North Boeing Field/ Georgetown Steam Plant Site Remedial Investigation/Feasibility Study

Preliminary Stormwater Sampling

Interim Data Report

Prepared for

Washington State Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
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List of Acronyms

µg	microgram
ARI	Analytical Resources, Inc.
CSL	Cleanup Screening Levels
DOC	dissolved organic carbon
EAP	Environmental Assessment Program
Ecology	Washington State Department of Ecology
EOF	emergency overflow
EPA	U.S. Environmental Protection Agency
ft/s	feet per second
g	gram
gpm	gallons per minute
GTSP	Georgetown Steam Plant
HHO	human health for consumption of organisms
HPAH	high molecular weight polycyclic aromatic hydrocarbon
KC	King County
KCIA	King County International Airport
kg	kilogram
L	liter
LAET	lowest apparent effects threshold
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LS	lift station
m/s	meters per second
mg	milligram
MH	manhole
mL	milliliter
mm	millimeter
NBF	North Boeing Field
NCDC	National Climatic Data Center
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pg	picogram
psi	pounds per square inch
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
RPD	relative percent difference
SAIC	Science Applications International Corporation
SAP	sampling and analysis plan
SD	storm drain
SMS	Sediment Management Standards

List of Acronyms (continued)

SOP	standard operating procedure
SPU	Seattle Public Utilities
SQS	Sediment Quality Standard
TEF	toxic equivalency factor
TEQ	toxic equivalent quotient
TOC	total organic carbon
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WAC	Washington Administrative Code
WHO	World Health Organization

1.0 Introduction

Stormwater discharge from the North Boeing Field-Georgetown Steam Plant (NBF-GTSP) Site is a potential source of contaminants to Slip 4 on the Lower Duwamish Waterway. The Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (USEPA) identified cleanup of contaminated sediment in Slip 4 as a high priority for the Lower Duwamish Waterway Superfund Site. Cleanup of Slip 4 has been delayed because of concerns about the potential recontamination of sediments in Slip 4 from releases of contaminants from this site. A Remedial Investigation/Feasibility Study (RI/FS) and cleanup of this site is necessary to allow sediment cleanup in Slip 4 to proceed. Because of the long time frame associated with completing the RI/FS, USEPA asked Ecology to investigate options that might allow the cleanup of Slip 4 to proceed.

To facilitate this process, Ecology tasked Science Applications International Corporation (SAIC) with the collection of stormwater and continuous flow measurements from the storm drain (SD) line upstream of the King County International Airport (KCIA) SD#3/PS44 emergency overflow (EOF) outfall in Slip 4. During the preliminary stormwater sampling phase, stormwater sampling systems were installed at two locations at NBF in September 2009. Whole water and filtered suspended solids samples were obtained at both of these locations during five storm events.

This report includes the chemical analysis results for the filtered suspended solids and whole water samples collected at these two locations during the preliminary stormwater sampling phase (September 2009 through early February 2010). In addition, continuous flow measurements collected over the duration of sampling are reported. These will be used to calculate contaminant loading to Slip 4, and the contaminant loading contribution of the north lateral SD line. Sampling was conducted following the study design and methods described in *Sampling and Analysis Plan and Quality Assurance Project Plan for Preliminary Stormwater and Filtered Suspended Solids Sampling*, dated August 2009 (SAIC 2009a).

1.1 Site Description

The NBF-GTSP Site is located east of Slip 4 and approximately 4 miles south of downtown Seattle. NBF is located at 7500 East Marginal Way S and occupies approximately 130 acres primarily within the Seattle and Tukwila city limits (Figure 1). The site is leased by Boeing from King County, with the exception of a few acres on either side of the former GTSP flume, which is leased from the City of Seattle, and Building 3-390 and an adjacent parcel used for parking, which are owned by Boeing. The head of Slip 4 is approximately 150 feet from the northwestern boundary of NBF.

The NBF SD system drains a total area of approximately 328 acres; this includes stormwater flow from 171 acres of KCIA, which enters the site from the north and east at four locations (SAIC 2009b). Most areas of NBF drain to one of four lateral SD lines (the north, north-central, south-central, and south lateral SD lines), which are directed to a trunk line that passes through a King County (KC) lift station, under East Marginal Way S, and to the 60-inch KCIA SD#3/PS44 EOF outfall at Slip 4 (Figure 2). Stormwater from a smaller area near Building 3-380 (which

previously discharged to Slip 4 via a separate SD line) and a parking area downstream of the lift station also drain to Slip 4.

1.2 Project Scope and Study Objectives

The primary purpose of this sampling and testing effort was to collect samples of whole water and filtered suspended solids from at least five storm events at two locations, and to measure the concentrations of selected contaminants in these samples. The two locations were selected to be representative of stormwater flow from the north lateral SD line and the NBF Site as a whole. These results were used to:

- Determine what contaminants, if any, are currently entering Slip 4 from the NBF SD system.
- Determine if contaminants in the stormwater currently being discharged to Slip 4 exceed Washington State surface water quality standards.
- Compare the contaminants detected in whole water and filtered suspended solids samples in the north lateral SD line at NBF with those detected downstream from the King County lift station that discharges into Slip 4.
- Determine if contaminants in stormwater are comparable to those found in solids samples collected from manholes, catch basins, and sediment traps on the site by comparing new whole water and filtered suspended solids data with previously collected sediment trap and grab sample data.
- Identify additional areas for sampling and analysis.

1.3 Document Organization

This Data Report summarizes and evaluates the results of the preliminary phase of the NBF stormwater investigation as described in Section 1.0. Section 2.0 of this document describes how the samples and stormwater flow data were collected, as well as any deviations from the Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) (SAIC 2009a). The flow measurement data and analytical results for filtered suspended solids and whole water are presented in Section 3.0. Comparisons between the data collected during this investigation to existing data type from grab samples and sediment traps are presented in Section 4.0. Section 5.0 summarizes the data validation reports. References are listed in Section 6.0. The appendices include flow profiles from both locations, as well as monthly precipitation summaries, relevant correspondence, laboratory data reports, and data validation reports.

2.0 Data Collection and Analytical Methods

This section describes the collection of flow measurement data and the sampling and analytical methods for filtered suspended solids and whole water samples. The SAP/QAPP was followed for all sample collection (SAIC 2009a), with the exceptions noted in this section.

Sampling was conducted at two locations (Figure 3):

- Lift station (LS) 431, located on the discharge (west) side of the King County Lift Station; and
- Manhole (MH) 108, located along the north lateral SD line, north of Building 3-380 and near the corner of Building 3-350.

All four major NBF-GTSP storm lines (north lateral, north-central lateral, south-central lateral, and south lateral) drain to the lift station prior to flowing into Slip 4. Therefore, stormwater collected at LS431 is representative of stormwater discharge to Slip 4.

MH108 was selected to represent stormwater drainage from the north lateral SD line. This location is relatively protected from aircraft and vehicle traffic and is located near the downstream end of the north lateral SD line. Therefore, this location provides samples that are representative of flow in the north lateral SD line. MH108 is located 85 meters (275 feet) upstream of the connection between the north and north-central SD lines.

2.1 Flow Measurements

Stormwater flow at LS431 and MH108 were measured using Teledyne Isco (Isco; Lincoln, NE) equipment leased from Whitney Equipment, Bothell, WA. Sampling equipment at LS431 was installed on September 17, 2009, and sampling equipment at MH108 was installed on September 18, 2009. Clearcreek Contractors of Everett, WA, performed the confined space entry necessary for installation.

Continuous flow measurements at LS431 were collected using an Isco 6712 stormwater sampler equipped with a Model 750 area velocity flow module. The Isco unit was plugged into the AC power available at the back of the lift station. The flow sensor was installed approximately 5 feet downstream in the 48-inch diameter SD pipe directed toward Slip 4. Due to the short cycling time of the lift station pumps, the flow sampler was programmed to collect level and velocity data every 1 minute. Flow was calculated during data collection but not logged to increase the storage capacity in the Isco unit's memory. Flow was recalculated during post-processing of the data.

Continuous flow measurements at MH108 were collected using an Isco Model 4250 flow meter run off a 12-volt marine battery. The battery was replaced on a biweekly basis for the duration of the sampling period. The flow meter was programmed to collect level, velocity, and flow data every 15 minutes. The flow sensor was installed in a 24-inch storm drain on the inlet side of MH108.

2.2 Sample Collection

Filtered suspended solids and whole water samples were collected at both sampling locations. The sampling units were stored in polypropylene garden sheds for protection. The LS431 sampling shed was stored on location at the lift station. The MH108 sampling shed was stored at the southeastern corner of Building 3-350 between sampling events. Five stormwater samples were collected between October 16, 2009, and February 5, 2010, as shown in Table 1. The start and end times for each sampling event are based on the times listed on the totalizer log sheets (Appendix A). These times are listed separately for each location, and may vary slightly between the two locations, depending on when the sampling units were turned on. Two sets of dates are included for Event 4 at MH108. A mat of material believed to be the result of iron oxidizing bacteria was present in the drain prior to Event 4 sampling. This material was dislodged during the first flush and caused the first set of filters to fill early in the event. A second filter was installed to finish sampling. Both sets of filters were submitted to the laboratory for analysis.

2.2.1 Filtered Suspended Solids Samples

The design of the stormwater filtration system was described in the SAP/QAPP (SAIC 2009a). A 50-gallon per minute (gpm), 45-feet-of-head effluent pump was positioned in the storm drain beneath the manhole cover. A float switch on the pump was set to trigger sampling at the start of a storm event. For the first three events, a tethered float switch was used. This float was unsuitable for the high flow conditions at the lift station. Prior to the fourth event, the float switches at LS431 and MH108 were replaced with switches built for turbulent conditions. Both types of float switches were set to turn on the pump with a water depth of about 6 inches.

Once triggered, water was pumped up through the intake line and split into parallel filter housings. Each filter housing contained a 20-inch long, 4-inch diameter filter bag. All filter bags were constructed of 5-micron polypropylene felt. The outflow from each filter housing was piped into a totalizer capable of measuring flows between 0.44 and 52 gpm. The outflow from both totalizers was combined and piped back into the storm drain to discharge downstream of the effluent pump, avoiding the potential for recirculating water.

Prior to each sampling event, clean, pre-weighed filters were installed in each of the filter housings and the start totalizer readings were recorded on the totalizer field form (Appendix A). After sampling, the final totalizer readings were recorded. The filter housings were drained and the filters removed. Residual water was gently squeezed out of the filter bags. Collected filters were placed in clean, labeled, Ziploc bags and stored on ice for delivery to the analytical laboratory.

2.2.2 Whole Water Samples

Whole water samples were collected using Isco 6712 stormwater sampling units. The inlet for the Isco samplers and the flow sensors were mounted adjacent to each other on stainless steel scissors brackets. The SAP stated that the flow sensor and Isco inlet would be installed upstream of the filtered solids effluent pump. This was only possible at MH108. The drain configuration at the lift station prevented upstream installation of the bracket at LS431. Instead, the flow sensor

and inlet were installed 6 feet downstream of the effluent pump. The output from the filtered solids sampler discharged an additional 2 feet farther downstream.

Flow weighted sampling programs were selected for each Isco unit prior to a sampling event. Flow weighting consists of collecting equal volume aliquots at predetermined volume intervals. The aliquot volume was constant at 500 milliliters (mL) for all sampled events. The volume interval was calculated using forecasted rainfall totals and the relationship between rainfall and stormwater flow established from previous rain events.

All samples were collected in 5-gallon carboys. During sampling, the carboy and collected water were stored on ice in the base of the Isco unit. After sampling, the carboy was delivered to the analytical laboratory, where the sample was split for analysis. The laboratory was responsible for decontamination of the carboy as specified in the SAP/QAPP (SAIC 2009a).

2.3 Chemical Analysis

All chemical and physical analytical procedures were performed by subcontracted laboratories in accordance with Ecology guidelines as outlined in the SAP/QAPP (SAIC 2009a).

2.3.1 Filtered Suspended Solids Samples

After collection, all filters were delivered to Analytical Resources, Inc. (ARI), of Tukwila, WA, for processing and analysis or archival. Table 2 lists the filtered suspended solids samples selected for analysis. Filtered solids from the "A" filter of the parallel filter setup were first scraped to obtain material for analysis of metals and grain size. Approximately 10 grams of material were needed for metals analysis, and approximately 20 grams for grain size. If insufficient sample material was obtained, mercury was analyzed first, then other metals, and finally grain size. The remainder of the filter bag was dried to determine the dry weight of material captured during filtration. The dry filter bag was extracted and analyzed for polychlorinated biphenyl (PCB) Aroclors.

The "B" filters from Event 3 (November 6, 2009) were analyzed for polycyclic aromatic hydrocarbons (PAHs). Due to the volatility of PAHs, the filter was not dried prior to extraction. The "B" filters from Events 2 and 4 (October 29, 2009, and December 15, 2009) were dried and weighed by ARI and sent to Axys Analytical Services, Ltd (Axys) of Sidney, BC, for analysis of dioxin/furan congeners by Method E1613.

Analytical methods are listed in Tables 5 and 6.

2.3.2 Whole Water Samples

The carboys containing the whole water samples were delivered to ARI for splitting and analysis. Table 3 lists the whole water samples selected for analysis. Analysis of pesticides was discontinued after the second sampling event due to the frequency of undetected results (i.e., pesticides were not detected during the first two sampling events). Due to instrument problems at ARI, analysis of chromium for Event 5 was sub-contracted to Fremont Analytical, Seattle, WA. All analytical methods are listed in Tables 7 and 8.

3.0 Summary of Results

This section presents a summary of flow measurement and analytical results. Chemical data validation results are summarized in Section 5.0.

3.1 Flow Measurements and Precipitation

Flow data logged by the Isco equipment was managed using the Isco program Flowlink (Version 5.10.101). All data incorporated into Flowlink are stored in a Microsoft Access database. Local precipitation data were added to the Access database to aid interpretation of the storm hydrographs.

3.1.1 Precipitation

The Seattle Boeing Field-King County International Airport rain gauge (identified as "KBFI") was chosen to be representative of precipitation at NBF. The KBFI rain gauge is located at 6.1 meters (20 feet) above sea level at 7602 Perimeter Road, on the KCIA property (Figure 2). KBFI is part of a network of meteorological stations maintained by the National Climatic Data Center (NCDC). Precipitation data are logged hourly and are available for download via subscription at (http://www.ncdc.noaa.gov/oa/climate/stationlocator.html). Trace amounts of precipitation are reported as "T" by NCDC. These values were replaced with 0.0254 millimeter (mm) (0.001 inch) when added to the Access database.

KBFI precipitation totals from late October through early November 2009 were inconsistent with precipitation from other regional rain gauges. NCDC confirmed that high winds had disabled the tipping bucket on the rain gauge for a portion of this time span. Given that this time span affected precipitation totals from Events 2 and 3, data from a nearby Seattle Public Utilities rain gauge were used to supplement the KBFI record. Seattle Public Utilities (SPU) rain gauge RG16 was the closest to NBF. It is located at King County's East Marginal Way Pump Station (Figure 2). Hourly precipitation data at KBFI were replaced with precipitation from RG16 for the time period ranging from 11:00 PM on October 26, 2009, through 8:00 PM on November 10, 2009.

3.1.2 Stormwater Flow Records

This section summarizes the water level, velocity, and flow data collected from mid-September 2009 through the end of February 2010. Monthly summaries of stormwater flow at MH108 and LS431, and precipitation from the KBFI and RG16 rain gauges, are presented in Appendix B. General flow conditions at both locations and issues encountered during sampling are described below.

LS431. Nearly all stormwater runoff from NBF-GTSP drains to the lift station, where it collects in an underground storage vault. The exact dimensions of this vault are unknown, but it is assumed to consist of a rectangular vault directly below the lift station plus storage capacity extending 210 meters (700 feet) up the 1.52-meter (5-foot) diameter south-central lateral SD to MH369, and 85 meters (275 feet) up the 1.22-meter (4-foot) diameter south lateral SD to MH353.

Four pumps are present in the lift station. Depending on the rate of water accumulation in the storage area, one to four pumps are activated to lift the water above sea level for discharge to Slip 4. The Isco unit's flow sensor was installed downstream of the lift station pumps.

Water level and velocity data are collected from the flow module on the Isco unit. The diameter of the drain was entered into the Isco unit during installation. These three measurements were used to calculate total flow. The flow measured by the Isco unit has consistently been between 0.19 and 0.38 m^3/s (3,000 to 6,000 gpm) with one of the lift station pumps activated. Most of this flow variability was due to level measurements, which ranged between 0.12 and 0.20 meter (5 to 8 inches). Velocity readings were more constant at values near 3 m/s (9.8 ft/s).

For several reasons, the measured flow is believed to underestimate the true flow by a factor of approximately 2.5:

- The lift station is operated by King County. Early discussions with county workers indicated that the output of each lift station pump is 38 m^3/s (10,000 gpm). SAIC obtained the pump curve for the lift station pumps (Appendix C). An SAIC hydraulics engineer looked at the pump curve and verified that the Isco unit's flows are about one-half the pump curve projection. However, he could not arrive at a better approximation of the pump output without knowing the hydrostatic head of the pumps.
- Beth Schmoyer of Seattle Public Utilities calculated the area and approximate runoff volumes of stormwater from each SD line. The ratio of surface area and runoff between the north line and the total area draining to the lift station was estimated as 0.22 (Appendix C). In the current study, the average ratio of flow between MH108 and LS431 was measured as closer to 0.6, suggesting a low bias at LS431.
- Water level readings made by the Isco unit at LS431 are under-representing the true water level. The water depth has been observed to be at least 0.3 meter (12 inches) while the lift station is pumping. This is higher than the water levels measured by the Isco unit. Isco technicians visited the site and suggested that the large amount of water being channeled into the 48-inch drain may create localized pressure differences within the water column, resulting in lower water levels measured over the sensor.

On March 19, 2010, confined space technicians measured the visible water line markings above the sensor at LS431 to be 0.39 meter (15.5 inches). In the Flowlink software, 0.2 meter (8 inches) of water level was added to the measurements collected at LS431 to bring the measured level closer to the physical water line. Flows calculated using the adjusted levels ranged between 0.76 and 0.95 m^3/s (12,000 to 15,000 gpm).

The average ratio of flow between MH108 and the adjusted flow at LS431 is 0.16. This is lower than the ratio of drainage areas calculated by SPU, suggesting that the modified flow may be biased high. Without an accurate flow measurement at LS431, it is not possible to calculate accurate loadings. Several possibilities exist for correcting flow measurements:

- The most accurate way of calculating the true flow at the lift station would be to determine the capacity of the water storage area and divide by the average time the lift station pumps are on during base flow conditions.

- The hydrostatic head on the lift station pumps could be found in a build plan for the station. The pump curve could be used to approximate flow.

- Boeing's Stormwater Pollution Prevention Plan (Boeing 2007) and Landau's Preliminary Evaluation of Contingency Stormwater Treatment (Landau 2010) provide estimates of site flow. These could be used as guidelines.

- Revised estimates of the drainage areas for each of the SD lines could supplement the areas calculated by SPU.

For this interim report, the adjusted flow values as described above have been used. While these flows may be biased high, they represent a conservative estimate of flow to Slip 4 from the NBF-GTSP Site.

During base flow conditions, one lift station pump is activated for a period of 8 to 10 minutes to empty the underground storage area. Through October, the lift station was activated an average of twice per day on precipitation-free days. By late November through February, the lift station was activated 5 or 6 times per day on precipitation-free days.

