November 2015 Middle River Fish Kill Investigation Report

Maryland
Department of
the Environment

In Partnership With

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

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Executive Summary

On November 9, 2015 the Department of Environment (MDE) received reports of dead fish in Middle River and its tributaries (Figure 1). In response, MDE lead a multiagency investigation with experts from the Maryland Department of Natural Resources, the University of Maryland, and the National Oceanic and Atmospheric Administration. Water samples collected at the height of the fish kill contained the toxic algae *Karlodinium veneficum* with a total toxin (e.g., karlotoxin) concentration high enough to cause significant gill damage to exposed fish (Place AR 2012, Bachvaroff TR 2009). Microscopic examination of organ tissue from fish collected also showed extensive gill damage consistent with karlotoxin exposure.

Additional water samples collected over the broader fish kill area on following days also contained *K. veneficum*, indicating that this algal bloom was a wide spread event. Algal cell counts were found to diminish during the sampling period indicating that the bloom was dying off during the monitoring effort and that higher cell counts may have been present when the fish kill began.

During the investigation MDE received several citizen complaints that the fish kill was a result of facility discharges. As a result, MDE Compliance staff investigated facilities of public concern and analyzed multiple associated water samples. The Department found no evidence that facility discharges caused this fish kill. Also, the large geographical area of the fish kill, laboratory confirmation of *K. venificum* in multiple samples and at toxic amounts, and fish histopathology results consistent with *K. venificum* exposure provided a significant weight of evidence for toxic algae as the cause. Unrelated compliance violations identified during the fish kill investigation are currently being addressed by the Department.

High salinity and unseasonably high water temperatures measured during the investigation indicated favorable conditions for the bloom to form (Adolf, JE et al 2008, Hall, NS 2008, Huan Zhang et al 2008). The high salinities also suggest that freshwater fish had limited room to avoid toxic algae exposure, which was supported by field observations of numerous fish survivors schooling in freshwater. Within 48 hours after the bloom began dying-off, an estimated 201,789 fish died. Ninety-nine percent of the fish killed during this event were freshwater species including; yellow perch, largemouth bass, bluegill sunfish, chain pickerel, black crappie, pumpkinseed sunfish, and spottail shiner. Estuarine species including; bullheads, white perch, striped bass, gizzard shad, and American eel were largely unaffected as they were able to escape into saltier water towards Chesapeake Bay.

Approximately 40% of all the dead fish were found in headwater areas and likely died from a combination of stranding and toxin exposure. The remaining fish likely died in situ throughout the upper Middle River and its tributaries, which include Norman Creek, Hopkins Creek, Darkhead Creek, Cow Pens Creek, and Frogmortar Creek (see Figure 1). The final cause of the fish kill was concluded to be gill damage caused by karlotoxin exposure, exacerbated by osmotic stress resulting from high salinities.

