temp. of Temp. Blank. ____ °C On Ice: ✓
Cooler seal intact upon receipt: ✓ Yes ____ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
[signature]	14:30	4/5/13			

Received in Laboratory By: [signature] Time: 10:00 Date: 4-6-13

CHAIN OF CUSTODY RECORD

Synergy
Environmental Lab, Inc.

1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • FAX 920-733-0631

Chain # № 15653

Page 5 of 5

Sample Handling Request
___ Rush Analysis Date Required ___
(Rushes accepted only with prior authorization)
X Normal Turn Around

Lab I.D. #	
Account No.:	Quote No.:
Project #: 13701	
Sampler: (signature) [signature]	
Project (Name / Location): Moss-American Milwaukee, WI	
Reports To: Mafizul Islam	Invoice To:
Company Sigma Environmental	Company same
Address 1300 West Canal St.	Address
City State Zip Milwaukee, WI	City State Zip
Phone 414-643-4125	Phone
FAX 414-643-4210	FAX

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Comp	Grab	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	IRON	LEAD	NITRATE / NITRITE	PAH (EPA 8270)	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	VOC DW (EPA 524.2)	VOC (EPA 8260)	8-RCRA METALS	BTEX	PID/FID
52500) NW	MW-7S-W	4/5/13	8:10			N	4	GW	HCL						X							X	
00	MW-34S-N	4/5/13	8:15			N	4	GW	HCL						X							X	

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge etc.)

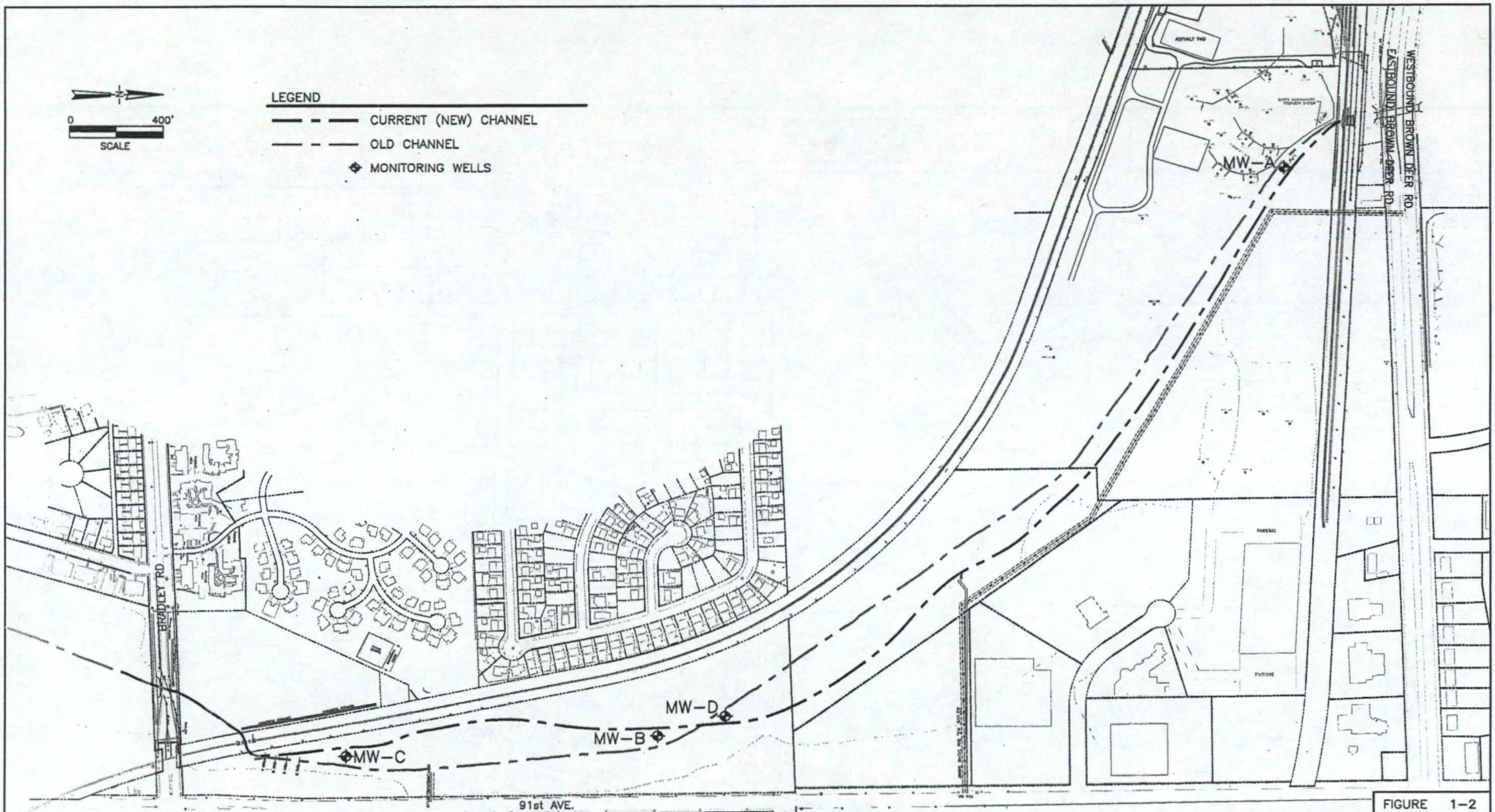
Sample Integrity - To be completed by receiving lab.
Method of Shipment: Dunham
Temp. of Temp. Blank. ___ °C On Ice: ✓
Cooler seal intact upon receipt: ✓ Yes ___ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date
[signature]	14:30	4/5/13			