During heavy precipitation, two or more pumps were activated to keep the storage area pumped down. Flows up to 2.5 m^3/s (40,000 gpm) were recorded with all four lift station pumps activated. The number of pumps running was determined from the water level data, as velocity did not increase much above 3 m/s (9.8 ft/s) regardless of the number of pumps in operation. During a precipitation event on October 17, all four pumps were activated sequentially, with water levels of 0.73 meter (29 inches) for four pumps, 0.62 meter (24 inches) for three pumps, 0.51 meter (20 inches) for two pumps, and 0.36 meter (14 inches) for one pump.

There was one period during which data were not collected. Between February 5 and February 19, 2010, flow data were measured but not logged due to instrumentation problems. The memory on the Isco unit had reached capacity. Rather than overwriting old data as it was programmed, the Isco stopped collecting data until it was rebooted on February 19.

MH108. The flow meter at MH108 was installed under a grated manhole cover, allowing stormwater to fall directly on the unit. The flow sensor cable has a hollow core that leads from the sensor to the flow meter, ending in a desiccant tube to remove atmospheric humidity. The first two precipitation events saturated the desiccant, allowing water to enter the hollow tube. Level measurements were impacted beginning October 2, 2009, when readings dropped to zero. A new dessicant tube was installed on October 12. By October 13, water level measurements stabilized at baseline levels. A protective cover was created for the flow meter to prevent this from happening again.

From the time of installation through November 6, the profile of velocity measurements between precipitation events varied. Some of the events had a plateau-like profile, where velocity increased as the rainfall began, and then remained constant even after rainfall had tapered off. This same profile was witnessed during the sampling of Event 3. Field staff checked the connection of the flow sensor cable to the flow meter and found corrosion at the connection. The

corrosion was believed to be caused by the moisture that entered the system due to the saturated dessicant.

The flow meter was removed on November 6 and sent to Isco for repairs. A loaner unit was installed at MH108 on November 12. The repaired unit was reinstalled December 22. Both the loaner and the repaired original units operated correctly except during Events 4 and 5. During these storm events, a plateau profile similar to that described above was seen in the velocity data. It is believed that interference from the effluent pump may have caused difficulties reading velocity. As a result of these problems, the velocity data logged during the collection of all five sample events was considered suspect.

Flow readings ranged from 0.003 m^3/s (during base flow conditions) to 0.17 m^3/s (48 to 2,700 gpm). Base flows should be regarded as estimates. The flow sensor has difficulty measuring low flow conditions at MH108 due to the clear water and low velocities present. Water levels in MH108 were between 0.1 and 0.15 meter (4 to 6 inches) for base flow conditions. During the largest precipitation events, water levels were as high as 0.7 meter (27 inches), nearly to the top of the 0.76-meter (30-inch) diameter drain.

On January 12, 2010, a water level of 1 meter was recorded. This date corresponds with a spill of jet fuel at King County Airport. The lift station was temporarily shut down, possibly causing disturbances farther upstream.

There was one period when data were not collected. Between January 21 and February 3, 2010, the battery was not connected correctly and the unit powered off.

3.1.3 Event Summaries

Each storm event was planned to meet criteria established by Ecology's Environmental Assessment Program's (EAP) standard operating procedures (SOPs) for stormwater monitoring (Ecology 2009).

A qualifying storm event was defined as follows:

- At least 3.8 mm (0.15 inch) of rainfall;
- Event duration of at least 5 hours;
- No more than 1 mm (0.04 inch) of rainfall during the preceding 24 hours;
- Sampling duration that includes at least 75% of the storm event hydrograph, or at least 75% of the first 24 hours of the storm if the storm lasted more than 24 hours;
- Collection of at least 10 sample aliquots, with a minimum volume of 200 mL.

Table 4 provides a summary of each sampling event with regard to the sampling criteria. As the table indicates, it was not always possible to meet these criteria. Sample analysis proceeded with approval from Ecology if the criteria were not met. Figures 4 through 8 show the storm hydrographs at LS431 and MH108 and the precipitation profile from KBFI/RG16 for each storm event. The total volume of flow at both locations and the total amount of precipitation are

included in the figure headings. As described in Section 3.1.2 above, total flow values at MH108 shown in Figures 3 through 7 are incorrect due to problems with the velocity measurements at that location.

Event 1 (Figure 4) did not have an antecedent dry period. As a result, only the final 50% of the storm hydrograph was sampled. The program at LS431 was initially set to collect 25 aliquots. A new program was set to collect the final four aliquots. Event 2 (Figure 5) also did not have a 24-hour antecedent dry period. The final 75% of the storm hydrograph was sampled.

All criteria were met at LS431 for Event 3 (Figure 6). Only eight aliquots were collected at MH108 due to the faulty velocity measurements. The filtration system was also turned off early (1:40 AM) at MH108 because the pressure at the inlet side of the filter housings was approaching the filter limit of 15 pounds per square inch (psi). The high pressure prevented larger SD solids from being pushed up the inlet tubing.

All criteria were met for Event 4 (Figure 7). No precipitation fell in the week preceding Event 4. During this time, a mat of filamentous growth believed to be caused by iron oxidizing bacteria accumulated in the submerged portion of the drain. The filtration system was turned on at 6:00 PM on December 14. After 3 hours, flow through the first set of filters had stopped. The filters were replaced with a second set, which ran until 4:45 AM on December 15.

The antecedent dry period was met for Event 5, and nearly 90% of the hydrograph was sampled (Figure 8).

3.2 Filtered Suspended Solids Sampling

Filtered suspended solids sampling results from MH108 and LS431 are summarized in Tables 5 and 6, respectively. Included in each table are the mass of solids from each filter bag, the flow through each totalizer, and the total flow of stormwater at each location. Laboratory data summaries are available in Appendix D.

The total flow of stormwater at LS431 was taken from Figures 4 through 8. The total flow of stormwater at MH108 for each event was calculated from a regression of flow versus precipitation collected from storms with correct velocity readings (Figure 9). This relationship between precipitation and flow was created using data from two separate flow meters. The r-square of 0.978 suggests that both units were consistent over time.

Two measures of filtered solids mass are included in the tables. “Total extracted solids” represents the dried mass of the sample filter (after wet weight splits were removed for grain size and metals) minus the pre-weighed mass of the filter. In other words, total extracted solids are the mass of material extracted for PCB Aroclor and dioxin/furan congener analysis. “Estimated total solids” represents the total extracted solids mass plus an assumed dry weight of the grain size and metals splits. Total suspended solids (TSS) is the estimated total solids mass divided by flow through the totalizer.

TSS at MH108 ranged between 0.8 and 2.4 milligrams per liter (mg/L), with one outlier of 22.2 mg/L occurring with the first filter bag sampled on December 14, 2009, from Event 4. This first

bag sampled the filamentous growth described in Section 3.1.3. Excluding this December 14 filter, TSS averaged 1.2 mg/L at MH108.

TSS at LS431 ranged between 2 and 6.8 mg/L, with an average of 3.4 mg/L. The difference in TSS concentrations between locations suggests that MH108 is not the primary contributor of TSS relative to the other SD lines.

Figure 10 shows the relationship between grain size fractions from Events 1 through 4. Grain size was not measured during Event 5, or in the second filter from Event 4 at MH108.

At MH108, Event 4 had the highest percentage of clays and total fines measured in any of the storm events. Most of this fine material is likely due to the iron growth in the storm drain. Events 1 through 3 are similar at MH108. The gravel fraction averaged 8.2 ± 1.1%, sand averaged 47.3 ± 5.4%, and total fines averaged 44.5 ± 5.9%.

There were larger differences between the first three events at LS431. Events 1 and 3 had similar amounts of sand at 78.3% and 78.8%, respectively. Total fines were 18.1% and 13.8% for the same events. Event 2 had higher amounts of total fines (52.9%) than sand (43.7%). Stormwater flows during Event 2 were lower than that during Events 1 and 3 (Table 6).

Metals results were compared to the Washington State Sediment Management Standards (SMS) numeric Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL) criteria (Washington Administrative Code [WAC] 173-204). PCBs and PAHs were compared to the lowest apparent effects threshold (LAET) and the second lowest AET (2LAET) (Barrick et al. 1988). The LAET and 2LAET are functionally equivalent to the SMS/CSL values, but are not organic carbon normalized. Collection of total organic carbon data (TOC) from the filters was not possible due to interference from the organic polypropylene filter bag.

All metals were analyzed for Events 1 through 4 at MH108. Only mercury was analyzed for Event 5. Five metals were detected at levels that exceeded the SQS or CSL. Zinc exceeded one or both of these criteria in all events, with concentrations ranging from 785 milligrams per kilogram (mg/kg) to 1,510 mg/kg. Cadmium exceeded the CSL in Events 1, 3, and the first filter from Event 4. It exceeded the SQS in the second filter from Event 4. Mercury concentrations were above the SQS in Event 2 and the first filter from Event 4, with concentrations of 0.5 and 0.7 mg/kg, respectively. Mercury exceeded the CSL in the second filter from Event 4 with a concentration of 2.67 mg/kg. Copper exceeded the CSL and lead exceeded the SQS in the second filter from Event 4. These two metals did not exceed the criteria in any other events.

Zinc exceeded one or both criteria in all five events at LS431, with concentrations ranging from 430 mg/kg to 1,200 mg/kg. Cadmium exceeded the SQS in Events 1 and 4, and the CSL in Event 3. Mercury exceeded the CSL in Event 2, with a concentration of 2 mg/kg.

Metals concentrations were higher at MH108 than LS431 for Events 1 and 4, but similar between the two locations for Events 2 and 3. For Event 1, all metals were 2.2 to 3.1 times higher in MH108 than LS431. For Event 2, the ratio of metals at MH108 to LS431 ranged between 0.2 and 2.1.

PCB concentrations were reported as micrograms (µg)/filter and converted to µg/kg by dividing by the mass of total extracted solids. Total PCBs were calculated as the sum of detected Aroclors

1221, 1232, 1242, 1016, 1248, 1254, and 1260. Total PCBs exceeded the LAET or 2LAET in all events sampled at MH108 and LS431. Concentrations were from 3.1 to 6.4 times higher at MH108 than LS431. Total PCBs at MH108 averaged 6,400 µg/kg and ranged from 2,200 to 18,000 µg/kg. Total PCBs at LS431 averaged 1,500 µg/kg and ranged from 650 to 2,800 µg/kg at LS431. The highest concentrations at both locations occurred during Event 5 (Tables 5 and 6).

PAHs were measured in filters from Event 3. Concentrations were reported as µg/filter wet weight and converted to µg/kg dry weight by dividing by the estimated total solids from the PCB filter. All of the high molecular weight PAHs (HPAHs) exceeded the LAET or 2LAET in the sample from LS431. All except benzo(a)anthracene exceeded the criteria at MH108. Low molecular weight PAHs (LPAHs) were detected at lower concentrations, with only phenanthrene exceeding the LAET. Overall, concentrations of PAHs were slightly higher at LS431 than MH108, suggesting a potential source other than the north SD line.

Dioxin/furan congeners were analyzed from Events 2 and 4. Concentrations of each congener were normalized to the toxicity of 2,3,7,8-TCDD (tetrachlorodibenzodioxin) using toxic equivalency factors (TEFs) updated by the World Health Organization (WHO) in 2005 (Van den Berg et al. 2006). The toxic equivalent quotient (TEQ) is equal to the sum of the concentrations of individual congeners multiplied by their TEF. Though all congeners were detected, TEQ values are reported as 0 and ½ times the method detection limits.

TEQ concentrations between Event 2 and 4 at MH108 were similar, at 144 and 157 picograms (pg) TEQ/g, respectively. There were larger differences between the Event 2 and 4 concentrations at LS431. TEQ concentrations for Event 2 were 67.5 pg TEQ/g, while those for Event 4 were 26.3 pg TEQ/g. The difference in concentration between locations suggests that the north SD line may be the primary source of dioxin/furan congeners to Slip 4.

3.3 Whole Water Sampling

Whole water sampling results from MH108 and LS431 are summarized in Tables 7 and 8, respectively. Concentrations are compared to the lower of the marine water or freshwater criteria (WAC 173-201A-240). Contaminants lacking marine or freshwater criteria are compared to the human health water quality criteria for consumption of organisms (HHO) (USEPA 2006). Laboratory data summaries are presented in Appendix D.

Conventional parameters including pH, alkalinity, hardness, TSS, chloride, nitrate, sulfate, dissolved organic carbon (DOC) and TOC were measured in each of the whole water samples. The pH was slightly higher at LS431, though both locations were close to neutral. Correspondingly, alkalinity was higher at LS431. TSS averaged 18.8 mg/L at MH108 and 21.5 mg/L at LS431. The whole water measurements of TSS were higher than those measured by the filtered suspended solids samplers. This may be at least partially explained by the different filter pore sizes used for TSS measurements in whole water and filtered solids. Filtered suspended solids were sampled using a 5-micron filter, while ARI measured whole water TSS using a 0.45-micron filter. Pump efficiencies over the duration of the storm event may also have played a role in the differing TSS concentrations. The peristaltic pump on the Isco unit sampled occasionally at a constant rate. The effluent pump on the filtration system sampled continuously at a rate that decreased as the filter accumulated solids.

DOC ranged between 3.3 and 30.0 mg/L at both sites. TOC ranged between 3.5 and 31.8 mg/L at both sites. The highest concentration for both DOC and TOC occurred during Event 3.

Total and dissolved concentrations of copper exceeded the marine water quality criterion of 3.1 µg/L at MH108 for all events. Total copper was consistently higher than dissolved (Table 7). Total copper averaged 12.2 µg/L, while dissolved copper concentrations averaged 5.5 µg/L. The highest concentrations of total copper were detected during Events 2 and 3. Total copper exceeded the marine water quality criterion in all events at LS431, with an average concentration of 9.3 µg/L. Dissolved copper exceeded the criterion for Events 1 and 2, with concentrations of 3.6 and 3.4 µg/L, respectively.

Total zinc concentrations exceeded the marine water quality criterion for Events 3 and 4 at both locations. Total lead exceeded the marine water quality criterion at LS431 for Event 3, with a concentration of 13 µg/L.

PCBs were detected in all samples from MH108. Total PCB concentrations ranged from 0.016 to 0.054 µg/L with an average of 0.033 µg/L. Total PCBs in all events exceeded the freshwater criterion of 0.014 µg/L. PCBs were detected at LS431 during Events 3 through 5, but only Events 3 and 4 exceeded the criterion. Total PCBs were higher at MH108 than at LS431 for all but Event 3. During Event 3, total PCBs at MH108 were 0.036 µg/L, while concentrations at LS431 were 0.037 µg/L.

Several PAHs, including benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene, have a water quality criterion (HHO) of 0.018 µg/L. Measured concentrations for each of these PAHs exceeded this criterion in Events 1 through 4 at LS431. All but benzo(a)anthracene and dibenz(a,h)anthracene exceeded this criterion in Event 5. Concentrations of PAHs of were typically 50 percent higher at LS431 than MH108, with the exception of Event 3, where this pattern was reversed (Tables 7 and 8).

Additional semi-volatile organic compounds were analyzed, but seldom detected. Diethylphthalate was detected at MH108 during Event 5. Bis(2-ethylhexyl)phthalate was detected at MH108 during Events 1 and 4, with an exceedance of the water quality criterion during Event 4. Di-n-octyl phthalate and bis(2-ethylhexyl)phthalate were detected at LS431 during Event 3. Bis(2-ethylhexyl)phthalate was also detected during Event 5.

Pesticides were included for analysis as part of Events 1 and 2, but none were detected. They were excluded from the remaining events.

Most of the volatile organic compounds analyzed were undetected. However, three compounds were found in nearly all samples. Methylene chloride, acetone, and 2-butanone were detected at varying concentrations during Events 1 through 5. Acetone had the largest variation in concentration, ranging from 1,600 µg/L in Event 4 to undetected in Event 5. Although these compounds were detected in blank samples, the sample data were determined to be valid during data validation (Section 5.0). However, all of these compounds are believed to be common constituents of the paint products used at NBF.

4.0 Data Comparison

Previous SD solids samples have been collected at structures in the vicinity of both locations. Collected sample types include sediment traps, grab samples, and filtered solids. This section presents a comparison of SD solids results between the current stormwater study and previously collected data. Only SD solids are compared. Further evaluation of whole water samples will be conducted after completion of the expanded stormwater sampling at NBF (currently in progress).

Figure 3 shows the sampling locations used in this comparison. CB363 is the last structure on the north SD line before it joins the north-central line. MH422 is near the downstream end of the north-central line, and combines stormwater flow from the north, north-central, and Building 3-380 drain lines. Sediment trap results from CB363 (SL4-T1) were compared with Event 1 through 5 filter results at MH108. Sediment trap results at MH422 (SL4-T5) were compared with Event 1 through 5 filter results at LS431. Sediment trap data from the April 8, 2010, traps were used in both comparisons.

Figure 11 shows results for total PCBs along with reference lines for the LAET and 2LAET values. Trap SL4-T5 had a total PCB concentration of 2,550 µg/kg, which was comparable to Event 1 at MH108. Other events sampled at MH108 had PCB concentrations ranging from 1.2 to 7 times higher than the T5 sediment trap. Trap SL4-T1 had a concentration of 3,950 µg/kg. Concentrations for the five filtered solids events at LS431 ranged between 650 and 2,800 µg/kg. LS431 has inputs from all SD lines, whereas only two lines flow over the SL4-T1 sediment trap. Total PCBs exceeded the LAET in all samples listed on Figure 11, and exceeded the 2LAET in all but Events 1 and 4 at LS431.

Figure 12 shows HPAH concentrations for traps T5 and T1 and filtered solids during Event 3. Both sediment traps had similar concentrations at 43,900 µg/kg at T5 and 44,700 µg/kg at T1. Sediment trap concentrations were higher than the filtered solids samples by nearly 50 percent. HPAH concentrations were 24,000 µg/kg at MH108 and 30,000 µg/kg at LS431.

Mercury concentrations in the sediment traps were 0.34 mg/kg for T5 and 0.36 mg/kg for T1 (Figure 13). Concentrations in both sediment traps were within the range of concentrations found in the filtered solids.

5.0 Quality Assurance/Quality Control

A Level IV data validation was performed by EcoChem, Inc. of Seattle, WA, on all analytical results with the exception of the PAH filters analyzed in Event 3. These filters will be validated with the filters analyzed as part of expanded stormwater sampling (currently in progress). The data validation report is available in Appendix E.

All reported results are considered valid. A subset of metals data from Events 1 and 2 were rejected. Initially, whole water metals were analyzed using method SW6010B. The reporting limits outlined in the SAP/QAPP (SAIC 2009a) could not be met by this method. These metals were reanalyzed using method EPA 200.8. The metals analyzed by SW6010 were rejected with the reason code indicating a more appropriate result is reported elsewhere.

Quality assurance/quality control (QA/QC) samples were analyzed and reviewed as part of the data validation. Prior to sampling, blank filters and rinseate blanks were analyzed to provide a quality control check on the potential for contamination from sampling equipment. Two blank filters were analyzed for metals and PCBs, none of which were detected. An equipment rinseate was collected by running de-ionized water through the LS431 filtration system. No PCBs were detected, but chromium, copper, lead, and zinc were detected at concentrations ranging from 0.005 to 0.02 µg/L. All results for these metals that were detected in the sampling events were greater than the action level of five times the blank concentration. No qualification of data was necessary.