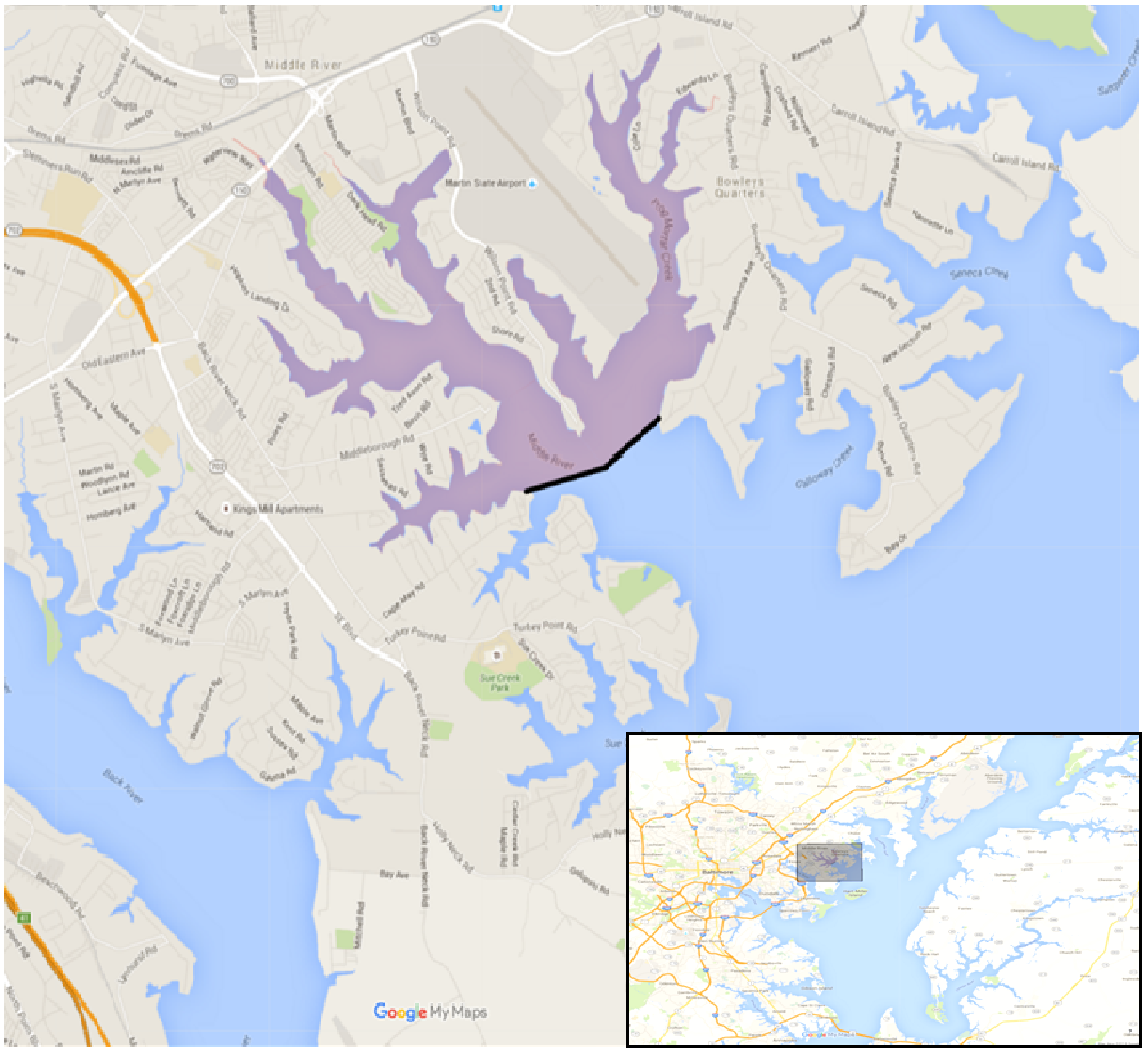


Figure 1: Area affected by Middle River Fish Kill, November 2015

Fish Kill Investigation Timeline and Findings

November 9 and 10

On November 9th MDE biologists responded to a report of dead fish in Norman Creek at the end of Vogts Lane (Figure 2). The water appeared fairly clear, with a slight greenish tint. SAV were clearly observed in the shallows. Water quality measured in-situ (Table 1) met State water quality standards and no dead fish were observed. A water sample was also archived for potential future reference.

Table 1: Norman Creek water quality.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.3	13.99	7.01	14,520	8.46	258	9.94	99.9

On November 10th MDE biologists responded to a second report of dead fish in Hopkins Creek. The investigation began at the Hopewell Point Community Marina at 11:18 AM. Water quality measured in-situ (Table 2) met State water quality standards. One freshly dead yellow perch and one redbreast sunfish were observed.

Table 2: Hopkins Creek water quality.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.5	13.79	7.07	13,621	8.15	408	9.9	n/a

During this period two stormwater management ponds were being treated at the Hopewell Point Community with a blue dye to control algae. Copies of the permits were obtained through MDE's Water Management Administration. There was no evidence of discharge into the creek.

A second area was investigated in the Middle River in the cove near Kingston Park along Kingston Park Lane (Figure 2). Twelve dead sunfish and three dead bay anchovies were observed. Several dozen fish were observed schooling lethargically near the bank; many were actively gulping for air at the surface. Water quality measured in-situ (Table 3) met State water quality standards and a second water sample was taken for laboratory analysis.