Received in Laboratory By: [signature] Time: 10:00 Date: 4-6-13

APPENDIX C

FIGURES 1-2, 1-3 & 1-4



WESTON SOLUTIONS

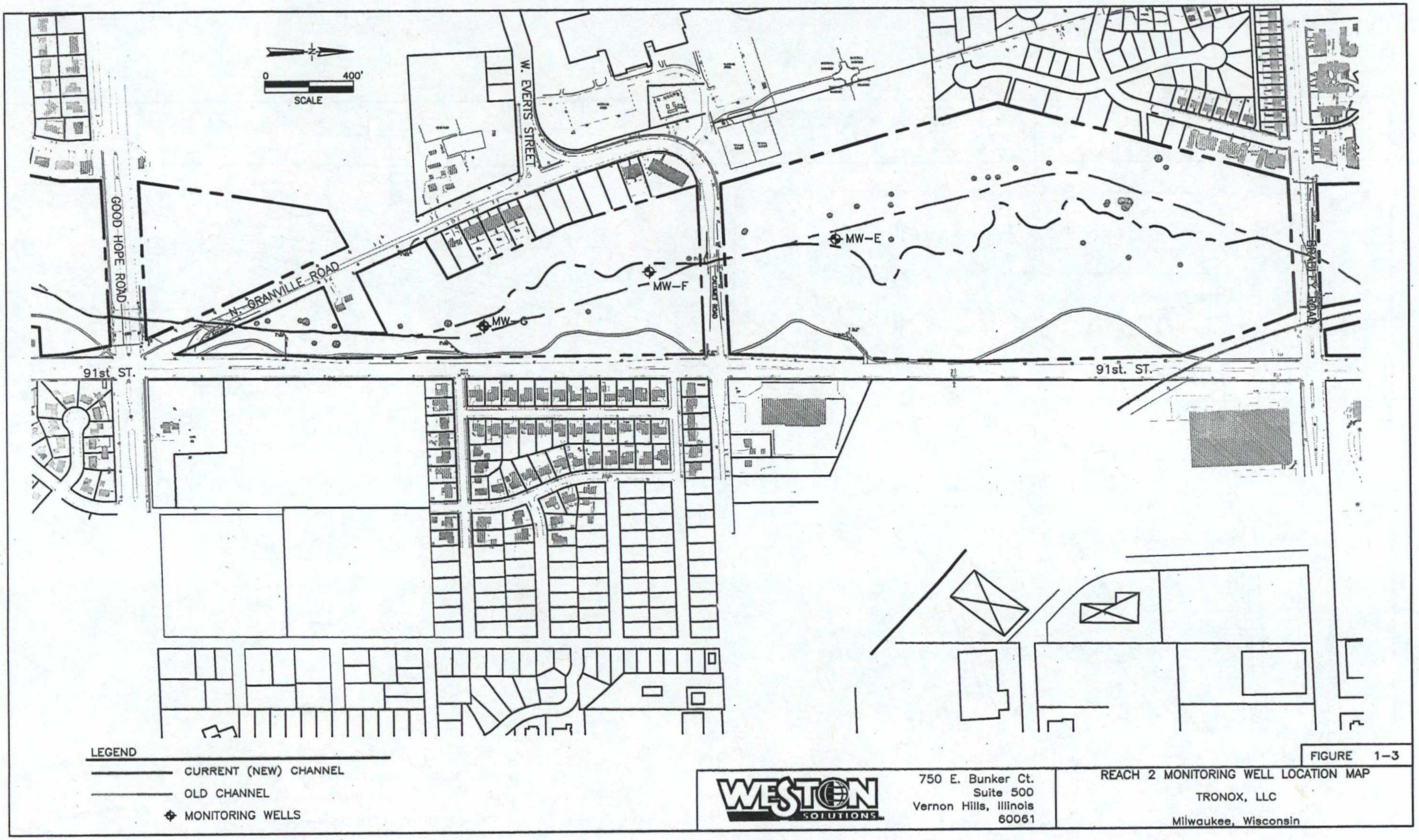
750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