An equipment rinseate blank was collected from the LS431 Isco sampler. There were positive results for methylene chloride, acetone, chloroform, 2-butanone, and toluene in this sample. Prior to collection of the rinseate sample, a chemical paint stripper was used in the storage warehouse. The paint stripper was believed to contribute the detected volatile organic compounds (VOCs) in the rinseate sample. The rinseate was collected several days prior to installation, and nearly four weeks prior to collection of the first stormwater sample. It is believed that any VOCs associated with the sampling unit would have volatilized during this period. Based on this assumption, no sample VOCs were qualified as a result of the rinseate blank.

The same VOCs detected in the rinseate were also detected in subsequent sampling events at varying levels. To test whether the Isco unit may be the source, grab samples were collected at MH108 and LS431 during Event 3 and analyzed for 2-butanone. 2-butanone was detected in both Isco samples, but not in the grab samples. Further evaluation is needed to determine the source of these VOCs.

Additional whole water sample volume from Event 5 at MH108 was analyzed as a field duplicate. While not a true field duplicate, this duplicate does serve as a measure of laboratory precision. Except for nickel and DOC, all relative percent differences (RPD) between the sample and duplicate were under 20%.

6.0 References

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Figures

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Figure 1. Rain Gauge Locations Near North Boeing Field

0 500 1,000 2,000 Feet

DEPARTMENT OF ECOLOGY State of Washington

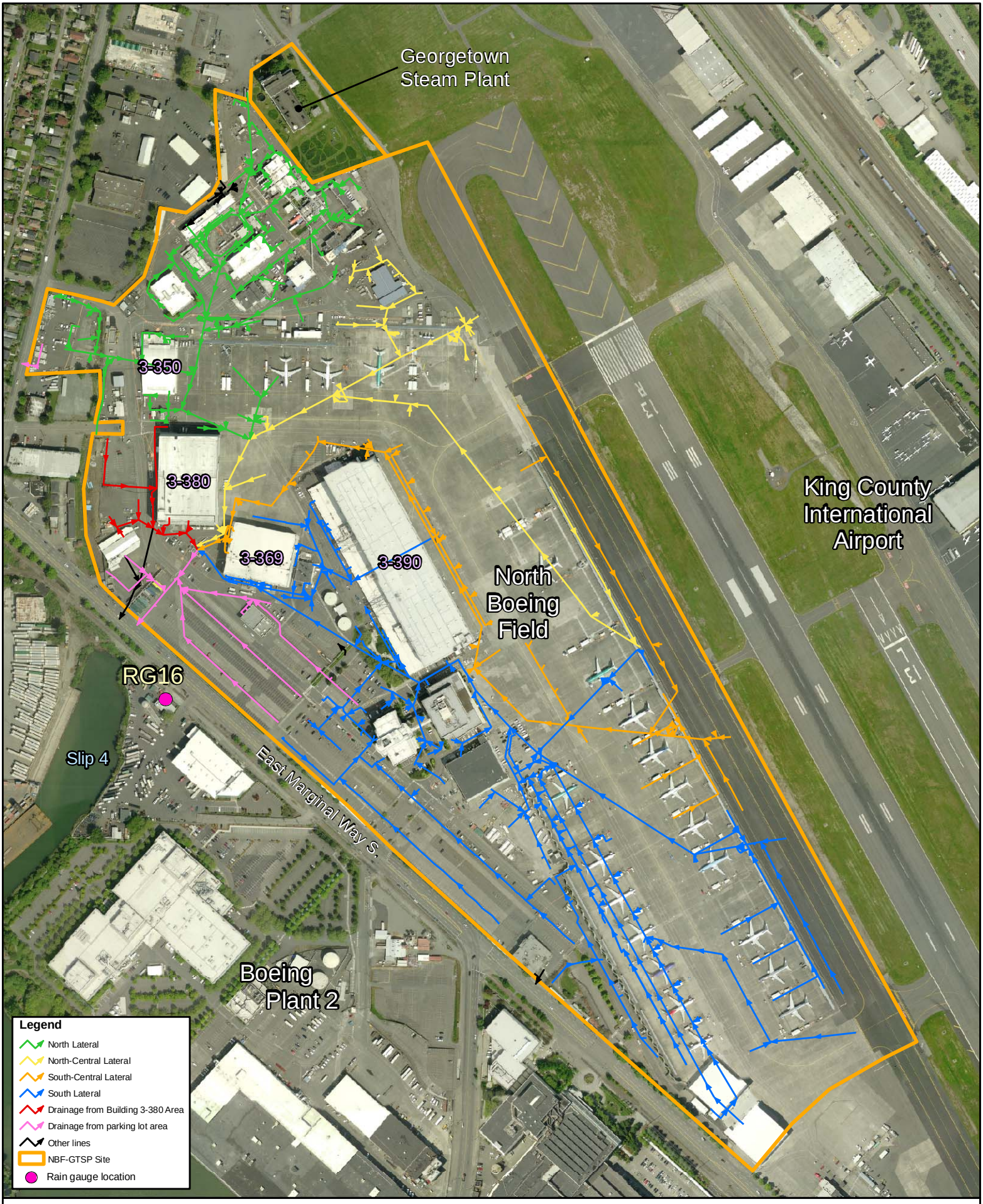

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Figure 2. NBF-GTSP Site

0 300 600 1,200 Feet

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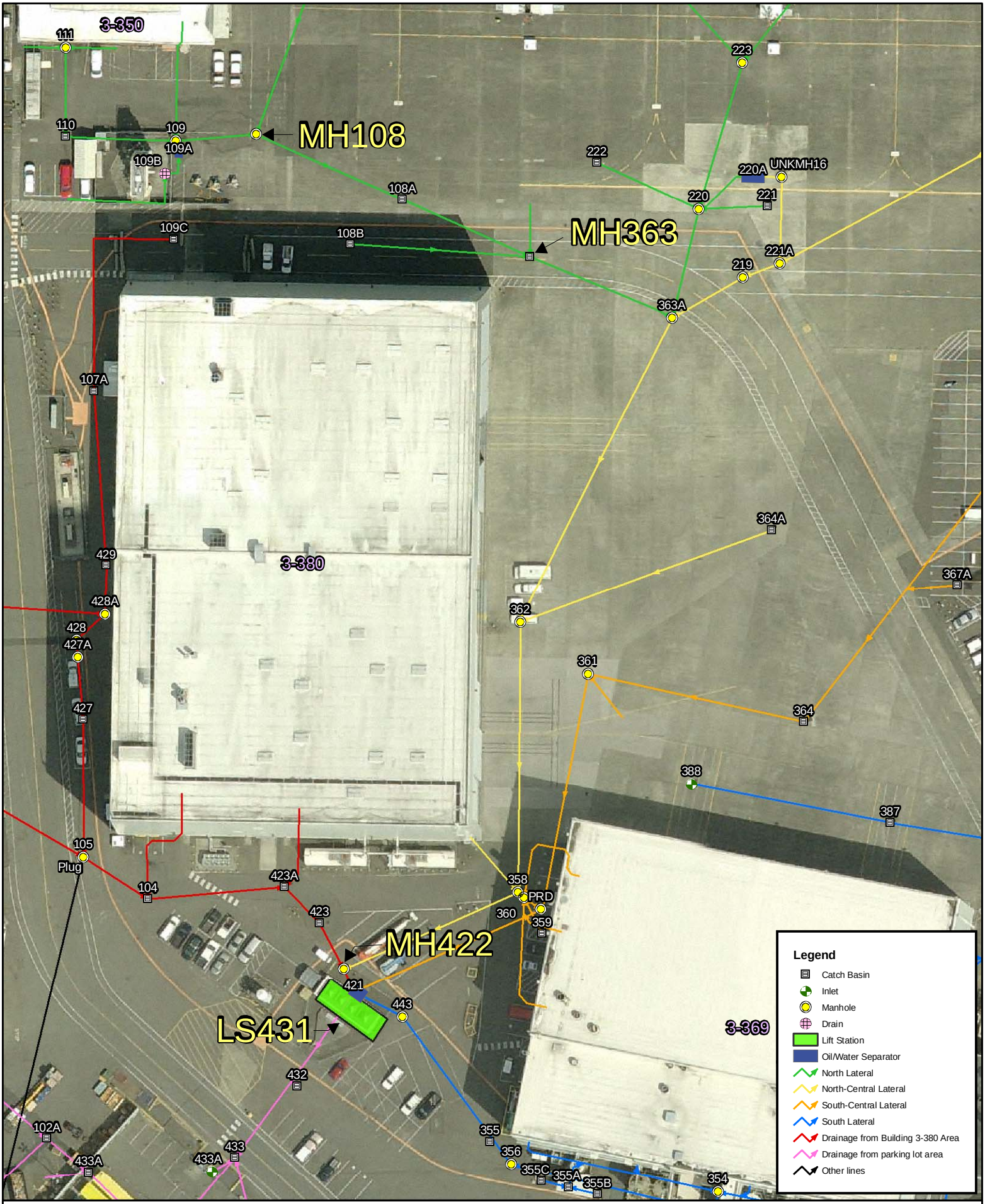

Figure 3. Locations of LS431 and MH108 Relative to the NBF Storm Drain Lines

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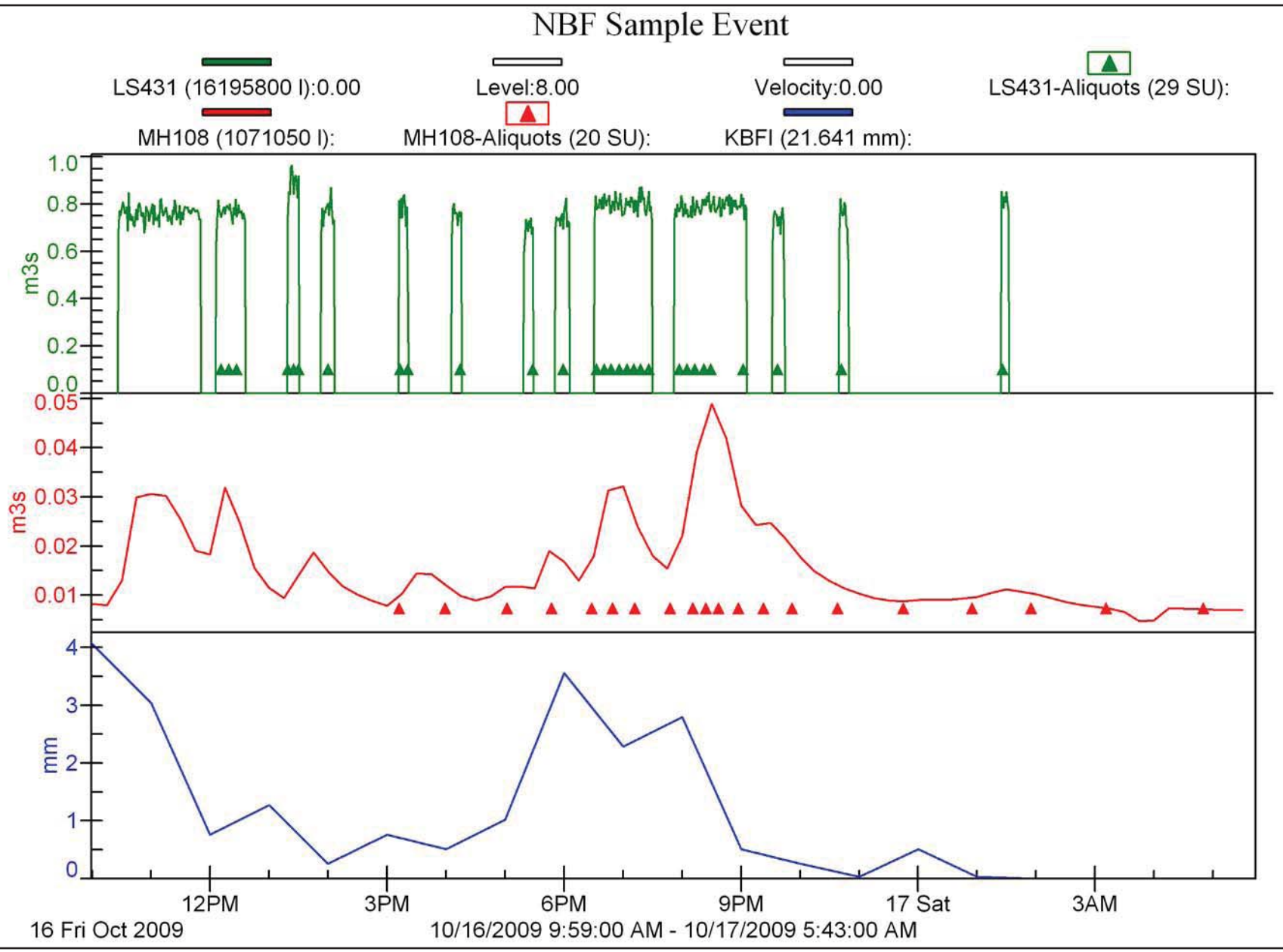

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Figure 4. Storm Hydrograph and Precipitation for Event 1

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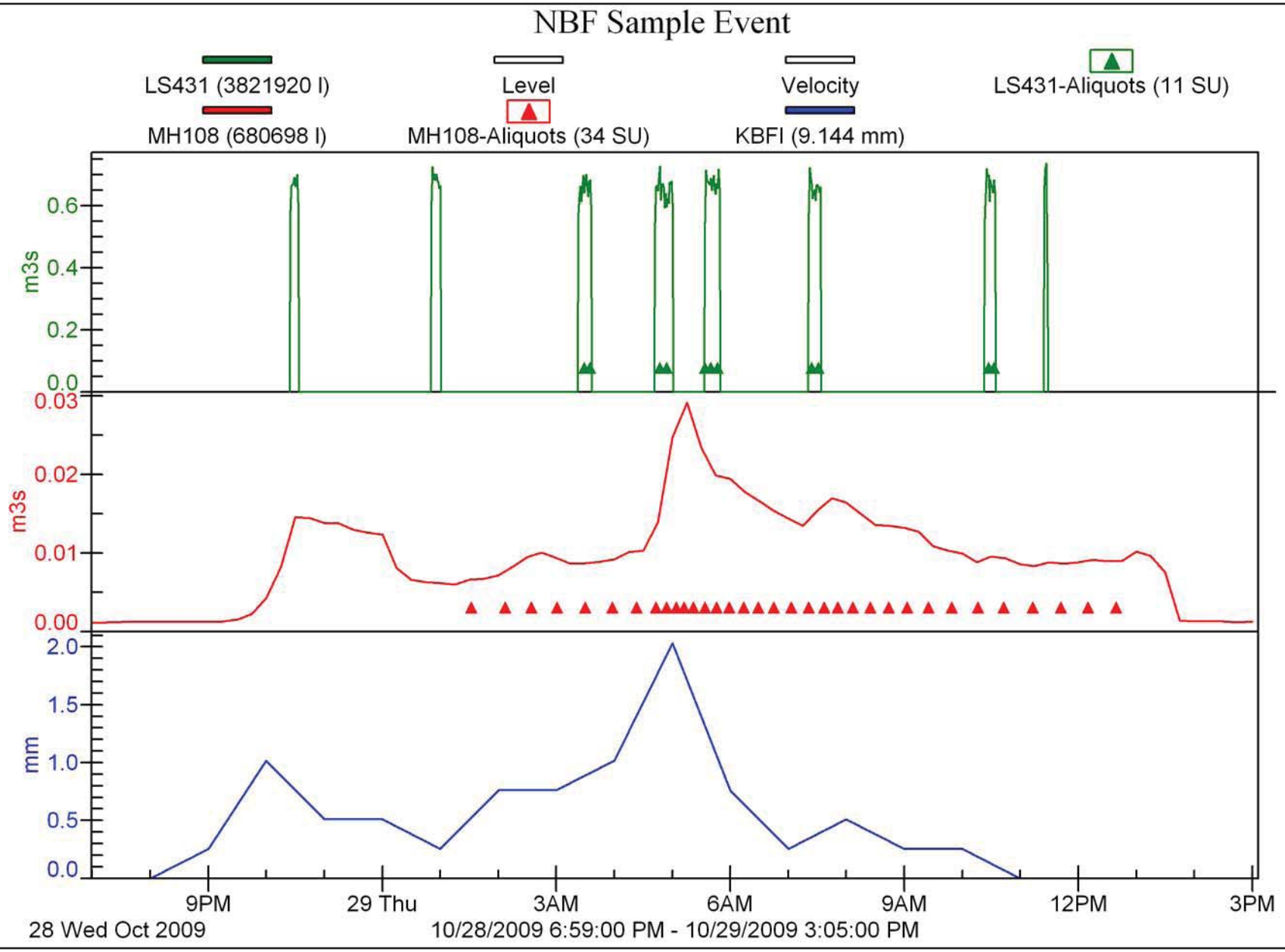

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Figure 5. Storm Hydrograph and Precipitation for Event 2

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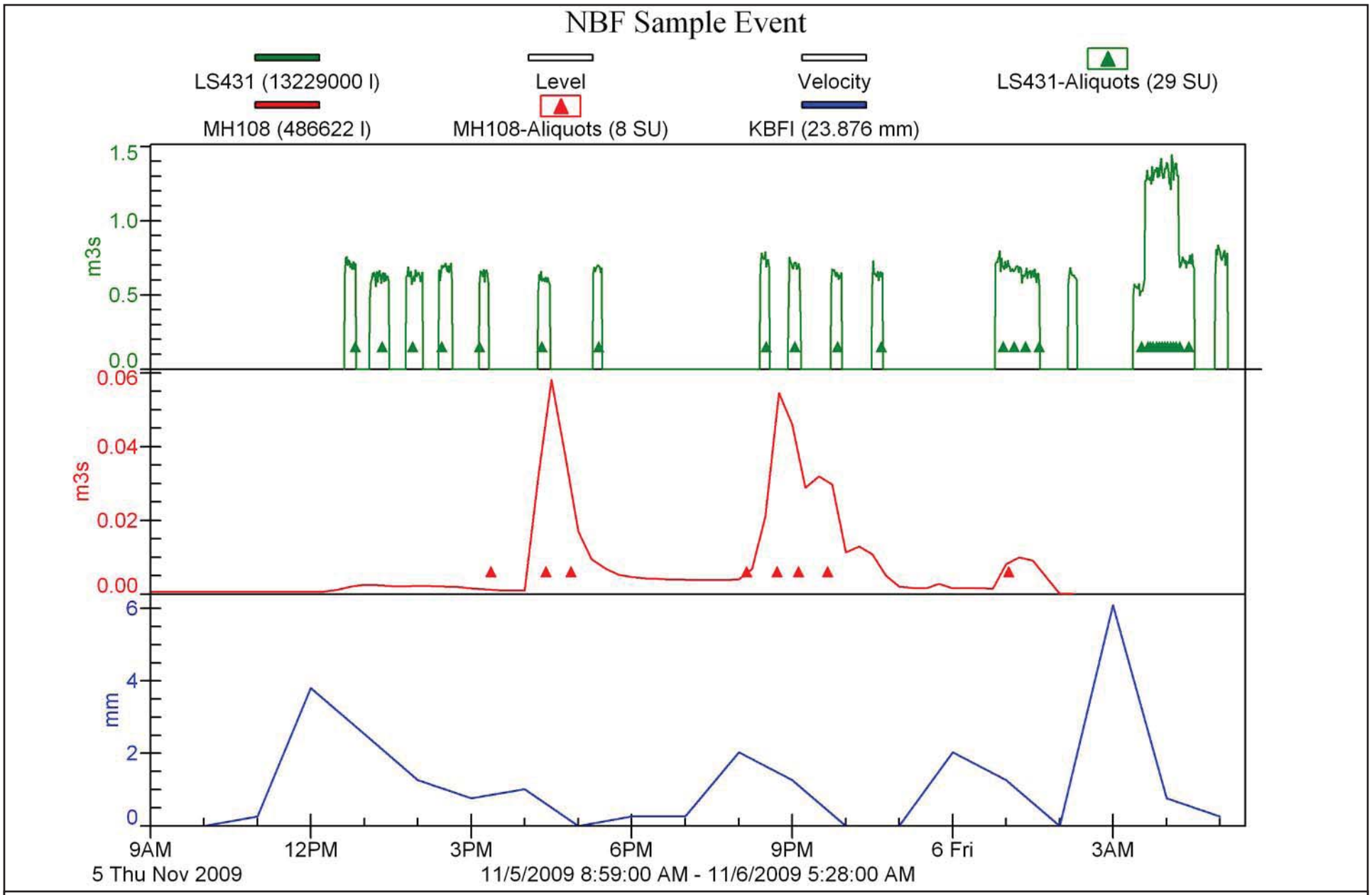