Table 3: Cove near Kingston Park water quality.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.5	14.36	7.00	14,256	8.3	414	8.73	n/a
1.2.	14.49	6.72	14,290	8.3	426	8.16	n/a

During the investigation dozens of fish were observed attempting to swim up a large storm water culvert near the Hawthorne Pumping Station at the head of the cove near Kingston Park. The pumping station operator on site reported that everything was operating normally. Visual inspection by the MDE biologist confirmed there was no sign of recent overflows. No unusual odor or color was observed in the cove near Kingston Park.

Laboratory analysis of water taken from the cove near Kingston Park identified a bloom of the fish killing algae *Karlodinium veneficum* present at 14, 382 cells/ml. Samples were delivered later that day to Dr. Allen Place at the University of Maryland's Institute of Marine and Environmental Technology (IMET) for karlotoxin analysis. His results indicated that two forms of karlotoxin KmTx1 and KmTx 3 were in the water sample along with their sulfated forms. These are the congeners expected for the Chesapeake Bay. Initial estimates were Kmtx 1 12-15 ng/ml and KmTx 3 8-12 ng/ml with similar values for the sulfated forms (Appendix 2). The total karlotoxin concentration was near 50 ng/ml, which has been shown to cause significant gill damage in laboratory fish over several hours (Deeds, JR 2006). Furthermore, a 125 dilution of the purified toxins resulted in 50% hemolysis or rupturing of fish red blood cells in 1 hour. This is equivalent ~200 ng/ml of purified KmTx 1 or KmTx 3 which is consistent with the estimate obtained by High-performance liquid chromatography (HPLC). IMET also analyzed the water sample chemistry (Table 4) which met state water quality standards.

Table 4: IMET Water Sample Analysis Results:

NH4	NO2-	pH	Alkalinity	Salinity (ppt)	Cu (mg/l)
0.06	0.01	6.91	80.4	8.2	0.028

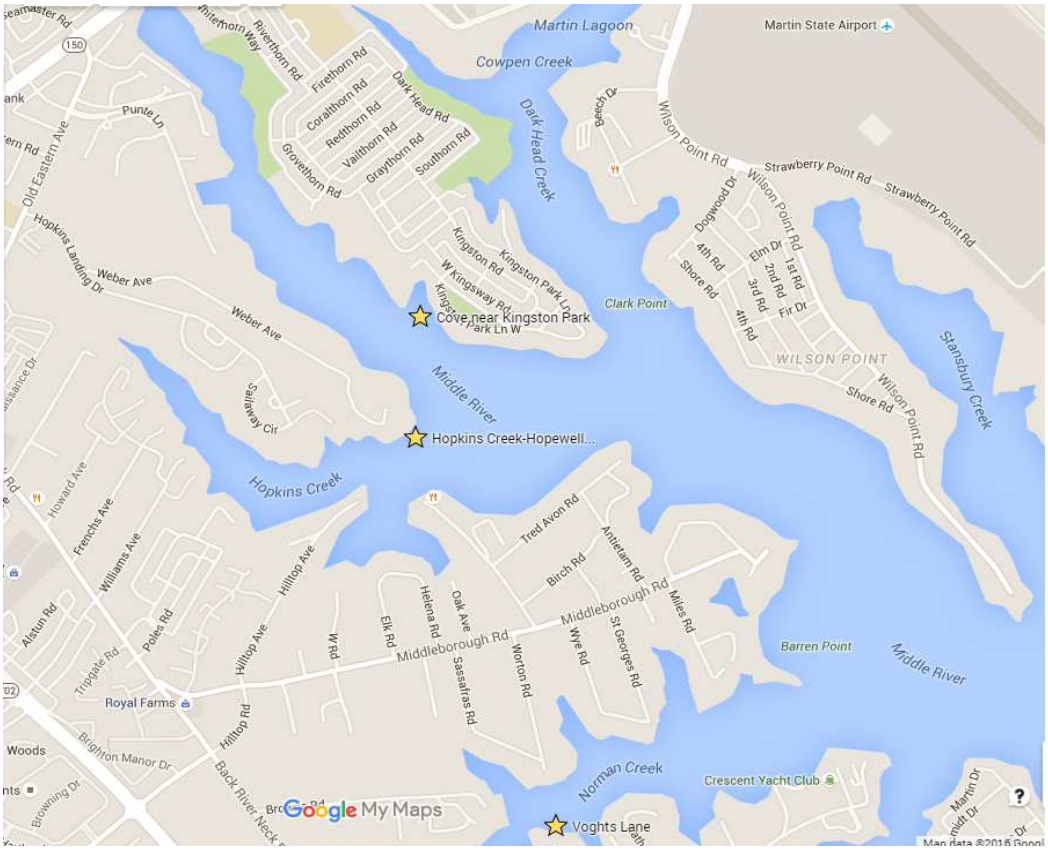


Figure 2: Initial phase of Middle River Fish Kill Investigation. Events of November 09 and 10, 2015.