FIGURE 1-2

REACH 1 MONITORING WELL LOCATION MAP

TRONOX, LLC

Milwaukee, Wisconsin



0
400'
SCALE
W. EVERTS STREET
GOOD HOPE ROAD
N. GRANVILLE ROAD
MW-E
MW-F
MW-G
BRADLEY ROAD
91st ST.
91st. ST.
LEGEND
CURRENT (NEW) CHANNEL
OLD CHANNEL
MONITORING WELLS
WESTON SOLUTIONS
750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061
FIGURE 1-3
REACH 2 MONITORING WELL LOCATION MAP
TRONOX, LLC
Milwaukee, Wisconsin

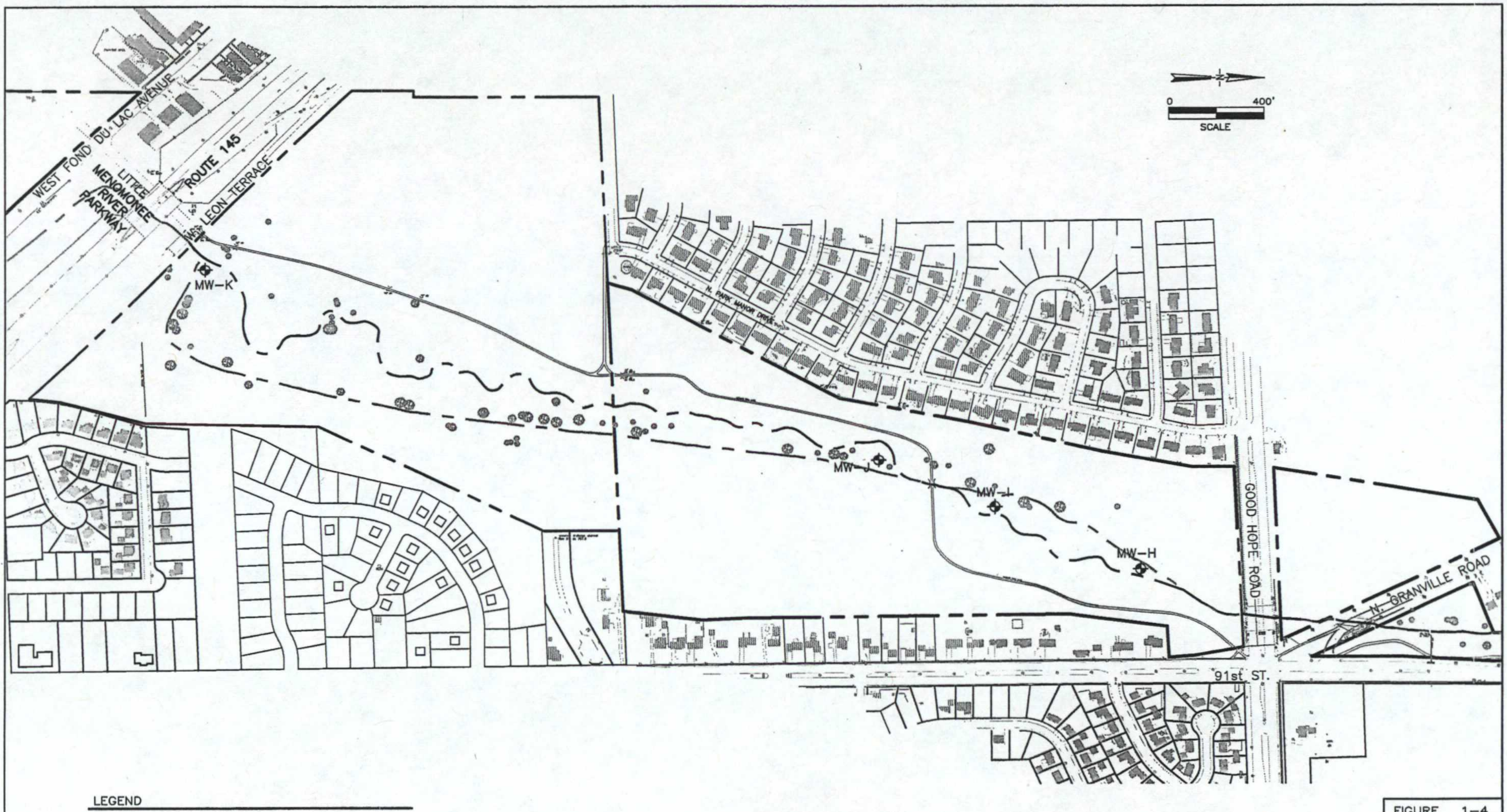


FIGURE 1-4

WESTON SOLUTIONS

750 E. Bunker Ct.
Suite 500
Vernon Hills, Illinois
60061

REACH 3 MONITORING WELL LOCATION MAP

TRONOX, LLC

Milwaukee, Wisconsin

Attachment 6

Notification of Next Five-Year Review

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

June 4, 2014

Thomas Wentland, State Project Manager
Wisconsin Department of Natural Resources
Southeast District Office/Plymouth Service Center
1155 Pilgrim Road
Plymouth, WI 53073