Figure 6. Storm Hydrograph and Precipitation for Event 3

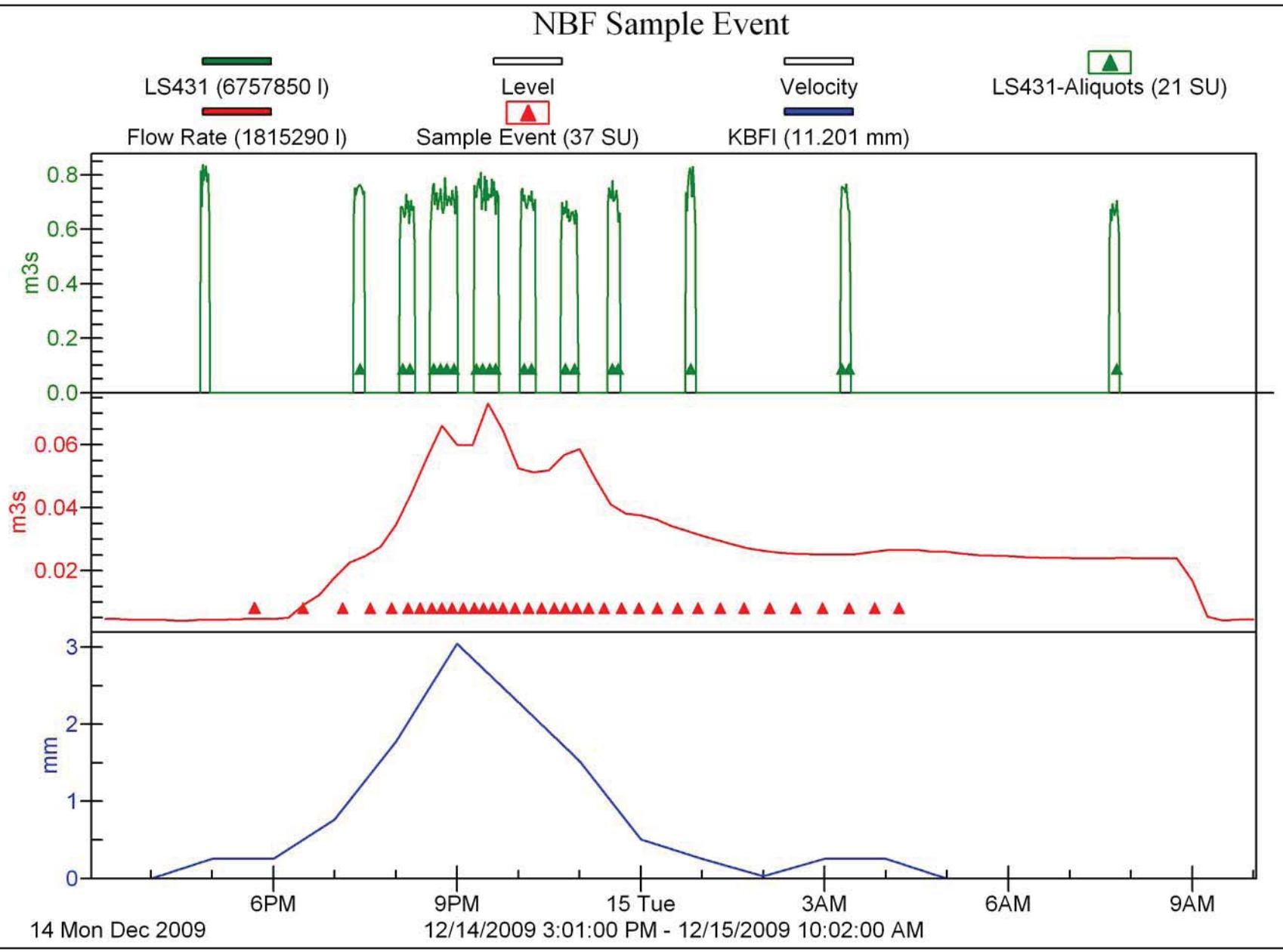

Figure 7. Storm Hydrograph and Precipitation for Event 4

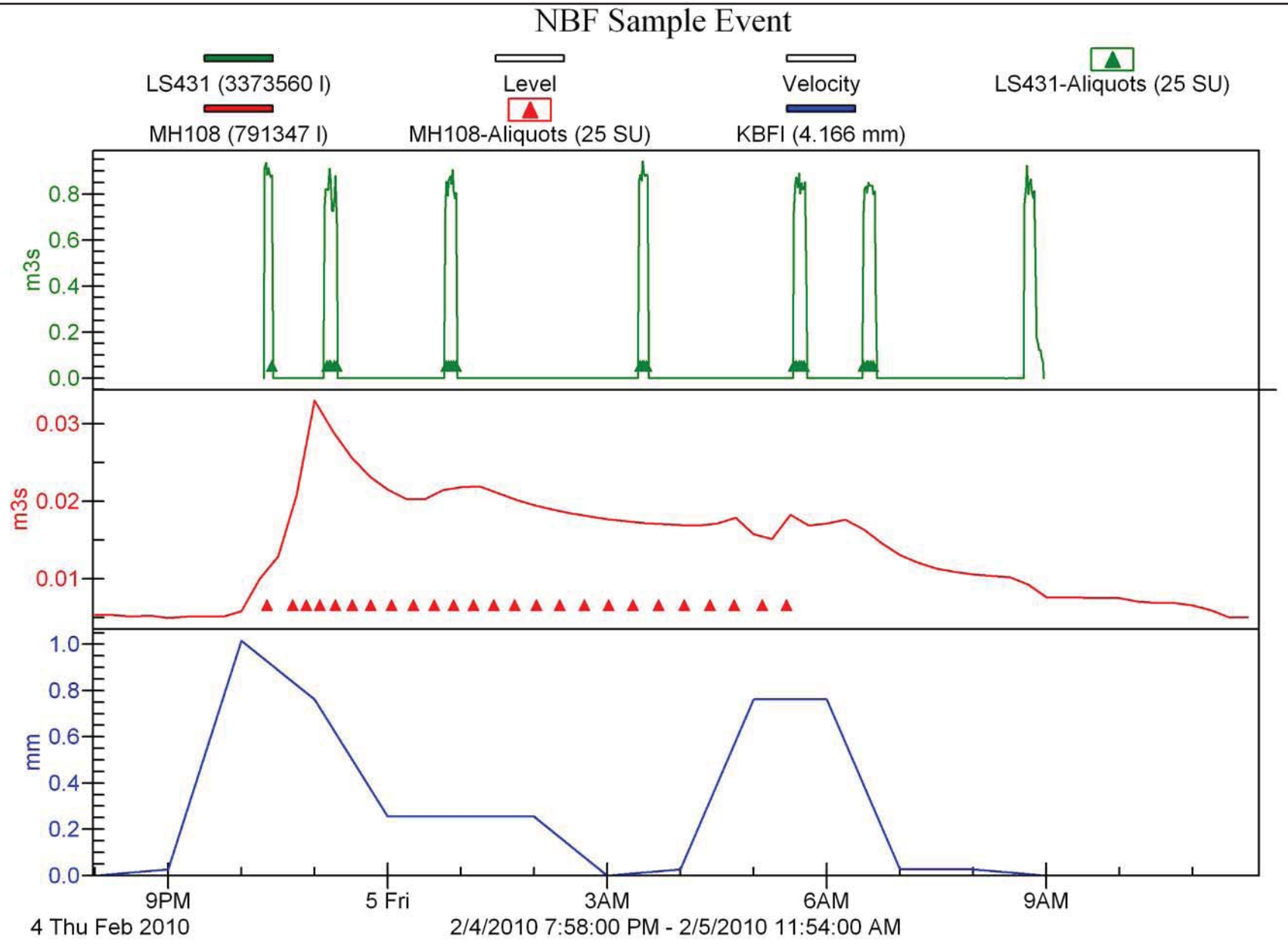

Figure 8. Storm Hydrograph and Precipitation for Event 5

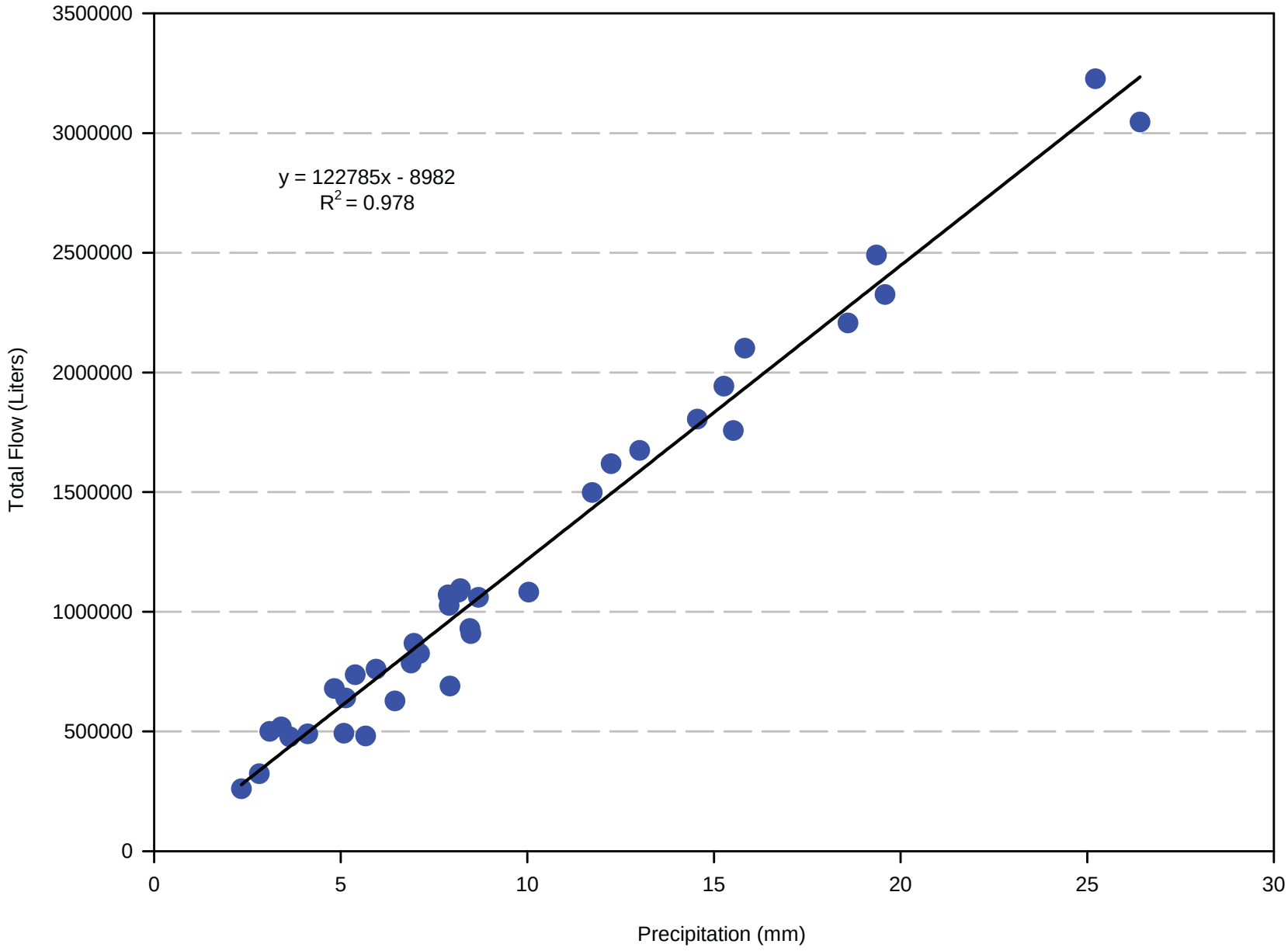

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Figure 9. MH108 Regression

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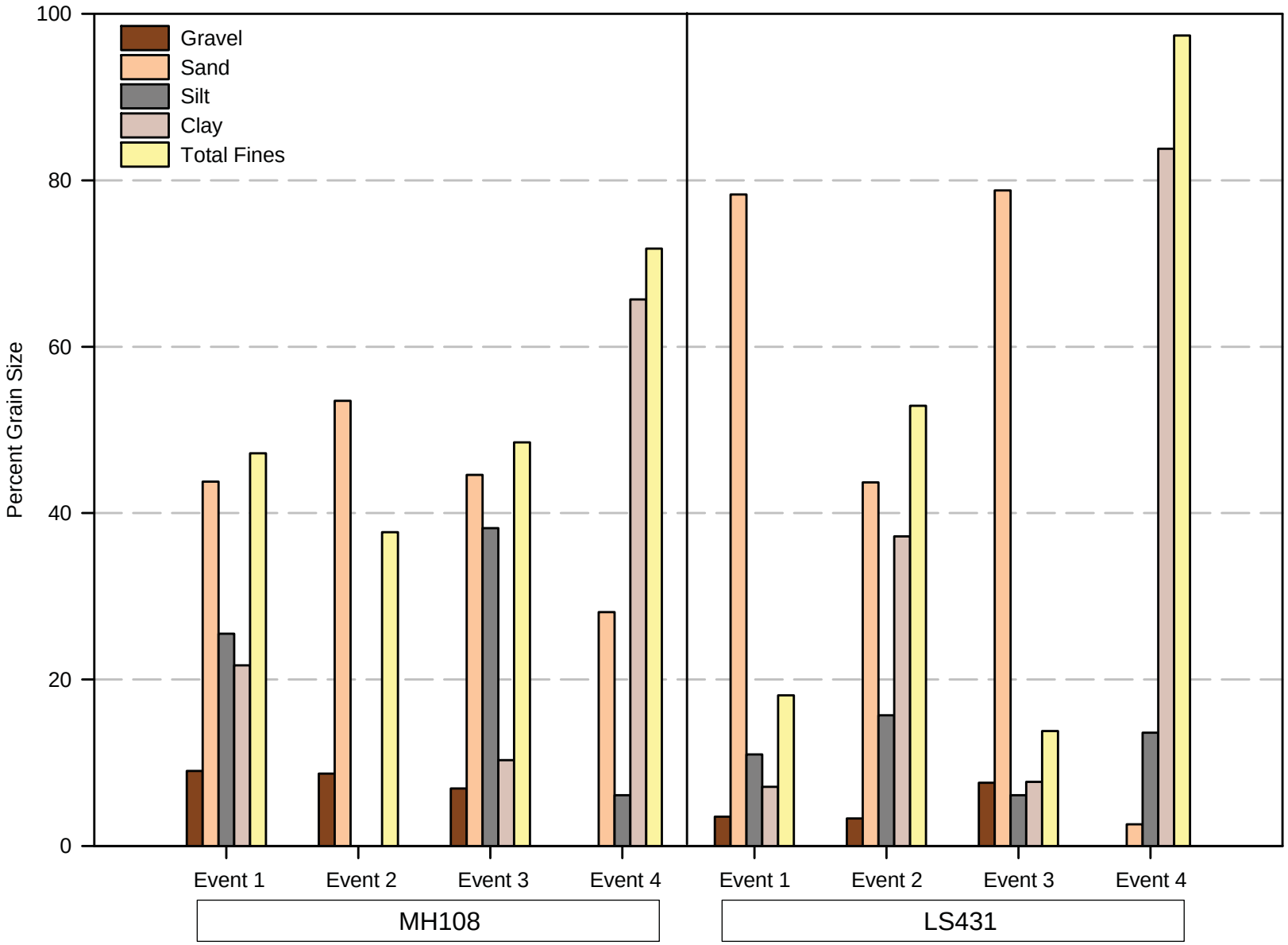

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Figure 10. Grain Size Distribution for Events 1 through 4

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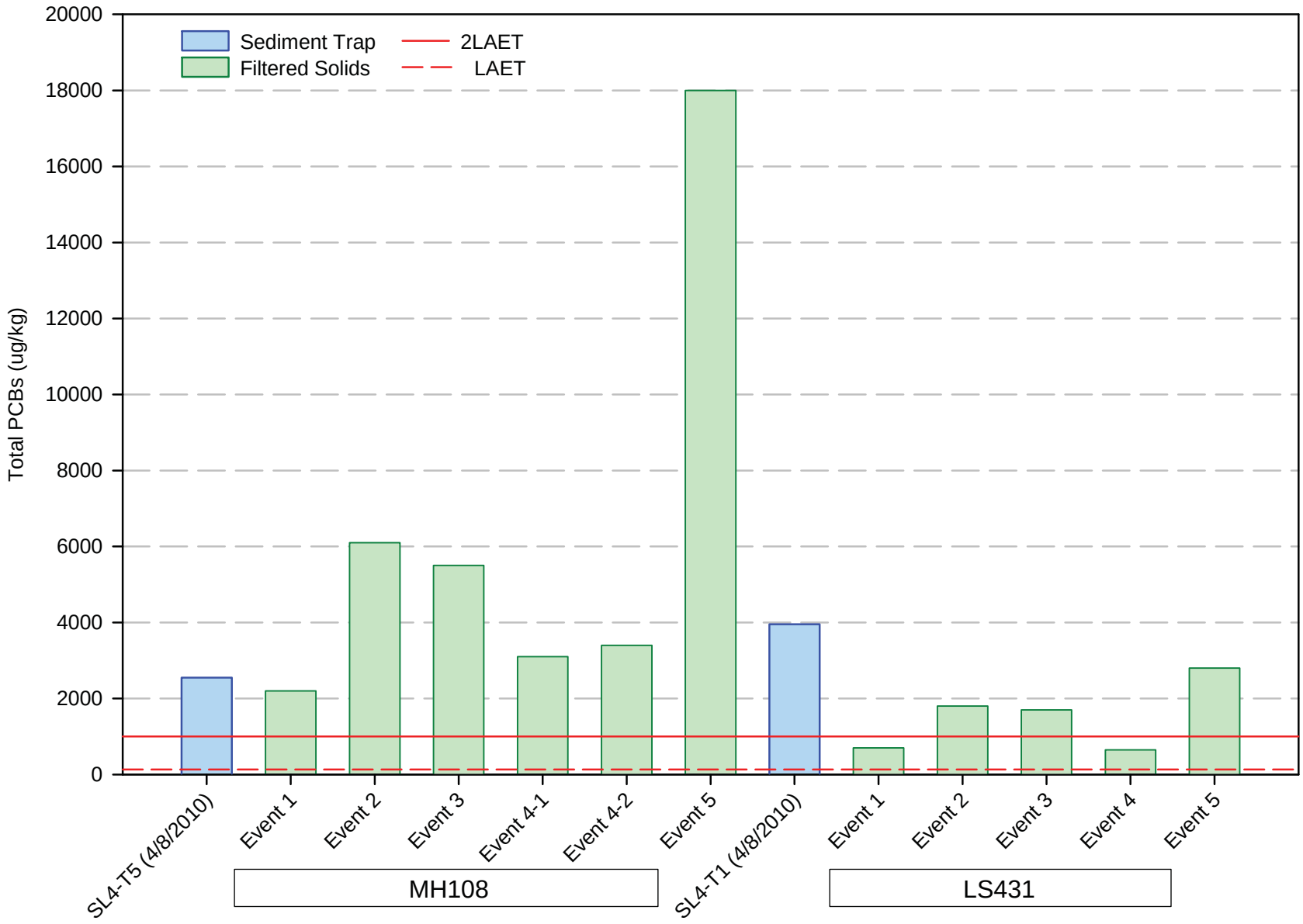