November 12

MDE biologists returned to meet a local resident at the Darkhead Creek boat ramp (Figure 3), 10:50 AM, where they joined him on his boat to conduct further investigation. During this period approximately 150 freshly dead sunfish 2-6" were observed scattered on the river bottom near the boat ramp. Water quality measured in-situ (Table 5) met State water quality standards.

Table 5: Darkhead Creek water quality.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.5	14.2	8.0	14,284	8.3	n/a	7.30	n/a
3.65	14.4	8.1	14,407	8.7	n/a	6.70	n/a

Pockets of "cooked cabbage" smell were periodically detected in the area, which is a typical smell associated with decomposing algae. Numerous stressed fish were observed throughout the upper Darkhead Creek area. Approximately 100 dead fish per 30 feet of shoreline were observed in this area. They included yellow perch, pumpkinseed sunfish, Atlantic menhaden, largemouth bass, chain pickerel, black crappie, and golden shiner. No active discharges were observed in this area.

Random counts of dead fish were conducted at stations in Martin Lagoon CP1-4 and ML1-8 (Figure 3). Water quality measured in-situ (Table 6) met State water quality standards. Counts per linear feet of shoreline were as follows: 20/30ft., 50/30ft., 24/30ft., 60/30ft., 200/30ft., 20/30ft., 12/30ft, 0/20ft, old seaplane ramp 50/30ft (station CP1), Cowpens' Creek (station CP2-4) 12/30ft, 500/30ft, 100/1ft, and a cove across from the boat Ramp at 10 per square foot (station DHC). Water quality measured in-situ (Table 6) met State water quality standards.

Table 6: Martin Lagoon water quality.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.5	14.7	7.9	14,359	8.3	n/a	7.2	n/a

Hopkins Creek fish were scattered at a concentration of approximately 1/300ft., sunfish and one carp were observed. A water sample was collected near Hopewell Point.
Water quality measured in-situ (Table 7) met State water quality standards.

Table 7: Hopkins Creek water sample.

Depth (m)	Temp. (C)	pH	Conductivity (uS/cm)	Salinity (ppt)	Redox	D.O. (mg/l)	% DO sat.
0.5	14.3	7.8	14,280	8.3	n/a	8.4	n/a

Numerous struggling fish were also observed. Biologists collected two struggling pumpkinseed sunfish, two yellow perch and one bluegill from near Kingston Park, which were necropsied and fixed in 10% formalin for histological analysis.

The histological results indicated acute respiratory failure as a result of pathological changes to the architecture of the gills. The observed gill lesions are consistent with published reports of exposure to karlotoxin from *K. veneficum* blooms (Deeds JR 2006) (Appendix 1).

Another 20 dead fish/20ft and 150/30ft were observed in a small cove near Hilltop Ave. No active discharges were observed in this area. No unusual odor or color was associated with the water in this area.

Water samples analyzed contained 586 cells/ml *K. veneficum* in Darkhead Creek and 707 cells/ml *K. veneficum* in Middle River near the mouth of Hopkins Creek.

November 14

An MDE biologist revisited Darkhead Creek and Cowpens Creek to ensure no pollution discharges were occurring. None were found. MDE's Land Management Administration and Water Management Administration (LMA and WMA, respectively) Compliance Units were notified to conduct further inspections at both properties (see Compliance Investigation Timeline and Findings section below). LMA staff also contacted Lockheed Martin (LMC) regarding current stormwater management controls at their remediation site on Dark Head Creek/Cowpens Creek (see "LMC Remediation" in Figure 7) and no violations were found.