Re: Moss-American Superfund Site – Notification of Five-Year Review Start

Dear ~~Mr. Wentland~~ Tom:

This letter is to notify you that the United States Environmental Protection Agency (EPA) is beginning the process of working on the next five-year review for the Moss-American Superfund Site in Milwaukee, Wisconsin. This review for Moss-American will be conducted according to the requirements of Section 121 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Its objective is to evaluate the remedy implemented at the site and determine if it remains protective of human health and the environment.

The five-year review report is due no later than late March 2015. We are providing you this notification so that EPA and WDNR can begin the necessary coordination activities. At the earliest convenience, I would like to discuss key action items with you, such as the site inspection, issuance of the required public notice, getting input from the public, and any other issues that are of concern to you.

I look forward working with you on this next five-year review for Moss-American. If you have any questions, you can reach me at (312) 886-6195.

Sincerely,

R. del Rosario

Ross del Rosario
Remedial Project Manager

Attachment 7

Public Notice Ad

8/14/14

EPA Begins Review of Moss-American Superfund Site

Milwaukee, Wisconsin

The U.S. Environmental Protection Agency is conducting a five-year review of the Moss-American Superfund site. The site comprises 88 acres of a former creosote facility at the intersection of Brown Deer and Granville roads and a portion of the Little Menomonee River, adjacent to the former facility. The Superfund law requires regular checkups of sites that have been cleaned up or where cleanup has been ongoing for at least five years – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the fourth five-year review of this site.

EPA cleaned up polycyclic aromatic hydrocarbon, or PAH, contamination in the site's soil and sediment. About six miles of the Little Menomonee River was also rerouted or dredged.

More information is available at the Mill Road Library, 6431 N. 76th St., Milwaukee, and at www.epa.gov/Region5/sites/mossamerican. The review should be completed by March 2015.

The five-year review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Susan Pastor
Community Involvement Coordinator
312-353-1325
pastor.susan@epa.gov

Ross Del Rosario
Remedial Project Manager
312-886-6195
delrosario.rosauro@epa.gov

You may also call EPA toll-free at 800-621-8431, 8:30 a.m. to 4:30 p.m., weekdays.

4419411-01

Attachment 8

Site Inspection Report

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Moss American NPL Site	**Date of inspection: 07/16/14**
Location and Region: Milwaukee, WI (R5)	**EPA ID: WID039052626**
Agency, office, or company leading the five-year review: U.S. EPA – Region 5, assisted by WDNR	**Weather/temperature: 67°F** **Sunny, wind speed approx. <5 mph**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
X Access controls
X Institutional controls
X Groundwater pump and treatment **(Funnel & Gate/Air Sparge)**
☐ Surface water collection and treatment
X Other__Soil – Low-temp. thermal desorption, Sediment – Rerouting & Excavation

☐ Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: X Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager**: Name: Tom Wentland, (WDNR) Title: Site Manager Date: 7/16/14
   Interviewed Mr. Wentlant **at site** ☐ at office ☐ by phone Phone no. (920)893-8528
   Problems, suggestions; X Report attached

2. **O&M staff: WDNR performing O & M – Not required to be onsite**
   Name Title Date
   Interviewed X at site ☐ at office ☐ by phone Phone no. (920)893-8528
   Problems, suggestions; ☐ Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency: WDNR
   Contact: Tom Wentland, Site Manager Phone No.: (920) 893-8528

Problems; suggestions; ☐ Report attached

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date ☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date ☐ N/A
X Maintenance logs	☐ Readily available	☐ Up to date ☐ N/A

Remarks______________________________

2. **Site-Specific Health and Safety Plan** X Readily available ☐ Up to date ☐ N/A

☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date ☐ N/A

Remarks______________________________

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☐ N/A

Remarks______________________________

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date xN/A
☐ Effluent discharge	☐ Readily available	☐ Up to date xN/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date xN/A
☐ Other permits__________	☐ Readily available	☐ Up to date xN/A

Remarks______________________________

5. **Gas Generation Records** ☐ Readily available ☐ Up to date xN/A

Questions during Moss-American FYR site inspection:

1. Are there any changes in State or local laws you are aware of that may impact the protectiveness at the Moss-American site?
2. What is the state of groundwater quality, based on comparison of 2013 test results with the 2010 survey?
3. Describe field activities the State has performed since taking over the O & M responsibilities in 2012?
4. Are there any O & M activities (e.g., groundwater monitoring, security, mowing) that the State has not been able to perform? If there are any, please describe such activities and reasons why they haven't been performed?
5. Have there been incidents of trespassing/vandalism/etc. that you are aware of since the last five-year review in 2010?