Figure 11. Summary of Data Results for Total PCBs

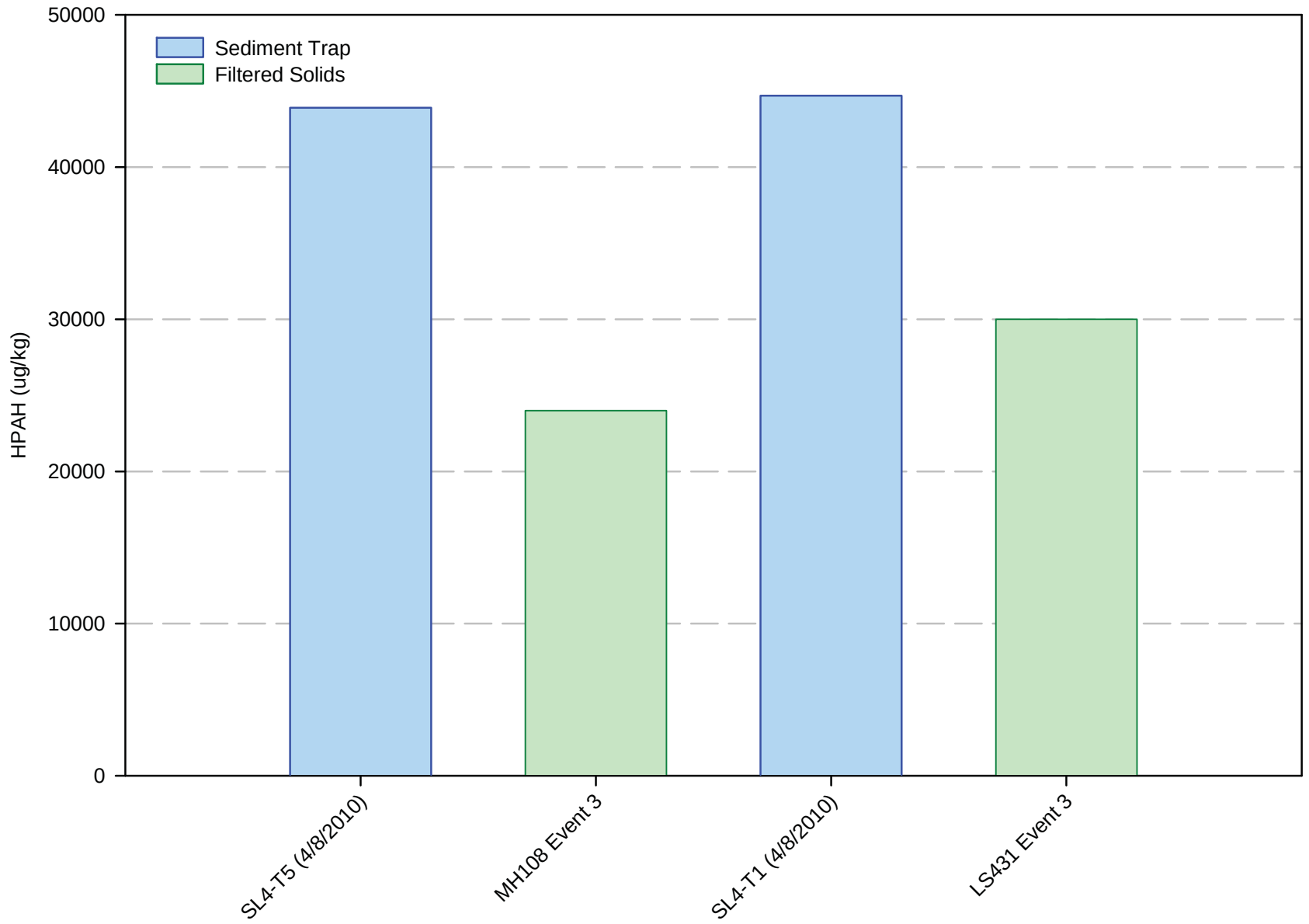

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Figure 12. Summary of Data Results for HPAHs

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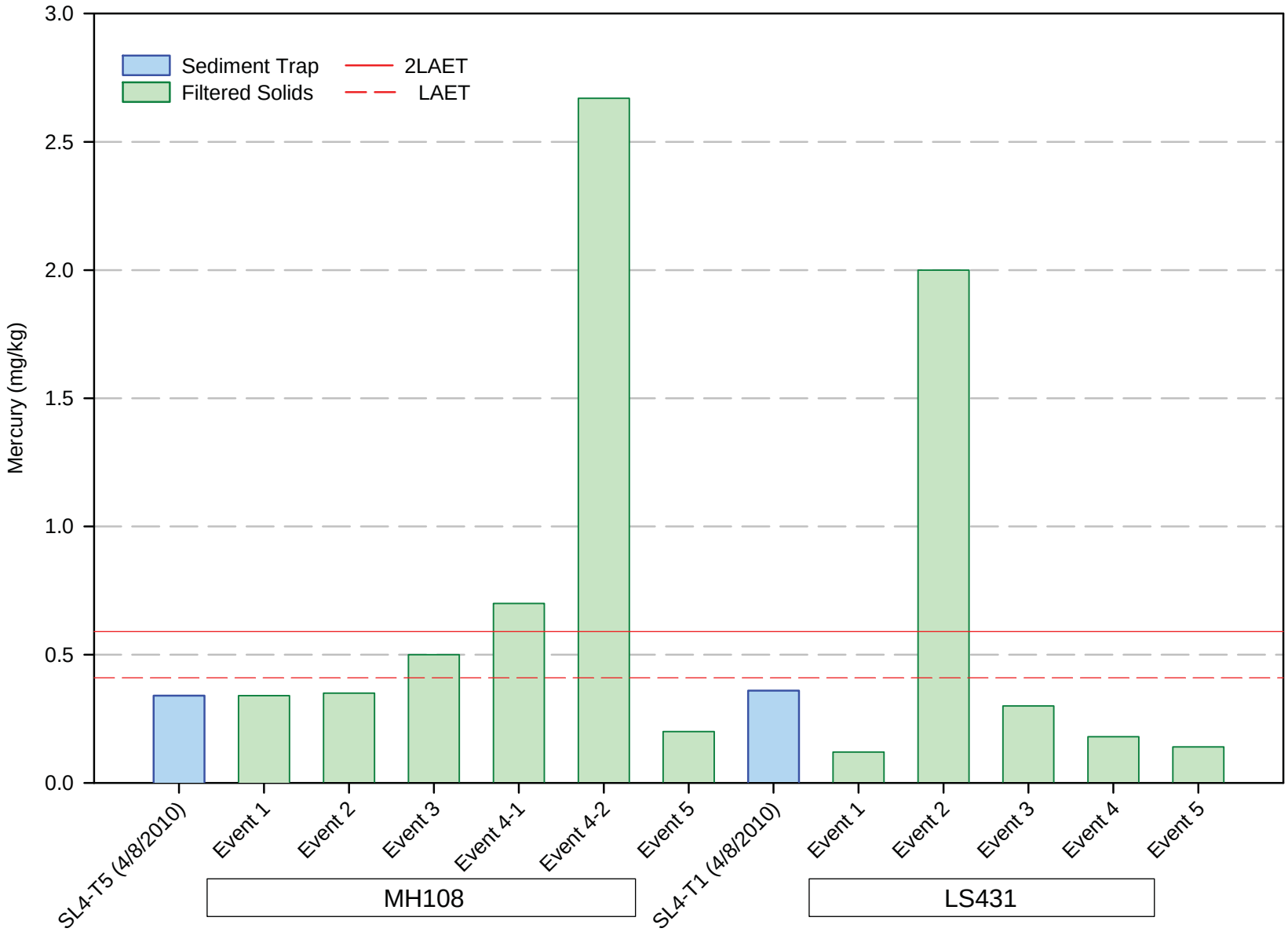

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Figure 13. Summary of Data Results for Mercury

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Tables

Table 1
Stormwater Sampling Event Start and End Times

		Start		End	
		Date	Time	Date	Time
Event 1	MH108	10/16/2009	1:45 PM	10/17/2009	5:00 AM
	LS431	10/16/2009	12:00 PM	10/17/2009	6:00 AM
Event 2	MH108	10/29/2009	1:00 AM	10/29/2009	12:45 PM
	LS431	10/29/2009	2:00 AM	10/29/2009	2:00 PM
Event 3	MH108	11/5/2009	10:00 AM	11/6/2009	1:45 AM
	LS431	11/5/2009	10:35 AM	11/6/2009	3:45 AM
Event 4	MH108	12/14/2009	6:00 PM	12/14/2009	8:55 PM
	MH108	12/14/2009	9:50 PM	12/15/2009	4:45 AM
	LS431	12/14/2009	6:30 PM	12/15/2009	8:30 AM
Event 5	MH108	2/4/2010	9:20 PM	2/5/2010	10:45 AM
	LS431	2/4/2010	8:30 PM	2/5/2010	10:45 AM

Table 2
Chemical and Physical Analysis of NBF-GTSP Filtered Solids Samples

Sample ID	Date Sampled	Grain Size	PAHs	PCB Aroclors	Metals + Mercury	Mercury	Dioxin/ Furan Congeners	Archive
MH108A-101709-S	10/17/2009	X		X	X			
MH108B-101709-S	10/17/2009							X
LS431A-101709-S	10/17/2009	X		X	X			
LS431B-101709-S	10/17/2009							X
MH108A-102909-S	10/29/2009	X		X	X			
MH108B-102909-S	10/29/2009						X	
LS431A-102909-S	10/29/2009	X		X	X			
LS431B-102909-S	10/29/2009						X	
MH108A-110609-S	11/6/2009	X		X	X			
MH108B-110609-S	11/6/2009		X					
LS431A-110609-S	11/6/2009	X		X	X			
LS431B-110609-S	11/6/2009		X					
MH108A-121409-S	12/14/2009	X		X	X			
MH108B-121409-S	12/14/2009							X
MH108A-121509-S	12/15/2009			X	X			
MH108B-121509-S	12/15/2009						X	
LS431A-121509-S	12/15/2009	X		X	X			
LS431B-121509-S	12/15/2009						X	
MH108A-020510-S	2/5/2010			X		X		
MH108B-020510-S	2/5/2010							X
LS431A-020510-S	2/5/2010			X	X			
LS431B-020510-S	2/5/2010							X

Table 3
Chemical and Physical Analysis of NBF-GTSP Whole Water Samples

Sample ID	Date Sampled	Conv.[1]	VOCs	SVOCs	SVOC (SIM)	Low Level PCB Aroclors	Total and Dissolved Metals + Mercury	Pesticides
MH108-101709-W	10/17/2009	X	X	X	X	X	X	X
LS431-101709-W	10/17/2009	X	X	X	X	X	X	X
MH108-102909-W	10/29/2009	X	X	X	X	X	X	X
LS431-102909-W	10/29/2009	X	X	X	X	X	X	X
MH108-110609-W	11/6/2009	X	X		X	X	X	
LS431-110609-W	11/6/2009	X	X	X	X	X	X	
MH108-121509-W	12/15/2009	X	X	X	X	X	X	
LS431-121509-W	12/15/2009	X	X	X	X	X	X	
MH108-020510-W	2/5/2010	X	X	X	X	X	X	
LS431-020510-W	2/5/2010	X	X	X	X	X	X	

1. Conventionals analysis consists of hardness, pH, alkalinity, anions, TOC, DOC, and TSS.

Table 4
Comparison of Sampled Events and Storm Criteria

Event	Precipitation in preceding 24 hours (mm)	Total Precipitation	Percent of storm hydrograph (%)[1]	Aliquots sampled	
				LS431	MH108
Criteria	**<1**	**>3.8**	**>75**	**>10**	**>10**
1	9.6	14.8	50	29	20
2	2.3	6.9	75	11	34
3	0.0	23.6	75	29	8
4	0.9	10.9	95	21	37
5	0.1	4.2	90	25	25

1. The percentages of the storm hydrograph sampled are estimated values.

Table 5
Summary of Results for Filtered Suspended Solids Samples at MH108

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	MH108-A Event #1 10/17/2009	MH108-A Event #2 10/29/2009	MH108-B Event #2 10/29/2009	MH108-A Event #3 11/6/2009	MH108-B Event #3 11/6/2009	MH108-A Event #4 12/14/2009	MH108-A Event #4 12/15/2009	MH108-B Event #4 12/15/2009	MH108-A Event #5 2/5/2010
Estimated Total Solids (g/filter DW)[1]				33	14.1	12.89	18.9	NA	40.7	19.4	10.13	9.5
Total Extracted Solids (g/filter DW)[2]				30.6	13.57	12.89	17.51	NA	38.46	19.03	10.13	9.38
Volume of water through filter (liters)				39,427	15,367	16,665	18,455	16,766	1,836	8,155	12,803	5,147
Calculated TSS (Filter A) (mg/L)				0.8	0.9	0.8	1	NA	22.2	2.4	0.8	1.8
Total Volume of Flow (L)[8]				2,648,000	1,114,000	1,114,000	2,923,000	2,923,000	1,366,000	1,366,000	1,366,000	502,500
Grain Size (%)												
Gravel	ASTM_D422			9	8.7	NA	6.9	NA	0	NA	NA	NA
Very Coarse Sand	ASTM_D422			7	4.2	NA	7.4	NA	2.3	NA	NA	NA
Coarse Sand	ASTM_D422			8	6.8	NA	8.7	NA	3.8	NA	NA	NA
Medium Sand	ASTM_D422			12.7	12.1	NA	9	NA	7.6	NA	NA	NA
Fine Sand	ASTM_D422			10.2	17	NA	9.3	NA	9.6	NA	NA	NA
Very Fine Sand	ASTM_D422			5.9	13.4	NA	10.2	NA	4.8	NA	NA	NA
Coarse Silt	ASTM_D422			2.3	NA	NA	7.1	NA	0.7	NA	NA	NA
Medium Silt	ASTM_D422			7.2	NA	NA	14.8	NA	1.6	NA	NA	NA
Fine Silt	ASTM_D422			7.8	NA	NA	7.7	NA	1.4	NA	NA	NA
Very Fine Silt	ASTM_D422			8.2	NA	NA	8.6	NA	2.4	NA	NA	NA
Clay	ASTM_D422			21.7	NA	NA	10.3	NA	65.7	NA	NA	NA
Total Fines	ASTM_D422			47.2	37.7	NA	48.5	NA	71.8	NA	NA	NA
Metals in mg/kg DW												
Arsenic	SW6010B	57	93	**20**	20 U	NA	**30**	NA	100 U	20 U	NA	NA
Cadmium	SW6010B	5.1	6.7	**16.7**	**4.5**	NA	**9.8**	NA	**9**	**6.5**	NA	NA
Chromium	SW6010B	260	270	**116**	**63**	NA	**111**	NA	**70**	**110**	NA	NA
Copper	SW6010B	390	390	**311**	**298**	NA	**301**	NA	**264**	**421**	NA	NA
Lead	SW6010B	450	530	**406**	**163**	NA	**253**	NA	**150**	**452**	NA	NA
Mercury	SW7471A	0.41	0.59	**0.34**	**0.35 J**	NA	**0.5**	NA	**0.7**	**2.67**	NA	**0.2**
Silver	SW6010B	6.1	6.1	**2.0**	**2.0**	NA	**5.0**	NA	6 U	**2**	NA	NA
Zinc	SW6010B	410	960	**1360**	**785**	NA	**1310**	NA	**1510**	**1100**	NA	NA
PCBs in µg DW												
Aroclor-1221	SW8082			1 U	1 U	NA	5 U	NA	5 U	5 U	NA	10 U
Aroclor-1232	SW8082			1 U	1 U	NA	5 U	NA	5 U	5 U	NA	10 U
Aroclor-1242	SW8082			1 U	1 U	NA	5 U	NA	75 U	50 U	NA	10 U
Aroclor-1016	SW8082			1 U	1 U	NA	5 U	NA	5 U	5 U	NA	10 U
Aroclor-1248	SW8082			**14**	**29**	NA	50 U	NA	5 U	5 U	NA	71 J
Aroclor-1254	SW8082			**27**	**38**	NA	**68**	NA	**100**	**52**	NA	**77**
Aroclor-1260	SW8082			**25**	**16**	NA	**29**	NA	**18**	**12**	NA	**23**
Total PCBs				**66**	**83**	NA	**97**	NA	**118**	**64**	NA	**171**
PCBs in µg/kg DW[3]												
Aroclor-1221				33 U	74 U	NA	290 U	NA	130 U	260 U	NA	1100 U
Aroclor-1232				33 U	74 U	NA	290 U	NA	130 U	260 U	NA	1100 U
Aroclor-1242				33 U	74 U	NA	290 U	NA	2000 U	2600 U	NA	1100 U
Aroclor-1016				33 U	74 U	NA	290 U	NA	130 U	260 U	NA	1100 U
Aroclor-1248				**460**	**2100**	NA	2900 U	NA	130 U	260 U	NA	**7600 J**