DelRosario, Ross

From: Wentland, Thomas A - DNR <Thomas.Wentland@wisconsin.gov>
Sent: Tuesday, July 22, 2014 10:46 AM
To: DelRosario, Ross
Subject: 2014 FYR Answers to Site Inspection Questions.
Attachments: removed.txt

1. No.
2. Based on the results of a groundwater monitoring and site evaluation report completed in April of 2013, performed by the Sigma Group, contractor for the Wisconsin Department of Natural Resources, the site exhibits improvement in groundwater quality from the previous groundwater monitoring event completed in September 2010 performed by Weston Solutions, Inc. The noted improvements are summarized as follows:
    a. Total PAH concentrations have decreased at all on-site sample locations since September 2010.
    b. No indication of free-phase product was present at MW-7S where an oily-sheen was observer in September 2010.
    c. The sheet-pile containment and in-situ treatment systems have effectively contained and remediated the majority of the groundwater impacts.
    d. Based on one round of data from the newly installed wells located immediately outside the sheet-pile area no indication of groundwater plume migration outside the containment area is evident.
    e. Groundwater quality data from monitoring well MW-33S and piezometer PZ-02 located near the northeast portion of the sheet-pile area show decreasing concentrations of total PAHs; the data also indicate no plum migration around the containment area.
3. The Wisconsin Department of Natural Resources contracted with the Sigma Group, to conduct groundwater monitoring and site evaluation in April of 2013.
4. No, we have not proposed any activities at the site since the 2013 sampling. Although there is nothing limiting our activity at the site.
5. Vandalism discovered June 2012. Control building was broken into and many items were damaged. See attached photos.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Thomas A. Wentland
Waste Management Engineer
Wisconsin Department of Natural Resources
1155 Pilgrim Road, Plymouth, WI 53073
Phone: 920-893-8528
Fax: 920-892-6638
thomas.wentland@wi.gov

	Remarks		
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date xN/A
	Remarks		
7.	**Groundwater Monitoring Records**	xReadily available	☐ Up to date ☐ N/A
	Remarks		
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date xN/A
	Remarks		
9.	**Discharge Compliance Records**		
	☐ Air	☐ Readily available	☐ Up to date xN/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date xN/A
	Remarks		
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date xN/A
	Remarks		

IV. O&M COSTS

1. **O&M Organization** *
   ☒ State in-house * ☐ Contractor for State
   ☐ PRP in-house
   ☐ Federal Facility in-house ☐ Contractor for Federal Facility
   ☐ Other

   * Started in 2011

2. **O&M Cost Records**
   ☐ Readily available ☐ Up to date
   ☐ Funding mechanism/agreement in place
   Original O&M cost estimate___$150,000_(Est. from PRP) Breakdown attached

   Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached

From__________ To__________ ________________ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _Costs for operating the gw system (about $150K) appear reasonable.

V. ACCESS AND INSTITUTIONAL CONTROLS XApplicable ☐ N/A

A. Fencing - There is fencing around the perimeter of the former wood treating site.

1. **Fencing damaged** ☒ Location shown on site map XGates secured ☐ N/A

Remarks_Walk through of the site did not reveal any major damage to the fencing around the site

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks_Gates/fencing appear to be in good order.______________________________

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented ☐ Yes No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ______________________________
Frequency ______________________________
Responsible party/agency PRP has provided evaluation on effectiveness of deed restrictions put in place by county and railroad.
Contact _Keith Watson (Tronox)____ ___Project Manager ________ ____________
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A

	Reports are verified by the lead agency	N/A ☐ Yes ☐ No ☐ N/A
	Specific requirements in deed or decision documents have been met	☐ Yes ☐ No ☐ N/A
	Violations have been reported	☐ Yes ☐ No ☐ N/A
	Other problems or suggestions: ☐ Report attached	
2.	**Adequacy** xICs are adequate ☐ ICs are inadequate Remarks__Deed restrictions placed by the county and the railroad are in effect._	☐ N/A
D. General		
1.	**Vandalism/trespassing** ☐ Location shown on site map XNo vandalism evident Remarks	
2.	**Land use changes on site** ☐ N/A Remarks	
3.	**Land use changes off site** ☐ N/A Remarks	
	VI. GENERAL SITE CONDITIONS	
A. Roads	x Applicable ☐ N/A	
1.	**Roads damaged** ☐ Location shown on site map Remarks_Roads in and out of the site were in good condition and traffic along it were generally normal.	☐ Roads adequate ☐ N/A
B. Other Site Conditions		
	Remarks:	

VII. LANDFILL COVERS ☐ Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent____________ Depth__________
   Remarks____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths__________ Widths_________ Depths________
   Remarks____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent____________ Depth__________
   Remarks____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent____________ Depth__________
   Remarks____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent____________ Height__________
   Remarks____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent__________
   ☐ Ponding ☐ Location shown on site map Areal extent__________
   ☐ Seeps ☐ Location shown on site map Areal extent__________
   ☐ Soft subgrade ☐ Location shown on site map Areal extent__________
   Remarks____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent____________
   Remarks____

B. Benches ☐ Applicable X N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope

	in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks________________________________
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks________________________________
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks________________________________
C.	**Letdown Channels** ☐ Applicable X N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)
1.	**Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent____________ Depth____________ Remarks________________________________
2.	**Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation Material type____________ Areal extent____________ Remarks________________________________
3.	**Erosion** ☐ Location shown on site map ☐ No evidence of erosion Areal extent____________ Depth____________ Remarks________________________________
4.	**Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent____________ Depth____________ Remarks________________________________
5.	**Obstructions** Type____________ ☐ No obstructions ☐ Location shown on site map Areal extent____________ Size____________ Remarks________________________________
6.	**Excessive Vegetative Growth** Type____________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent____________ Remarks________________________________
D.	**Cover Penetrations** ☐ Applicable X N/A

1.	**Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks
2.	**Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks
3.	**Monitoring Wells** (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks
4.	**Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks
5.	**Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A Remarks
E. Gas Collection and Treatment	☐ Applicable X N/A
1.	**Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks
2.	**Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks

	Remarks______		
F. Cover Drainage Layer		☐ Applicable	X N/A
1.	**Outlet Pipes Inspected**	☐ Functioning	X N/A
	Remarks______		
2.	**Outlet Rock Inspected**	☐ Functioning	X N/A
	Remarks______		
G. Detention/Sedimentation Ponds		☐ Applicable	X N/A
1.	**Siltation** Areal extent______ Depth______ ☐ N/A ☐ Siltation not evident Remarks______		
2.	**Erosion** Areal extent______ Depth______ ☐ Erosion not evident Remarks______		
3.	**Outlet Works** ☐ Functioning ☐ N/A Remarks______		
4.	**Dam** ☐ Functioning ☐ N/A Remarks______		
H. Retaining Walls ☐ Applicable X N/A			
1.	**Deformations** ☐ Location shown on site map ☐ Deformation not evident Horizontal displacement______ Vertical displacement______ Rotational displacement______ Remarks______		
2.	**Degradation** ☐ Location shown on site map ☐ Degradation not evident Remarks______		
I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A			
1.	**Siltation** ☐ Location shown on site map ☐ Siltation not evident Areal extent______ Depth______ Remarks______		
2.	**Vegetative Growth** ☐ Location shown on site map ☐ N/A ☐ Vegetation does not impede flow Areal extent______ Type______ Remarks______		
3.	**Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent______ Depth______		

Remarks____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks____

VIII. VERTICAL BARRIER WALLS ☐ Applicable X N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent______________ Depth____________
Remarks____

2. **Performance Monitoring** Type of monitoring__________________________
☐ Performance not monitored
Frequency_______________________________☐ Evidence of breaching
Head differential__________________________
Remarks____

IX. GROUNDWATER/SURFACE WATER REMEDIES X Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance **X N/A**

Remarks: Facility does not use extraction wells._Instead, it uses a "funnel and gate" system.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable X N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance
Remarks__Uses 3 air blowers located in the gw treatment system. _________

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks____
____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks____
____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters____
☐ Additive (*e.g.*, chelation agent, flocculent)______________________________
XOthers___**Air Sparging using a funnel and gate to bring contaminated gw to treatment zone**
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
XEquipment properly identified
☐ Quantity of groundwater treated annually________________________
☐ Quantity of surface water treated annually________________________
Remarks____
____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks____Functioning as intended______________________________________
____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks__**Holding tank inside gw treatment building not being used**______________
____

4. **Discharge Structure and Appurtenances**
☐ N/A ☐ Good condition ☐ Needs Maintenance
Remarks____
____

5. **Treatment Building(s)**
☐ N/A **X** Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks____
____

6. **Monitoring Wells** (pump and treatment remedy)
☐ Properly secured/locked **X** Functioning ☐ Routinely sampled **X** Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks____
____

D. Monitoring Data

1. Monitoring Data

X Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:

X Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs Maintenance X N/A

Remarks____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Attachment 9

Follow-up to Site Inspection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