Table 5
Summary of Results for Filtered Suspended Solids Samples at MH108

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	MH108-A Event #1 10/17/2009	MH108-A Event #2 10/29/2009	MH108-B Event #2 10/29/2009	MH108-A Event #3 11/6/2009	MH108-B Event #3 11/6/2009	MH108-A Event #4 12/14/2009	MH108-A Event #4 12/15/2009	MH108-B Event #4 12/15/2009	MH108-A Event #5 2/5/2010
Aroclor-1254				**880**	**2800**	NA	**3900**	NA	**2600**	**2700**	NA	**8200**
Aroclor-1260				**820**	**1200**	NA	**1700**	NA	**470**	**630**	NA	**2500**
Total PCBs		130	1000	**2200**	**6100**	NA	**5500**	NA	**3100**	**3400**	NA	**18000**
PAHs in µg WW												
Naphthalene	SW8270D			NA	NA	NA	NA	**4.5**	NA	NA	NA	NA
Acenaphthylene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA	NA
Acenaphthene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA	NA
Fluorene	SW8270D			NA	NA	NA	NA	**4.3**	NA	NA	NA	NA
Phenanthrene	SW8270D			NA	NA	NA	NA	**45**	NA	NA	NA	NA
Anthracene	SW8270D			NA	NA	NA	NA	**3.5**	NA	NA	NA	NA
1-Methylnaphthalene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA	NA
2-Methylnaphthalene	SW8270D			NA	NA	NA	NA	**9.6**	NA	NA	NA	NA
Fluoranthene	SW8270D			NA	NA	NA	NA	**92**	NA	NA	NA	NA
Pyrene	SW8270D			NA	NA	NA	NA	**68**	NA	NA	NA	NA
Benzo(a)anthracene	SW8270D			NA	NA	NA	NA	**21**	NA	NA	NA	NA
Chrysene	SW8270D			NA	NA	NA	NA	**58**	NA	NA	NA	NA
Benzo(b)fluoranthene	SW8270D			NA	NA	NA	NA	**42**	NA	NA	NA	NA
Benzo(k)fluoranthene	SW8270D			NA	NA	NA	NA	**42**	NA	NA	NA	NA
Total Benzofluoranthenes				NA	NA	NA	NA	**84**	NA	NA	NA	NA
Benzo(a)pyrene	SW8270D			NA	NA	NA	NA	**37**	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	SW8270D			NA	NA	NA	NA	**33**	NA	NA	NA	NA
Dibenz(a,h)anthracene	SW8270D			NA	NA	NA	NA	**13**	NA	NA	NA	NA
Benzo(g,h,i)perylene	SW8270D			NA	NA	NA	NA	**39**	NA	NA	NA	NA
Total LPAH[5]				NA	NA	NA	NA	**57.3**	NA	NA	NA	NA
Total HPAH[6]				NA	NA	NA	NA	**445**	NA	NA	NA	NA
Dibenzofuran	SW8270D			NA	NA	NA	NA	**5.2**	NA	NA	NA	NA
PAHs in µg/kg DW[4]												
Naphthalene		2100	2400	NA	NA	NA	NA	**240**	NA	NA	NA	NA
Acenaphthylene		1300	1300	NA	NA	NA	NA	79 U	NA	NA	NA	NA
Acenaphthene		500	730	NA	NA	NA	NA	79 U	NA	NA	NA	NA
Fluorene		540	1000	NA	NA	NA	NA	**230**	NA	NA	NA	NA
Phenanthrene		1500	5400	NA	NA	NA	NA	**2400**	NA	NA	NA	NA
Anthracene		960	4400	NA	NA	NA	NA	**190**	NA	NA	NA	NA
1-Methylnaphthalene				NA	NA	NA	NA	79 U	NA	NA	NA	NA
2-Methylnaphthalene		670	1400	NA	NA	NA	NA	**510**	NA	NA	NA	NA
Fluoranthene		1700	2500	NA	NA	NA	NA	**4900**	NA	NA	NA	NA
Pyrene		2600	3300	NA	NA	NA	NA	**3600**	NA	NA	NA	NA
Benzo(a)anthracene		1300	1600	NA	NA	NA	NA	**1100**	NA	NA	NA	NA
Chrysene		1400	2800	NA	NA	NA	NA	**3100**	NA	NA	NA	NA
Benzo(b)fluoranthene				NA	NA	NA	NA	**2200**	NA	NA	NA	NA
Benzo(k)fluoranthene				NA	NA	NA	NA	**2200**	NA	NA	NA	NA
Total Benzofluoranthenes		3200	3600	NA	NA	NA	NA	**4400**	NA	NA	NA	NA

Table 5
Summary of Results for Filtered Suspended Solids Samples at MH108

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	MH108-A Event #1 10/17/2009	MH108-A Event #2 10/29/2009	MH108-B Event #2 10/29/2009	MH108-A Event #3 11/6/2009	MH108-B Event #3 11/6/2009	MH108-A Event #4 12/14/2009	MH108-A Event #4 12/15/2009	MH108-B Event #4 12/15/2009	MH108-A Event #5 2/5/2010
Benzo(a)pyrene		1600	3000	NA	NA	NA	NA	**2000**	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene		600	690	NA	NA	NA	NA	**1700**	NA	NA	NA	NA
Dibenz(a,h)anthracene		230	540	NA	NA	NA	NA	**690**	NA	NA	NA	NA
Benzo(g,h,i)perylene		670	720	NA	NA	NA	NA	**2100**	NA	NA	NA	NA
Total LPAH[5]		12000	17000	NA	NA	NA	NA	**3000**	NA	NA	NA	NA
Total HPAH[6]		5200	13000	NA	NA	NA	NA	**24000**	NA	NA	NA	NA
Dibenzofuran		540	700	NA	NA	NA	NA	**280**	NA	NA	NA	NA
Dioxin/Furan pg DW												
2,3,7,8-TCDD	E1613			NA	NA	**85.6**	NA	NA	NA	NA	**66.8**	NA
1,2,3,7,8-PECDD	E1613			NA	NA	**477**	NA	NA	NA	NA	**358**	NA
1,2,3,4,7,8-HXCDD	E1613			NA	NA	**872**	NA	NA	NA	NA	**636**	NA
1,2,3,6,7,8-HXCDD	E1613			NA	NA	**1620**	NA	NA	NA	NA	**1340**	NA
1,2,3,7,8,9-HXCDD	E1613			NA	NA	**2580**	NA	NA	NA	NA	**2000**	NA
1,2,3,4,6,7,8-HPCDD	E1613			NA	NA	**34500**	NA	NA	NA	NA	**29700**	NA
OCDD	E1613			NA	NA	**217000**	NA	NA	NA	NA	**226000**	NA
2,3,7,8-TCDF	E1613			NA	NA	**460**	NA	NA	NA	NA	**460**	NA
1,2,3,7,8-PECDF	E1613			NA	NA	**156**	NA	NA	NA	NA	**157**	NA
2,3,4,7,8-PECDF	E1613			NA	NA	**354**	NA	NA	NA	NA	**373**	NA
1,2,3,4,7,8-HXCDF	E1613			NA	NA	**714**	NA	NA	NA	NA	**861**	NA
1,2,3,6,7,8-HXCDF	E1613			NA	NA	**447**	NA	NA	NA	NA	**460**	NA
1,2,3,7,8,9-HXCDF	E1613			NA	NA	**22.3 J**	NA	NA	NA	NA	**29.7 J**	NA
2,3,4,6,7,8-HXCDF	E1613			NA	NA	**375**	NA	NA	NA	NA	**399**	NA
1,2,3,4,6,7,8-HPCDF	E1613			NA	NA	**5750**	NA	NA	NA	NA	**5770**	NA
1,2,3,4,7,8,9-HPCDF	E1613			NA	NA	**412**	NA	NA	NA	NA	**453**	NA
OCDF	E1613			NA	NA	**15900**	NA	NA	NA	NA	**11800**	NA
DX Total (TEQ 0 DL)	E1613			NA	NA	**1860**	NA	NA	NA	NA	**1590**	NA
DX Total (TEQ 1/2 DL)	E1613			NA	NA	**1860**	NA	NA	NA	NA	**1590**	NA
Dioxin/Furan TEQ pg/g DW[7]												
2,3,7,8-TCDD				NA	NA	**6.64**	NA	NA	NA	NA	**6.59**	NA
1,2,3,7,8-PECDD				NA	NA	**37**	NA	NA	NA	NA	**35.3**	NA
1,2,3,4,7,8-HXCDD				NA	NA	**67.6**	NA	NA	NA	NA	**62.8**	NA
1,2,3,6,7,8-HXCDD				NA	NA	**126**	NA	NA	NA	NA	**132**	NA
1,2,3,7,8,9-HXCDD				NA	NA	**200**	NA	NA	NA	NA	**197**	NA
1,2,3,4,6,7,8-HPCDD				NA	NA	**2680**	NA	NA	NA	NA	**2930**	NA
OCDD				NA	NA	**16800**	NA	NA	NA	NA	**22300**	NA
2,3,7,8-TCDF				NA	NA	**35.7**	NA	NA	NA	NA	**45.4**	NA
1,2,3,7,8-PECDF				NA	NA	**12.1**	NA	NA	NA	NA	**15.5**	NA
2,3,4,7,8-PECDF				NA	NA	**27.5**	NA	NA	NA	NA	**36.8**	NA
1,2,3,4,7,8-HXCDF				NA	NA	**55.4**	NA	NA	NA	NA	**85**	NA
1,2,3,6,7,8-HXCDF				NA	NA	**34.7**	NA	NA	NA	NA	**45.4**	NA
1,2,3,7,8,9-HXCDF				NA	NA	**1.73 J**	NA	NA	NA	NA	**2.93 J**	NA
2,3,4,6,7,8-HXCDF				NA	NA	**29.1**	NA	NA	NA	NA	**39.4**	NA

Table 5
Summary of Results for Filtered Suspended Solids Samples at MH108

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	MH108-A Event #1 10/17/2009	MH108-A Event #2 10/29/2009	MH108-B Event #2 10/29/2009	MH108-A Event #3 11/6/2009	MH108-B Event #3 11/6/2009	MH108-A Event #4 12/14/2009	MH108-A Event #4 12/15/2009	MH108-B Event #4 12/15/2009	MH108-A Event #5 2/5/2010
1,2,3,4,6,7,8-HPCDF				NA	NA	**446**	NA	NA	NA	NA	**570**	NA
1,2,3,4,7,8,9-HPCDF				NA	NA	**32**	NA	NA	NA	NA	**44.7**	NA
OCDF				NA	NA	**1230**	NA	NA	NA	NA	**1160**	NA
DX Total (TEQ 0 DL)				NA	NA	**144**	NA	NA	NA	NA	**157**	NA
DX Total (TEQ 1/2 DL)				NA	NA	**144**	NA	NA	NA	NA	**157**	NA

MRLs reported for all undetected results
Green highlighting indicates chemical not detected at a reporting limit that exceeds LAET
Gray highlighting indicates exceedance of the LAET/2LAE
Detections shown in **bold**
NA - Not available
VQ - Validation qualifier
1. Estimated mass of total solids that accounts for the aliquots removed for analysis of metals and grain size.
2. Actual mass of total solids analyzed for PCBs or dioxin/furan congeners.
3. µg of PCBs divided by total extracted solids.
4. µg of PAH divided by estimated mass of total solids from PCB filter.
5. Total LPAH were calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
6. Total HPAH were calculated as the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene
7. pg of dioxin divided by total extracted solids.
8. Total Volume of Flow for MH108 is estimated from the relationship between rainfall and flow at MH108
U - Target analyte not detected at the reported concentration.
B - Analyte detedted in an associated method blank
J - Estimated concentration when the value is less than established reporting limits.
Y - Equivalent to a U qualifier with a raised reporting limit.
P - The GC or HPLC confimration criteria was exceeded
SQS/LAET - Sediment Quality Standards/Lowest Apparent Effects Threshold
CSL/2LAET - Cleanup Screening Level/Second Lowest Apparent Effects Threshold

Table 6
Summary of Results for Filtered Suspended Solids Samples at LS431

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	LS431-A Event #1 10/17/2009	LS431-A Event #2 10/29/2009	LS431-B Event #2 10/29/2009	LS431-A Event #3 11/6/2009	LS431-B Event #3 11/6/2009	LS431-A Event #4 12/15/2009	LS431-B Event #4 12/15/2009	LS431-A Event #5 2/5/2010
Estimated Total Solids (g/filter DW)[1]				46.4	10.8	8.43	30.8	NA	27.3	7.79	11
Total Extracted Solids (g/filter DW)[2]				43.08	9.38	8.43	28.64	NA	25.2	7.79	10.9
Volume of water through filter (liters)				11,137	4,325	4,291	9,864	9,441	4,042	3,079	3,215
Calculated TSS (Filter A) (mg/L)				4.2	2.5	2	3.1	NA	6.8	2.5	3.4
Total Volume of Flow (L)[8]				16,200,000	3,822,000	3,822,000	13,230,000	13,230,000	6,758,000	6,758,000	3,374,000
Grain Size (%)											
Gravel	ASTM_D422			3.5	3.3	NA	7.6	NA	0	NA	NA
Very Coarse Sand	ASTM_D422			4.9	4.2	NA	8.8	NA	0.2	NA	NA
Coarse Sand	ASTM_D422			17.7	10.2	NA	23.4	NA	0.3	NA	NA
Medium Sand	ASTM_D422			44.3	15.7	NA	29.7	NA	0.7	NA	NA
Fine Sand	ASTM_D422			9	8.7	NA	12.4	NA	1.1	NA	NA
Very Fine Sand	ASTM_D422			2.4	4.9	NA	4.5	NA	0.3	NA	NA
Coarse Silt	ASTM_D422			1	-0.6	NA	0.3	NA	0.5	NA	NA
Medium Silt	ASTM_D422			3.4	3.6	NA	1.9	NA	2.4	NA	NA
Fine Silt	ASTM_D422			3.5	4.4	NA	1.9	NA	3.6	NA	NA
Very Fine Silt	ASTM_D422			3.1	8.3	NA	2	NA	7.1	NA	NA
Clay	ASTM_D422			7.1	37.2	NA	7.7	NA	83.8	NA	NA
Total Fines	ASTM_D422			18.1	52.9	NA	13.8	NA	97.4	NA	NA
Metals in mg/kg DW											
Arsenic	SW6010B	57	93	**9**	20 U	NA	**20**	NA	50 U	NA	50 U
Cadmium	SW6010B	5.1	6.7	**6.1**	**8**	NA	**11.1**	NA	**6**	NA	**5**
Chromium	SW6010B	260	270	**36.9**	**73**	NA	**102**	NA	**42**	NA	**42**
Copper	SW6010B	390	390	**73.9**	**145**	NA	**261**	NA	**95**	NA	**80**
Lead	SW6010B	450	530	**86**	**130**	NA	**265**	NA	**60**	NA	**80**
Mercury	SW7471A	0.41	0.59	**0.12**	**2 J**	NA	**0.3**	NA	**0.18**	NA	**0.14**
Silver	SW6010B	6.1	6.1	0.5 U	1 U	NA	1 U	NA	3 U	NA	3 U
Zinc	SW6010B	410	960	**443**	**823**	NA	**1200**	NA	**760**	NA	**430**
PCBs in µg DW											
Aroclor-1221	SW8082			1 U	1 U	NA	5 U	NA	0.5 U	NA	10 U
Aroclor-1232	SW8082			1 U	1 U	NA	5 U	NA	0.5 U	NA	10 U
Aroclor-1242	SW8082			1 U	1 U	NA	5 U	NA	7.5 U	NA	**13**
Aroclor-1016	SW8082			1 U	1 U	NA	5 U	NA	0.5 U	NA	10 U
Aroclor-1248	SW8082			**5.2**	**3.2**	NA	25 U	NA	0.5 U	NA	10 U
Aroclor-1254	SW8082			**16**	**7.9**	NA	**34**	NA	**13**	NA	**17**
Aroclor-1260	SW8082			**8.8**	**6**	NA	**14**	NA	**3.5**	NA	10 U
Total PCBs				**30**	**17.1**	NA	**48**	NA	**16.5**	NA	**30**
PCBs in µg/kg DW[3]											
Aroclor-1221				23 U	110 U	NA	170 U	NA	20 U	NA	920 U
Aroclor-1232				23 U	110 U	NA	170 U	NA	20 U	NA	920 U

Table 6
Summary of Results for Filtered Suspended Solids Samples at LS431

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	LS431-A Event #1 10/17/2009	LS431-A Event #2 10/29/2009	LS431-B Event #2 10/29/2009	LS431-A Event #3 11/6/2009	LS431-B Event #3 11/6/2009	LS431-A Event #4 12/15/2009	LS431-B Event #4 12/15/2009	LS431-A Event #5 2/5/2010
Aroclor-1242				23 U	110 U	NA	170 U	NA	300 U	NA	**1200**
Aroclor-1016				23 U	110 U	NA	170 U	NA	20 U	NA	920 U
Aroclor-1248				**120**	**340**	NA	870 U	NA	20 U	NA	920 U
Aroclor-1254				**370**	**840**	NA	**1200**	NA	**520**	NA	**1600**
Aroclor-1260				**200**	**640**	NA	**490**	NA	**140**	NA	920 U
Total PCBs		130	1000	**700**	**1800**	NA	**1700**	NA	**650**	NA	**2800**
PAHs in µg WW											
Naphthalene	SW8270D			NA	NA	NA	NA	**3.9**	NA	NA	NA
Acenaphthylene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA
Acenaphthene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA
Fluorene	SW8270D			NA	NA	NA	NA	**5.7**	NA	NA	NA
Phenanthrene	SW8270D			NA	NA	NA	NA	**82**	NA	NA	NA
Anthracene	SW8270D			NA	NA	NA	NA	**8.5**	NA	NA	NA
1-Methylnaphthalene	SW8270D			NA	NA	NA	NA	1.5 U	NA	NA	NA
2-Methylnaphthalene	SW8270D			NA	NA	NA	NA	**5.6**	NA	NA	NA
Fluoranthene	SW8270D			NA	NA	NA	NA	**240**	NA	NA	NA
Pyrene	SW8270D			NA	NA	NA	NA	**100**	NA	NA	NA
Benzo(a)anthracene	SW8270D			NA	NA	NA	NA	**53**	NA	NA	NA
Chrysene	SW8270D			NA	NA	NA	NA	**110**	NA	NA	NA
Benzo(b)fluoranthene	SW8270D			NA	NA	NA	NA	**82**	NA	NA	NA
Benzo(k)fluoranthene	SW8270D			NA	NA	NA	NA	**82**	NA	NA	NA
Total Benzofluoranthenes				NA	NA	NA	NA	**164**	NA	NA	NA
Benzo(a)pyrene	SW8270D			NA	NA	NA	NA	**78**	NA	NA	NA
Indeno(1,2,3-cd)pyrene	SW8270D			NA	NA	NA	NA	**72**	NA	NA	NA
Dibenz(a,h)anthracene	SW8270D			NA	NA	NA	NA	**32**	NA	NA	NA
Benzo(g,h,i)perylene	SW8270D			NA	NA	NA	NA	**78**	NA	NA	NA
Total LPAH[5]				NA	NA	NA	NA	**100.1**	NA	NA	NA
Total HPAH[6]				NA	NA	NA	NA	**927**	NA	NA	NA
Dibenzofuran	SW8270D			NA	NA	NA	NA	**6.8**	NA	NA	NA
PAHs in µg/kg DW[4]											
Naphthalene		2100	2400	NA	NA	NA	NA	**130**	NA	NA	NA
Acenaphthylene		1300	1300	NA	NA	NA	NA	49 U	NA	NA	NA
Acenaphthene		500	730	NA	NA	NA	NA	49 U	NA	NA	NA
Fluorene		540	1000	NA	NA	NA	NA	**190**	NA	NA	NA
Phenanthrene		1500	5400	NA	NA	NA	NA	**2700**	NA	NA	NA
Anthracene		960	4400	NA	NA	NA	NA	**280**	NA	NA	NA
1-Methylnaphthalene				NA	NA	NA	NA	49 U	NA	NA	NA
2-Methylnaphthalene		670	1400	NA	NA	NA	NA	**180**	NA	NA	NA
Fluoranthene		1700	2500	NA	NA	NA	NA	**7800**	NA	NA	NA

Table 6
Summary of Results for Filtered Suspended Solids Samples at LS431

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	LS431-A Event #1 10/17/2009	LS431-A Event #2 10/29/2009	LS431-B Event #2 10/29/2009	LS431-A Event #3 11/6/2009	LS431-B Event #3 11/6/2009	LS431-A Event #4 12/15/2009	LS431-B Event #4 12/15/2009	LS431-A Event #5 2/5/2010
Pyrene		2600	3300	NA	NA	NA	NA	**3200**	NA	NA	NA
Benzo(a)anthracene		1300	1600	NA	NA	NA	NA	**1700**	NA	NA	NA
Chrysene		1400	2800	NA	NA	NA	NA	**3600**	NA	NA	NA
Benzo(b)fluoranthene				NA	NA	NA	NA	**2700**	NA	NA	NA
Benzo(k)fluoranthene				NA	NA	NA	NA	**2700**	NA	NA	NA
Total Benzofluoranthenes		3200	3600	NA	NA	NA	NA	**5300**	NA	NA	NA
Benzo(a)pyrene		1600	3000	NA	NA	NA	NA	**2500**	NA	NA	NA
Indeno(1,2,3-cd)pyrene		600	690	NA	NA	NA	NA	**2300**	NA	NA	NA
Dibenz(a,h)anthracene		230	540	NA	NA	NA	NA	**1000**	NA	NA	NA
Benzo(g,h,i)perylene		670	720	NA	NA	NA	NA	**2500**	NA	NA	NA
Total LPAH[5]		12000	17000	NA	NA	NA	NA	**3300**	NA	NA	NA
Total HPAH[6]		5200	13000	NA	NA	NA	NA	**30000**	NA	NA	NA
Dibenzofuran		540	700	NA	NA	NA	NA	**220**	NA	NA	NA
Dioxin/Furan pg DW											
2,3,7,8-TCDD	E1613			NA	NA	**25.4**	NA	NA	NA	**9.28 J**	NA
1,2,3,7,8-PECDD	E1613			NA	NA	**144**	NA	NA	NA	**50.1 J**	NA
1,2,3,4,7,8-HXCDD	E1613			NA	NA	**261**	NA	NA	NA	**77.4 J**	NA
1,2,3,6,7,8-HXCDD	E1613			NA	NA	**485**	NA	NA	NA	**168**	NA
1,2,3,7,8,9-HXCDD	E1613			NA	NA	**765**	NA	NA	NA	**251**	NA
1,2,3,4,6,7,8-HPCDD	E1613			NA	NA	**9110**	NA	NA	NA	**3080**	NA
OCDD	E1613			NA	NA	**55000**	NA	NA	NA	**21900**	NA
2,3,7,8-TCDF	E1613			NA	NA	**296**	NA	NA	NA	**105**	NA
1,2,3,7,8-PECDF	E1613			NA	NA	**70.2 J**	NA	NA	NA	**26.9 J**	NA
2,3,4,7,8-PECDF	E1613			NA	NA	**146**	NA	NA	NA	**62.2 J**	NA
1,2,3,4,7,8-HXCDF	E1613			NA	NA	**185**	NA	NA	NA	**103**	NA
1,2,3,6,7,8-HXCDF	E1613			NA	NA	**141**	NA	NA	NA	**59.3 J**	NA
1,2,3,7,8,9-HXCDF	E1613			NA	NA	**8.53 J**	NA	NA	NA	**3.89 J**	NA
2,3,4,6,7,8-HXCDF	E1613			NA	NA	**140**	NA	NA	NA	**52.2 J**	NA
1,2,3,4,6,7,8-HPCDF	E1613			NA	NA	**1590**	NA	NA	NA	**568**	NA
1,2,3,4,7,8,9-HPCDF	E1613			NA	NA	**115**	NA	NA	NA	**48.4 J**	NA
OCDF	E1613			NA	NA	**3660**	NA	NA	NA	**1290**	NA
DX Total (TEQ 0 DL)	E1613			NA	NA	**569**	NA	NA	NA	**205**	NA
DX Total (TEQ 1/2 DL)	E1613			NA	NA	**569**	NA	NA	NA	**205**	NA
Dioxin/Furan TEQ pg/g DW[7]											
2,3,7,8-TCDD				NA	NA	**3.01**	NA	NA	NA	**1.19 J**	NA
1,2,3,7,8-PECDD				NA	NA	**17.1**	NA	NA	NA	**6.43 J**	NA
1,2,3,4,7,8-HXCDD				NA	NA	**31**	NA	NA	NA	**9.94 J**	NA
1,2,3,6,7,8-HXCDD				NA	NA	**57.5**	NA	NA	NA	**21.6**	NA
1,2,3,7,8,9-HXCDD				NA	NA	**90.7**	NA	NA	NA	**32.2**	NA

Table 6
Summary of Results for Filtered Suspended Solids Samples at LS431

Location ID Filter Collection Date	Method	SQS/ LAET	CSL/ 2LAET	LS431-A Event #1 10/17/2009	LS431-A Event #2 10/29/2009	LS431-B Event #2 10/29/2009	LS431-A Event #3 11/6/2009	LS431-B Event #3 11/6/2009	LS431-A Event #4 12/15/2009	LS431-B Event #4 12/15/2009	LS431-A Event #5 2/5/2010
1,2,3,4,6,7,8-HPCDD				NA	NA	**1080**	NA	NA	NA	**395**	NA
OCDD				NA	NA	**6520**	NA	NA	NA	**2810**	NA
2,3,7,8-TCDF				NA	NA	**35.1**	NA	NA	NA	**13.5**	NA
1,2,3,7,8-PECDF				NA	NA	**8.33 J**	NA	NA	NA	**3.45 J**	NA
2,3,4,7,8-PECDF				NA	NA	**17.3**	NA	NA	NA	**7.98 J**	NA
1,2,3,4,7,8-HXCDF				NA	NA	**21.9**	NA	NA	NA	**13.2**	NA
1,2,3,6,7,8-HXCDF				NA	NA	**16.7**	NA	NA	NA	**7.61 J**	NA
1,2,3,7,8,9-HXCDF				NA	NA	**1.01 J**	NA	NA	NA	**0.499 J**	NA
2,3,4,6,7,8-HXCDF				NA	NA	**16.6**	NA	NA	NA	**6.7 J**	NA
1,2,3,4,6,7,8-HPCDF				NA	NA	**189**	NA	NA	NA	**72.9**	NA
1,2,3,4,7,8,9-HPCDF				NA	NA	**13.6**	NA	NA	NA	**6.21 J**	NA
OCDF				NA	NA	**434**	NA	NA	NA	**166**	NA
DX Total (TEQ 0 DL)				NA	NA	**67.5**	NA	NA	NA	**26.3**	NA
DX Total (TEQ 1/2 DL)				NA	NA	**67.5**	NA	NA	NA	**26.3**	NA

MRLs reported for all undetected results
Green highlighting indicates chemical not detected at a reporting limit that exceeds LAET
Gray highlighting indicates exceedance of the SQS/LAET
Detections shown in **bold**
NA - Not available
VQ - Validation qualifier
1. Estimated mass of total solids that accounts for the aliquots removed for analysis of metals and grain size.
2. Actual mass of total solids analyzed for PCBs or dioxin/furan congeners.
3. µg of PCBs divided by total extracted solids.
4. µg of PAH divided by estimated mass of total solids from PCB filter.
5. Total LPAH were calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
6. Total HPAH were calculated as the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene
7. pg of dioxin divided by total extracted solids.
8. Total Volume of Flow for MH108 is estimated from the relationship between rainfall and flow at MH108
U - Target analyte not detected at the reported concentration.
B - Analyte detedted in an associated method blank
J - Estimated concentration when the value is less than established reporting limits.
Y - Equivalent to a U qualifier with a raised reporting limit.
P - The GC or HPLC confimration criteria was exceeded
SQS/LAET - Sediment Quality Standards/Lowest Apparent Effects Threshold
CSL/2LAET - Cleanup Screening Level/Second Lowest Apparent Effects Threshold

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Total Volume of Flow (L)[4]				2,648,000	1,114,000	2,923,000	1,366,000	502,500	502,500
Metals - Total (µg/L)									
Arsenic	EPA200.8	36	MWC	**0.6**	**0.6**	**0.9**	**1.6**	**0.9**	**0.9**
Cadmium	EPA200.8	9.3	MWC	**0.3**	**0.3**	**0.6**	**0.4**	0.2 U	0.2 U
Calcium	SW6010B			**2590**	**3400**	**3310**	**6860**	**16900**	**17000**
Chromium	EPA200.8	57	FC	**1**	**0.6**	**3.4**	**1.2**	**1.3 J**	**2.35 J**
Copper	EPA200.8	3.1	MWC	**8**	**7.8**	**26.5**	**16.6**	**7.2**	**7**
Lead	EPA200.8	8.1	MWC	**2.0**	**1.0**	**18**	**5.0**	**1.0**	**1.0**
Magnesium	SW6010B			**300**	**720**	**700 J**	**1700**	**4670**	**4700**
Mercury	SW7470A	0.012	FC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	EPA200.8	8.2	MWC	**0.8**	**0.8**	**3.5**	**1.9**	**1.7**	**1.7**
Selenium	EPA200.8	5	FC1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	EPA200.8	1.9	MWA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	EPA200.8	81	MWC	**62**	**80**	**127**	**107**	**51**	**48**
Metals - Dissolved (µg/L)									
Arsenic	EPA200.8	36	MWC	**0.6**	**0.5**	**0.5**	**0.4**	**0.6**	**0.6**
Cadmium	EPA200.8	9.3	MWC	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	SW6010B			**2410**	**3400**	**2800**	NA	NA	NA
Chromium	EPA200.8	57	FC	0.6	0.5 U	0.5 U	0.5 U	0.95	0.8
Copper	EPA200.8	3.1	MWC	**5.6**	**6.5**	**6.7**	**5.5**	**4.1**	**4.3**
Lead	EPA200.8	8.1	MWC	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium	SW6010B			**250**	**700**	**460**	NA	NA	NA
Mercury	SW7470A	0.012	FC	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Nickel	EPA200.8	8.2	MWC	0.5 U	**0.5**	**0.6**	**0.8**	**1.0**	**1.5**
Selenium	EPA200.8	5	FC1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Silver	EPA200.8	1.9	MWA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	EPA200.8	81	MWC	**50**	**70**	**66**	**66**	**43**	**43**
PCBs (µg/L)									
Aroclor 1221	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1232	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1242	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1016	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1248	SW8082			**0.015**	0.025 U	0.025 U	0.05 U	0.04 U	0.045 U
Aroclor 1254	SW8082			**0.021**	**0.016**	**0.023**	**0.054**	**0.028**	**0.026**
Aroclor 1260	SW8082			0.01 U	0.01 U	**0.013**	0.01 U	0.01 U	0.01 U
Aroclor 1262	SW8082			0.01 U	NA	NA	0.01 U	NA	NA

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Aroclor 1268	SW8082			0.01 U	NA	NA	0.01 U	NA	NA
Total PCBs		0.014	FC	**0.036**	**0.016**	**0.036**	**0.054**	**0.028**	**0.026**
PAHs (µg/L)									
Naphthalene	SW8270DSIM			**0.038**	**0.032**	**0.087 J**	**0.034**	**0.024**	**0.02**
Acenaphthylene	SW8270DSIM			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	SW8270DSIM	990	HHO	0.01 U	0.01 U	**0.025**	0.01 U	0.01 U	0.01 U
Fluorene	SW8270DSIM	5300	HHO	**0.01**	0.01 U	**0.05**	0.01 U	0.01 U	0.01 U
Phenanthrene	SW8270DSIM			**0.068**	**0.052**	**1.2**	**0.098**	**0.029**	**0.029**
Anthracene	SW8270DSIM	40,000	HHO	0.01 U	0.01 U	**0.091**	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	SW8270DSIM			**0.022**	**0.017**	**0.058**	**0.02**	0.01 U	0.01 U
2-Methylnaphthalene	SW8270DSIM			**0.032**	**0.025**	**0.086**	**0.026**	0.01 U	0.01 U
Fluoranthene	SW8270DSIM	140	HHO	**0.12**	**0.088**	**2.7**	**0.15**	**0.047**	**0.047**
Pyrene	SW8270DSIM	4,000	HHO	**0.071**	**0.04**	**2**	**0.099**	**0.024**	**0.027**
Benzo(a)anthracene	SW8270DSIM	0.018	HHO	**0.017**	0.01 U	**0.61**	**0.025**	0.01 U	0.01 U
Chrysene	SW8270DSIM	0.018	HHO	**0.064**	**0.029**	**1.7**	**0.082**	**0.019**	**0.022**
Benzo(b)fluoranthene	SW8270DSIM	0.018	HHO	**0.04**	**0.012**	**1.3**	**0.074**	**0.011**	**0.012**
Benzo(k)fluoranthene	SW8270DSIM	0.018	HHO	**0.04**	**0.012**	**1.3**	**0.043**	0.01 U	**0.012**
Benzo(a)pyrene	SW8270DSIM	0.018	HHO	**0.031**	0.01 U	**1.2 J**	**0.038**	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	SW8270DSIM	0.018	HHO	**0.031**	0.01 U	**0.96**	**0.038**	0.01 U	0.01 U
Dibenz(a,h)anthracene	SW8270DSIM	0.018	HHO	**0.012**	0.01 U	**0.39**	**0.01**	0.01 U	0.01 U
Benzo(g,h,i)perylene	SW8270DSIM			**0.043**	0.01 U	**1.3**	**0.05**	0.01 U	0.01 U
Chlorinated Hydrocarbons (µg/L)									
1,3-Dichlorobenzene	SW8260C	960	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,4-Dichlorobenzene	SW8260C	190	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dichlorobenzene	SW8260C	1,300	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2,4-Trichlorobenzene	SW8260C	70	HHO	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Hexachlorobenzene	SW8270D[1]	0.00029	HHO	0.05 U	0.05 U	NA	1 U	1 U	1 U
Phthalates (µg/L)									
Dimethylphthalate	SW8270D	1,100,000	HHO	1 U	1 U	NA	1 U	1 U	1 U
Diethylphthalate	SW8270D	44,000	HHO	1 U	1 U	NA	1 U	**1.3**	**1.2**
Di-n-Butylphthalate	SW8270D	4,500	HHO	1 U	1 U	NA	1 U	1 U	1 U
Di-n-Octyl phthalate	SW8270D			1 U	1 U	NA	1 U	1 U	1 U
Butylbenzylphthalate	SW8270D	1,900	HHO	1 U	1 U	NA	1 U	1 U	1 U
bis(2-Ethylhexyl)phthalate	SW8270D	2.2	HHO	**0.8 J**	1 U	NA	**3.2**	1 U	1 U
Phenols (µg/L)									

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Phenol	SW8270D	860,000	HHO	**2.6**	1 U	NA	**1.7**	1 U	**1.1**
2-Methylphenol	SW8270D			1 U	1 U	NA	1 U	1 U	1 U
4-Methylphenol	SW8270D			1 U	1 U	NA	1 U	1 U	1 U
2,4-Dimethylphenol	SW8270D	850	HHO	1 U	1 U	NA	1 U	1 U	1 U
Pentachlorophenol	SW8270D	7.9	MWC	5 U	5 U	NA	5 U	5 U	5 U
Miscellaneous Extractables (µg/L)									
Benzyl Alcohol	SW8270D			5 U	5 U	NA	5 U	5 U	5 U
Benzoic Acid	SW8270D			10 U	10 U	NA	10 U	10 U	10 U
Dibenzofuran	SW8270DSIM			0.01 U	0.01 U	**0.059**	0.01 U	0.01 U	0.01 U
Hexachlorobutadiene	SW8260C[2]	18	HHO	0.05 U	0.05 U	0.5 U	0.5 UJ	0.5 U	0.5 U
N-Nitrosodiphenylamine	SW8270D	6	HHO	1 U	1 U	NA	1 UJ	1 U	1 U
Volatile Organics (µg/L)									
Trichloroethene	SW8260C	30	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1,1,2-Tetrachloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	SW8260C	4	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Ethylbenzene	SW8260C	2,100	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
m, p-Xylene	SW8260C			0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 U	0.4 U
o-Xylene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Pesticides (µg/L)									
alpha-BHC	SW8081B	0.0049	HHO	0.05 U	0.05 U	NA	NA	NA	NA
beta-BHC	SW8081B	0.017	HHO	0.05 U	0.05 U	NA	NA	NA	NA
delta-BHC	SW8081B			0.05 U	0.05 U	NA	NA	NA	NA
gamma-BHC (Lindane)	SW8081B	0.08	FC	0.05 U	0.05 U	NA	NA	NA	NA
Heptachlor	SW8081B	0.0036	MWC	0.05 U	0.05 U	NA	NA	NA	NA
Heptachlor Epoxide	SW8081B	0.0036	MWC	0.05 U	0.05 U	NA	NA	NA	NA
Aldrin	SW8081B	0.00005	HHO	0.05 U	0.05 U	NA	NA	NA	NA
Dieldrin	SW8081B	0.0019	MWC	0.1 U	0.1 U	NA	NA	NA	NA
Aldrin+Dieldrin		0.0019	FC/MWC	0.1 U	0.1 U	NA	NA	NA	NA
Endrin	SW8081B	0.0023	MWC	0.1 U	0.1 U	NA	NA	NA	NA
Endrin Ketone	SW8081B			0.1 U	0.1 U	NA	NA	NA	NA
Endrin Aldehyde	SW8081B			0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDT	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDD	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA	NA
4,4'-DDE	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA	NA
Endosulfan I	SW8081B	0.0087	MWC	0.05 U	0.05 U	NA	NA	NA	NA
Endosulfan II	SW8081B	0.0087	MWC	0.1 U	0.1 U	NA	NA	NA	NA

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Endosulfan Sulfate	SW8081B	0.0087	MWC	0.1 U	0.1 U	NA	NA	NA	NA
Methoxychlor	SW8081B			0.5 U	0.5 U	NA	NA	NA	NA
gamma Chlordane	SW8081B	0.004	MWC	0.05 U	0.05 U	NA	NA	NA	NA
alpha Chlordane	SW8081B	0.004	MWC	0.05 U	0.05 U	NA	NA	NA	NA
Toxaphene	SW8081B	0.0002	FC/MWC	5 U	5 U	NA	NA	NA	NA
Miscellaneous 8260 VOCs (µg/L)									
Acrolein	SW8260C	3	FWC	5 U	5 U	5 U	5 UJ	5 U	5 U
Methyl Iodide	SW8260C			1 U	1 U	1 U	1 UJ	1 U	1 U
Bromoethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Acrylonitrile	SW8260C	0.25	HHO	1 U	1 U	1 U	1 UJ	1 U	1 U
1,1-Dichloropropene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Dibromomethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2,3-Trichloropropane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	SW8260C			1 U	1 UJ	1 UJ	1 UJ	1 U	1 U
1,3,5-Trimethylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2,4-Trimethylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Ethylene Dibromide	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Bromochloromethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
2,2-Dichloropropane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,3-Dichloropropane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Isopropylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
n-Propylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Bromobenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
2-Chlorotoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
4-Chlorotoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
tert-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
sec-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
4-Isopropyltoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
n-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2,3-Trichlorobenzene	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Chloromethane	SW8260C			0.5 U	0.6	0.5 U	0.5 UJ	0.5 U	0.5 U
Bromomethane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Vinyl Chloride	SW8260C	2.4	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Chloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Methylene Chloride	SW8260C	590	HHO	**0.9**	**1.2**	**5.2**	**0.8 J**	**1.8**	**1.8**