July 17, 2014

Thomas Wentland, State Project Manager
Wisconsin Department of Natural Resources
Southeast District Office/Plymouth Service Center
1155 Pilgrim Road
Plymouth, WI 53073

Re: Moss-American Superfund Site
Five-Year Review Inspection/Interview Followup

Dear ~~Mr. Wentland~~ Tom:

It was a pleasure meeting with you at the site yesterday, as part of a site inspection and interview for the upcoming five-year review. As a follow-up to the site visit, EPA would like to summarize key points we discussed during the visit:

1. The site needs to be mowed, particularly in the areas where the monitoring wells are located. You agreed that WDNR will perform this task, which is part of O & M responsibilities which the State is required to perform, prior to the end of summer. You indicated that an existing State contract for mowing services can used for Moss-American and the expense is below the threshold requiring additional approval/authorization. We also agreed that, if necessary, EPA may be able to provide funding assistance via the existing cooperative agreement, if WDNR requests it. Per our discussion, we would like the mowing completed prior to September 30, 2014;

2. Based on our conversation yesterday, you will modify your initial responses to the list of questions we provided you in advance of the site visit. You indicated that this will require minimal effort and should be completed quickly. EPA requests that the modified responses to our questions be submitted to us no later than July 25, 2014;

3. We verified that the river crossing located on the eastern side of the site has been removed. This was performed as part of the additional removal activities performed by EPA's contractor in the summer and fall of 2011.

EPA appreciates your assistance in conducting this five-year review inspection on Moss-American. If you have any additional suggestions/thoughts on what we discussed during the visit, please feel free to contact me at your convenience. I can be reached at (312) 886-6195.

Sincerely,

R. del Rosario

Ross del Rosario
Remedial Project Manager

Attachment 10

State Responses to Interview Questions

DelRosario, Ross

From:	Wentland, Thomas A - DNR <Thomas.Wentland@wisconsin.gov>
Sent:	Tuesday, July 22, 2014 10:46 AM
To:	DelRosario, Ross
Subject:	2014 FYR Answers to Site Inspection Questions.
Attachments:	removed.txt

1. No.
2. Based on the results of a groundwater monitoring and site evaluation report completed in April of 2013, performed by the Sigma Group, contractor for the Wisconsin Department of Natural Resources, the site exhibits improvement in groundwater quality from the previous groundwater monitoring event completed in September 2010 performed by Weston Solutions, Inc. The noted improvements are summarized as follows:

    a. Total PAH concentrations have decreased at all on-site sample locations since September 2010.

    b. No indication of free-phase product was present at MW-7S where an oily-sheen was observer in September 2010.

    c. The sheet-pile containment and in-situ treatment systems have effectively contained and remediated the majority of the groundwater impacts.

    d. Based on one round of data from the newly installed wells located immediately outside the sheet-pile area no indication of groundwater plume migration outside the containment area is evident.

    e. Groundwater quality data from monitoring well MW-33S and piezometer PZ-02 located near the northeast portion of the sheet-pile area show decreasing concentrations of total PAHs; the data also indicate no plum migration around the containment area.

3. The Wisconsin Department of Natural Resources contracted with the Sigma Group, to conduct groundwater monitoring and site evaluation in April of 2013.
4. No, we have not proposed any activities at the site since the 2013 sampling. Although there is nothing limiting our activity at the site.
5. Vandalism discovered June 2012. Control building was broken into and many items were damaged. See attached photos.

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Waste Management Engineer
Wisconsin Department of Natural Resources
1155 Pilgrim Road, Plymouth, WI 53073
Phone: 920-893-8528
Fax: 920-892-6638
thomas.wentland@wi.gov

Questions during Moss-American FYR site inspection:

1. Are there any changes in State or local laws you are aware of that may impact the protectiveness at the Moss-American site? NO
2. What is the state of groundwater quality, based on comparison of 2013 test results with the 2010 survey?
3. Describe field activities the State has performed since taking over the O & M responsibilities in 2012?
4. Are there any O & M activities (e.g., groundwater monitoring, security, mowing) that the State has not been able to perform? If there are any, please describe such activities and reasons why they haven't been performed?
5. Have there been incidents of trespassing/vandalism/etc. that you are aware of since the last five-year review in 2010?