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Acetone	SW8260C			**19**	**13**	**160**	**1600 J**	5 U	5 U
Carbon Disulfide	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1-Dichloroethene	SW8260C	7,100	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1-Dichloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
trans-1,2-Dichloroethene	SW8260C	10,000	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
cis-1,2-Dichloroethene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Chloroform	SW8260C	470	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dichloroethane	SW8260C	37	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
2-Butanone	SW8260C			**120**	**72**	**130**	**17 J**	**35**	**34**
2-Butanone (grab)	SW8260C			NA	NA	NA	5 U	NA	NA
1,1,1-Trichloroethane	SW8260C	16	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Carbon Tetrachloride	SW8260C	1.6	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Vinyl Acetate	SW8260C			1 U	1 U	1 U	1 UJ	1 U	1 U
Bromodichloromethane	SW8260C	17	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dichloropropane	SW8260C	15	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
cis-1,3-Dichloropropene	SW8260C	21	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Dibromochloromethane	SW8260C	13	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1,2-Trichloroethane	SW8260C	16	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Benzene	SW8260C	51	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
trans-1,3-Dichloropropene	SW8260C	21	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
2-Chloroethylvinylether	SW8260C			1 U	1 U	1 U	1 UJ	1 U	1 U
Bromoform	SW8260C	140	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
4-Methyl-2-Pentanone (MIBK)	SW8260C			5 U	5 U	5 U	5 UJ	5 U	5 U
2-Hexanone	SW8260C			5 U	5 U	5 U	5 UJ	5 U	5 U
Tetrachloroethene	SW8260C	3.3	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Toluene	SW8260C	15,000	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Chlorobenzene	SW8260C	1,600	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Styrene	SW8260C			**0.5**	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Trichlorofluoromethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U
Conventionals (mg/L-except pH)									
pH	PH			6.75	6.73	6.66	6.86	6.77	6.85
Alkalinity, Total	SM2320			8.4	13.2	8.7	27.7	61.7	61.9
Alkalinity as Carbonate	SM2320			1 U	1 U	1 U	1 U	1 U	1 U
Alkalinity as Bicarbonate	SM2320			8.4	13.2	8.7	27.7	61.7	61.9
Alkalinity as Hydroxide	SM2320			1 U	1 U	1 U	1 U	1 U	1 U

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010
Hardness as CaCO3-Dissolved	SW6010B			7	11	8.9	NA	NA	NA
Hardness as CaCO3-Total	SW6010B			7.7	11	11	24	62	62
Total Suspended Solids	EPA160.2			13.3 J	3.3	49.7	23	4.7	4.8
Chloride	EPA300.0			0.5	1.2	1.8	3	2.9	2.9
Nitrate	EPA300.0[3]			0.1	0.1	0.126	0.3	0.5	0.5
Sulfate	EPA300.0			0.9	1	1.2	4.2	12.3	11.6
Dissolved Organic Carbon	EPA415.1			3.28	3.63	30	5.05	6.05 J	4.22 J
Total Organic Carbon	EPA415.1			4.15	3.51	31.8	6.75	6.58	7.59

Table 7
Summary of Results for Whole Water Samples at MH108

Sample ID Collection Date	Method	Criteria	Criteria Type	MH108 Event #1 10/17/2009	MH108 Event #2 10/29/2009	MH108 Event #3 11/6/2009	MH108 Event #4 12/15/2009	MH108 Event #5 2/5/2010	MH108-DUP Event #5 2/5/2010

MRLs reported for all undetected results
Gray highlighting indicates exceedance of the chronic water quality criteria
Green highlighting indicates chemical not detected at a reporting limit that exceeds the water quality criteria
Detections shown in **bold**
1. Hexachlorobenzene analyzed by SW8081B in samples MH108-101709-W and MH108-102909-W
2. Hexachlorobutadiene analyzed by SW8081B in samples MH108-101709-W and MH108-102909-W
3. Nitrate analyzed by EPA353.2 in sample MH108-110609-W
4. Total Volume of Flow for MH108 is estimated from the relationship between rainfall and flow at MH108
FC - Freshwater Chronic Critera
FA - Freshwater Acute Criteria
MWC - Marine Chronic Criteria
MWA - Marine Acute Criteria
HHO - Human Health Criteria, organisms only
U - Target analyte not detected at the reported concentration.
B - Analyte deteCted in an associated method blank
J - Estimated concentration when the value is less than established reporting limits.
Y - Equivalent to a U qualifier with a raised reporting limit.
NA - Not analyzed

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
Total Volume of Flow (L)				16,200,000	3,822,000	13,230,000	6,758,000	3,374,000
Metals - Total (µg/L)								
Arsenic	EPA200.8	36	MWC	**0.6**	**0.9**	**1.0**	**2.0**	**1.0**
Cadmium	EPA200.8	9.3	MWC	**0.3**	**0.4**	**0.7**	**1.0**	**0.2**
Calcium	SW6010B			**3230**	**7520**	**4790**	**7910**	**14400**
Chromium	EPA200.8	57	FC	**1.6**	**1.8**	**3.4**	**2.2**	**3.8**
Copper	EPA200.8	3.1	MWC	**7**	**6.7**	**17.4**	**11.6**	**4**
Lead	EPA200.8	8.1	MWC	**4**	**4**	**13**	**8**	**1**
Magnesium	SW6010B			**620**	**2740**	**1630 J**	**2610**	**6550**
Mercury	SW7470A	0.012	FC	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	EPA200.8	8.2	MWC	**0.9**	**1.2**	**2.5**	**1.7**	**1.2**
Selenium	EPA200.8	5	FC1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	EPA200.8	1.9	MWA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	EPA200.8	81	MWC	**46**	**58**	**95**	**98**	**35**
Metals - Dissolved (µg/L)								
Arsenic	EPA200.8	36	MWC	**0.5**	**0.4**	**0.3**	**0.3**	**0.5**
Cadmium	EPA200.8	9.3	MWC	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	SW6010B			**3250**	**7290**	**4290**	NA	NA
Chromium	EPA200.8	57	FC	**0.7**	**0.6**	0.5 U	0.5 U	**1.05**
Copper	EPA200.8	3.1	MWC	**3.6**	**3.4**	**2.8**	**2.3**	**2.1**
Lead	EPA200.8	8.1	MWC	1 U	1 U	1 U	1 U	1 U
Magnesium	SW6010B			**580**	**2750**	**1370**	NA	NA
Mercury	SW7470A	0.012	FC	0.02 U	0.02 U	0.04 U	0.02 U	0.02 U
Nickel	EPA200.8	8.2	MWC	0.5 U	0.6	0.5 U	0.5 U	0.5 U
Selenium	EPA200.8	5	FC1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	EPA200.8	1.9	MWA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	EPA200.8	81	MWC	**32**	**33**	**38**	**18**	**23**
PCBs (µg/L)								
Aroclor 1221	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1232	SW8082			0.01 U	0.015 U	0.01 U	0.01 U	0.01 U
Aroclor 1242	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1016	SW8082			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1248	SW8082			0.01 U	0.01 U	0.025 U	0.015 U	0.015 U
Aroclor 1254	SW8082			0.01 U	0.01 U	**0.022**	**0.018**	**0.012**
Aroclor 1260	SW8082			0.01 U	0.01 U	**0.015**	0.01 U	0.01 U
Aroclor 1262	SW8082			0.01 U	NA	NA	0.01 U	NA
Aroclor 1268	SW8082			0.01 U	NA	NA	0.01 U	NA

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
Total PCBs		0.014	FC	0.01 U	0.015 U	**0.037**	**0.018**	**0.012**
PAHs (µg/L)								
Naphthalene	SW8270DSIM			**0.099**	**0.036**	**0.11 J**	**0.04**	**0.058**
Acenaphthylene	SW8270DSIM			0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	SW8270DSIM	990	HHO	**0.014**	**0.025**	**0.028**	**0.024**	**0.037**
Fluorene	SW8270DSIM	5300	HHO	0.017	0.01 U	**0.028**	**0.014**	0.01 U
Phenanthrene	SW8270DSIM			**0.1**	**0.094**	**0.52**	**0.19**	**0.046**
Anthracene	SW8270DSIM	40,000	HHO	0.01 U	0.01 U	**0.048**	0.01 U	0.01 U
1-Methylnaphthalene	SW8270DSIM			**0.087**	**0.015**	**0.088**	**0.023**	**0.052**
2-Methylnaphthalene	SW8270DSIM			**0.13**	**0.023**	**0.13**	**0.034**	**0.066**
Fluoranthene	SW8270DSIM	140	HHO	**0.24**	**0.27**	**1.4**	**0.38**	**0.12**
Pyrene	SW8270DSIM	4,000	HHO	**0.14**	**0.17**	**0.95**	**0.24**	**0.074**
Benzo(a)anthracene	SW8270DSIM	0.018	HHO	**0.039**	**0.07**	**0.37**	**0.064**	**0.013**
Chrysene	SW8270DSIM	0.018	HHO	**0.16**	**0.2**	**0.99**	**0.23**	**0.074**
Benzo(b)fluoranthene	SW8270DSIM	0.018	HHO	**0.099**	**0.16**	**0.71**	**0.2**	**0.04**
Benzo(k)fluoranthene	SW8270DSIM	0.018	HHO	**0.099**	**0.16**	**0.71**	**0.11**	**0.04**
Benzo(a)pyrene	SW8270DSIM	0.018	HHO	**0.069**	**0.13**	**0.65 J**	**0.088**	**0.019**
Indeno(1,2,3-cd)pyrene	SW8270DSIM	0.018	HHO	**0.067**	**0.11**	**0.6**	**0.086**	**0.022**
Dibenz(a,h)anthracene	SW8270DSIM	0.018	HHO	**0.022**	**0.041**	**0.23**	**0.025**	0.01 U
Benzo(g,h,i)perylene	SW8270DSIM			**0.08**	**0.13**	**0.73**	**0.099**	**0.024**
Chlorinated Hydrocarbons (µg/L)								
1,3-Dichlorobenzene	SW8260C	960	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,4-Dichlorobenzene	SW8260C	190	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichlorobenzene	SW8260C	1,300	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2,4-Trichlorobenzene	SW8260C	70	HHO	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Hexachlorobenzene	SW8270D[1]	0.00029	HHO	0.05 U	0.05 U	1 U	1 U	1 U
Phthalates (µg/L)								
Dimethylphthalate	SW8270D	1,100,000	HHO	1 U	1 U	1 U	1 U	1 U
Diethylphthalate	SW8270D	44,000	HHO	1 U	1 U	1 U	1 U	1 U
Di-n-Butylphthalate	SW8270D	4,500	HHO	1 U	1 U	1 U	1 U	1 U
Di-n-Octyl phthalate	SW8270D			1 U	1 U	**2.1**	1 U	1 U
Butylbenzylphthalate	SW8270D	1,900	HHO	1 U	1 U	1 U	1 U	1 U
bis(2-Ethylhexyl)phthalate	SW8270D	2.2	HHO	1 U	1 U	**1.2**	**1.6**	1 U
Phenols (µg/L)								
Phenol	SW8270D	860,000	HHO	1 U	1 U	**1.5**	**3.2**	1 U
2-Methylphenol	SW8270D			1 U	1 U	1 U	1 U	1 U
4-Methylphenol	SW8270D			1 U	1 U	1 U	1 U	1 U

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
2,4-Dimethylphenol	SW8270D	850	HHO	1 U	1 U	1 U	1 U	1 U
Pentachlorophenol	SW8270D	7.9	MWC	5 U	5 U	5 U	5 U	5 U
Miscellaneous Extractables (µg/L)								
Benzyl Alcohol	SW8270D			5 U	5 U	5 U	5 U	5 U
Benzoic Acid	SW8270D			10 U	10 U	10 U	10 U	10 U
Dibenzofuran	SW8270DSIM			**0.011**	0.01 U	**0.03**	**0.013**	0.01 U
Hexachlorobutadiene	SW8260C[2]	18	HHO	0.05 U	0.05 U	0.5 U	0.5 UJ	0.5 U
N-Nitrosodiphenylamine	SW8270D	6	HHO	1 U	1 U	1 U	1 UJ	1 U
Volatile Organics (µg/L)								
Trichloroethene	SW8260C	30	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1,1,2-Tetrachloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1,2,2-Tetrachloroethane	SW8260C	4	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Ethylbenzene	SW8260C	2,100	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
m, p-Xylene	SW8260C			0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 U
o-Xylene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Pesticides (µg/L)								
alpha-BHC	SW8081B	0.0049	HHO	0.05 U	0.05 U	NA	NA	NA
beta-BHC	SW8081B	0.017	HHO	0.05 U	0.05 U	NA	NA	NA
delta-BHC	SW8081B			0.05 U	0.05 U	NA	NA	NA
gamma-BHC (Lindane)	SW8081B	0.08	FC	0.05 U	0.05 U	NA	NA	NA
Heptachlor	SW8081B	0.0036	MWC	0.05 U	0.05 U	NA	NA	NA
Heptachlor Epoxide	SW8081B	0.0036	MWC	0.05 U	0.05 U	NA	NA	NA
Aldrin	SW8081B	0.00005	HHO	0.05 U	0.05 U	NA	NA	NA
Dieldrin	SW8081B	0.0019	MWC	0.1 U	0.1 U	NA	NA	NA
Aldrin+Dieldrin		0.0019	FC/MWC	0.1 U	0.1 U	NA	NA	NA
Endrin	SW8081B	0.0023	MWC	0.1 U	0.1 U	NA	NA	NA
Endrin Ketone	SW8081B			0.1 U	0.1 U	NA	NA	NA
Endrin Aldehyde	SW8081B			0.1 U	0.1 U	NA	NA	NA
4,4'-DDT	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA
4,4'-DDD	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA
4,4'-DDE	SW8081B	0.001	FC/MWC	0.1 U	0.1 U	NA	NA	NA
Endosulfan I	SW8081B	0.0087	MWC	0.05 U	0.05 U	NA	NA	NA
Endosulfan II	SW8081B	0.0087	MWC	0.1 U	0.1 U	NA	NA	NA
Endosulfan Sulfate	SW8081B	0.0087	MWC	0.1 U	0.1 U	NA	NA	NA
Methoxychlor	SW8081B			0.5 U	0.5 U	NA	NA	NA
gamma Chlordane	SW8081B	0.004	MWC	0.05 U	0.05 U	NA	NA	NA
alpha Chlordane	SW8081B	0.004	MWC	0.05 U	0.05 U	NA	NA	NA

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
Toxaphene	SW8081B	0.0002	FC/MWC	5 U	5 U	NA	NA	NA
Miscellaneous 8260 VOCs (µg/L)								
Acrolein	SW8260C	3	FWC	5 U	5 U	5 U	5 UJ	5 U
Methyl Iodide	SW8260C			1 U	1 U	1 U	1 UJ	1 U
Bromoethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Acrylonitrile	SW8260C	0.25	HHO	1 U	1 U	1 U	1 UJ	1 U
1,1-Dichloropropene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Dibromomethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dibromo-3-chloropropane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,2,3-Trichloropropane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
trans-1,4-Dichloro-2-butene	SW8260C			1 U	1 UJ	1 UJ	1 UJ	1 U
1,3,5-Trimethylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2,4-Trimethylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Ethylene Dibromide	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Bromochloromethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
2,2-Dichloropropane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,3-Dichloropropane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Isopropylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
n-Propylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Bromobenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
2-Chlorotoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
4-Chlorotoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
tert-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
sec-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
4-Isopropyltoluene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
n-Butylbenzene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2,3-Trichlorobenzene	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Chloromethane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Bromomethane	SW8260C			0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Vinyl Chloride	SW8260C	2.4	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Chloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Methylene Chloride	SW8260C	590	HHO	**0.8**	**2**	**2.6**	**1.8 J**	**0.8**
Acetone	SW8260C			**25**	**28**	**220 J**	**30 J**	**5.1**
Carbon Disulfide	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1-Dichloroethene	SW8260C	7,100	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1-Dichloroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
trans-1,2-Dichloroethene	SW8260C	10,000	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
cis-1,2-Dichloroethene	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Chloroform	SW8260C	470	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloroethane	SW8260C	37	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
2-Butanone	SW8260C			**46**	**83**	**40**	**27 J**	**13**
2-Butanone (grab)	SW8260C			NA	NA	NA	5 U	NA
1,1,1-Trichloroethane	SW8260C	16	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Carbon Tetrachloride	SW8260C	1.6	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Vinyl Acetate	SW8260C			1 U	1 U	1 U	1 UJ	1 U
Bromodichloromethane	SW8260C	17	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,2-Dichloropropane	SW8260C	15	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
cis-1,3-Dichloropropene	SW8260C	21	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Dibromochloromethane	SW8260C	13	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1,2-Trichloroethane	SW8260C	16	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Benzene	SW8260C	51	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
trans-1,3-Dichloropropene	SW8260C	21	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
2-Chloroethylvinylether	SW8260C			1 U	1 U	1 U	1 UJ	1 U
Bromoform	SW8260C	140	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
4-Methyl-2-Pentanone (MIBK)	SW8260C			5 U	5 U	5 U	5 UJ	5 U
2-Hexanone	SW8260C			5 U	5 U	5 U	5 UJ	5 U
Tetrachloroethene	SW8260C	3.3	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Toluene	SW8260C	15,000	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Chlorobenzene	SW8260C	1,600	HHO	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Styrene	SW8260C			**0.2**	0.2 U	0.2 U	0.2 UJ	0.2 U
Trichlorofluoromethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	SW8260C			0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Conventionals (mg/L-except pH)								
pH	PH			6.81	7.18	6.84	7.08	7
Alkalinity, Total	SM2320			12.5	41.8	21.8	40.7	79
Alkalinity as Carbonate	SM2320			1 U	1 U	1 U	1 U	1 U
Alkalinity as Bicarbonate	SM2320			12.5	41.8	21.8	40.7	79
Alkalinity as Hydroxide	SM2320			1 U	1 U	1 U	1 U	1 U
Hardness as CaCO3-Dissolved	SW6010B			10	30	16	NA	NA
Hardness as CaCO3-Total	SW6010B			11	30	19	31	63
Total Suspended Solids	EPA160.2			7.6 J	10.9	29.3	43	16.5
Chloride	EPA300.0			1.2	6.1	5	6.2	15.9
Nitrate	EPA300.0[3]			0.1 U	0.1	0.098	0.2	0.2
Sulfate	EPA300.0			0.8	1.8	1.2	2.4	7.4

Table 8
Summary of Results for Whole Water Samples at LS431

Sample ID Collection Date	Method	Criteria	Criteria Type	LS431 Event #1 10/17/2009	LS431 Event #2 10/29/2009	LS431 Event #3 11/6/2009	LS431 Event #4 12/15/2009	LS431 Event #5 2/5/2010
Dissolved Organic Carbon	EPA415.1			4.82	3.89	19.6	17.7	5.49
Total Organic Carbon	EPA415.1			5.59	4.58	21.1	21.2	9.81

MRLs reported for all undetected results
Gray highlighting indicates exceedance of the chronic water quality criteria
Green highlighting indicates chemical not detected at a reporting limit that exceeds the water quality criteria
Detections shown in **bold**
1. Hexachlorobenzene analyzed by SW8081B in samples LS431-101709-W and LS431-102909-W
2. Hexachlorobutadiene analyzed by SW8081B in samples LS431-101709-W and LS431-102909-W
3. Nitrate analyzed by EPA353.2 in sample LS431-110609-W
VQ - Validation qualifier
FC - Freshwater Chronic Critera
FA - Freshwater Acute Criteria
MWC - Marine Chronic Criteria
MWA - Marine Acute Criteria
HHO - Human Health Criteria, organisms only
U - Target analyte not detected at the reported concentration.
B - Analyte deteCted in an associated method blank
J - Estimated concentration when the value is less than established reporting limits.
Y - Equivalent to a U qualifier with a raised reporting limit.
NA - Not analyzed