Moss-American Superfund Site
4th Five-Year Review Report

Site Photos
June 2014

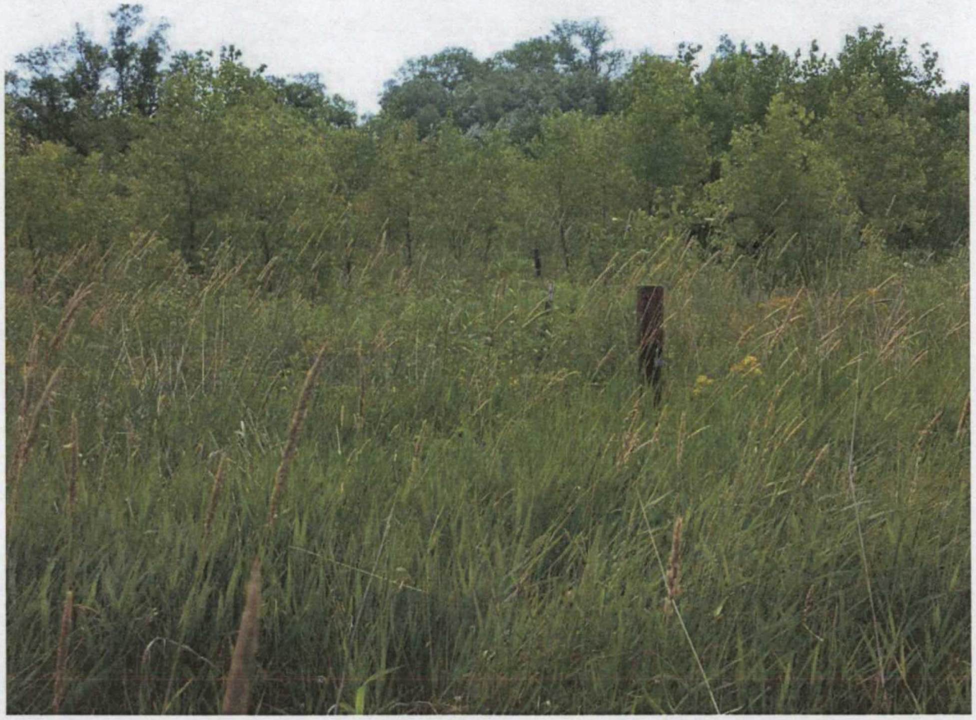
Moss-American Superfund Site
June 2014

View of Groundwater Treatment Building

Inside Groundwater Treatment Building

Moss-American Superfund Site
June 2014

View of monitoring well in treatment area



View of Little Menomonee River near western edge of site

Moss-American Superfund Site
June 2014

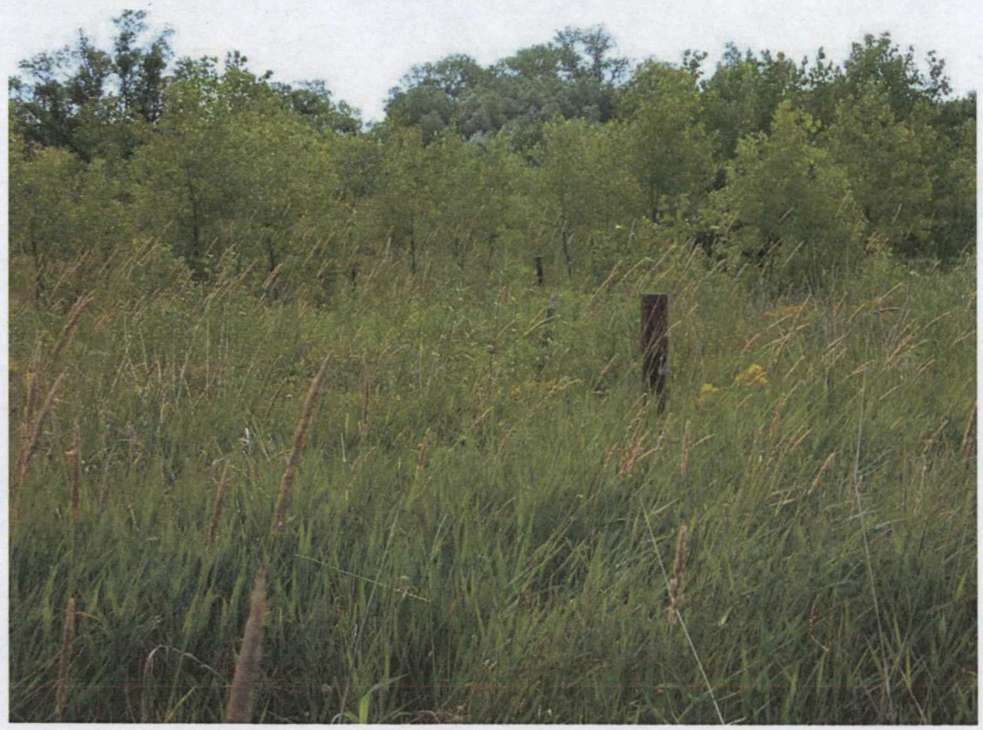
View of monitoring well network

View of river downstream from gw treatment building

Moss-American Superfund Site
June 2014

View of site looking to the west

Monitoring well near groundwater treatment building



Moss-American Superfund Site
June 2014

View of river near demolished river crossing

View of site to the north