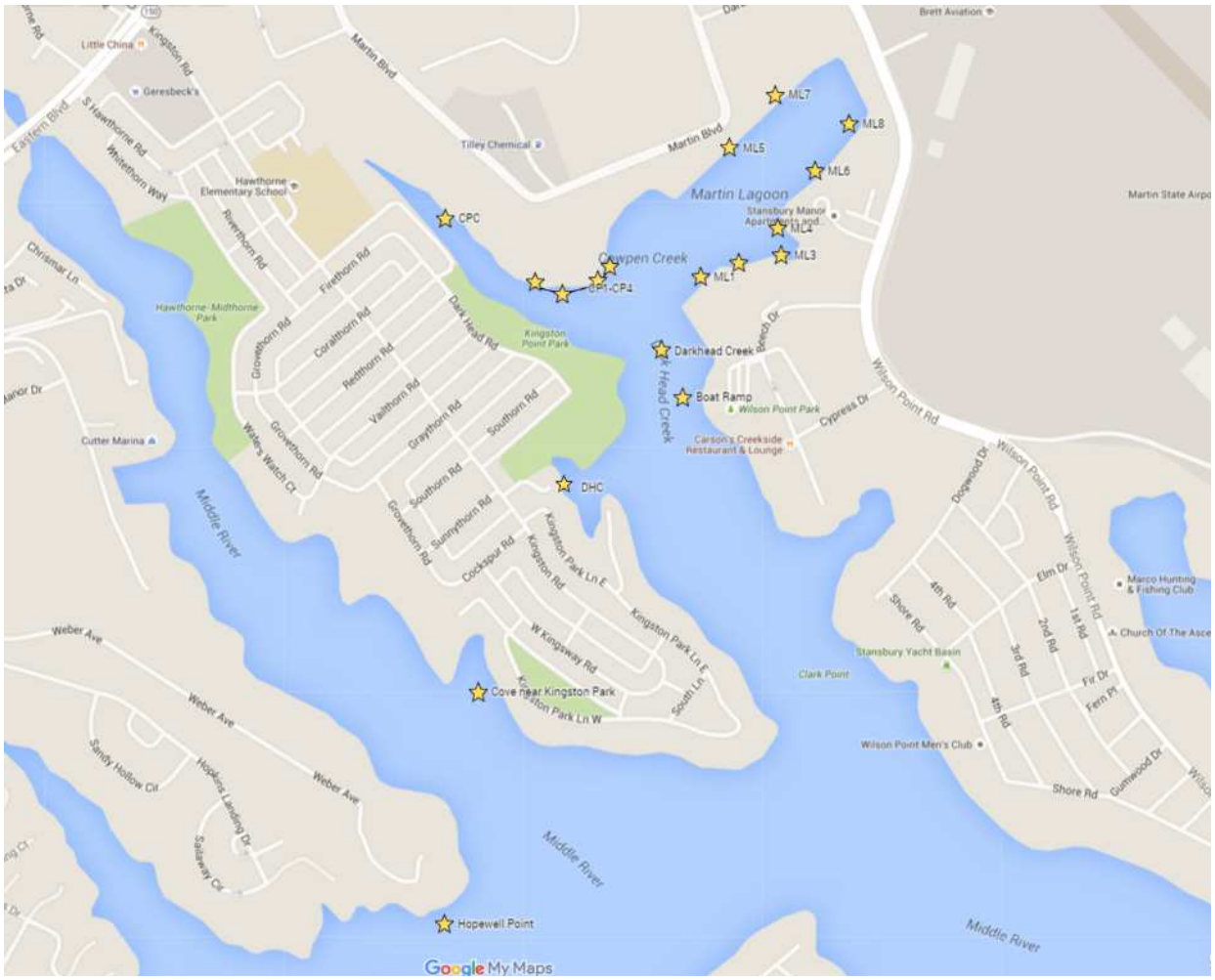


Figure 3: Middle River Fish Kill Investigation. Events of November 12-14, 2015.

November 16

MDE biologists again met a local citizen at 11:20 AM to further investigate the area by boat. New reports from residents indicated that there were large accumulations of dead fish in upper Middle River near Hawthorne-Midthorne Park and in the extreme tidal headwaters of Cowpens Creek and Frogmortar Creek (Figure 4).

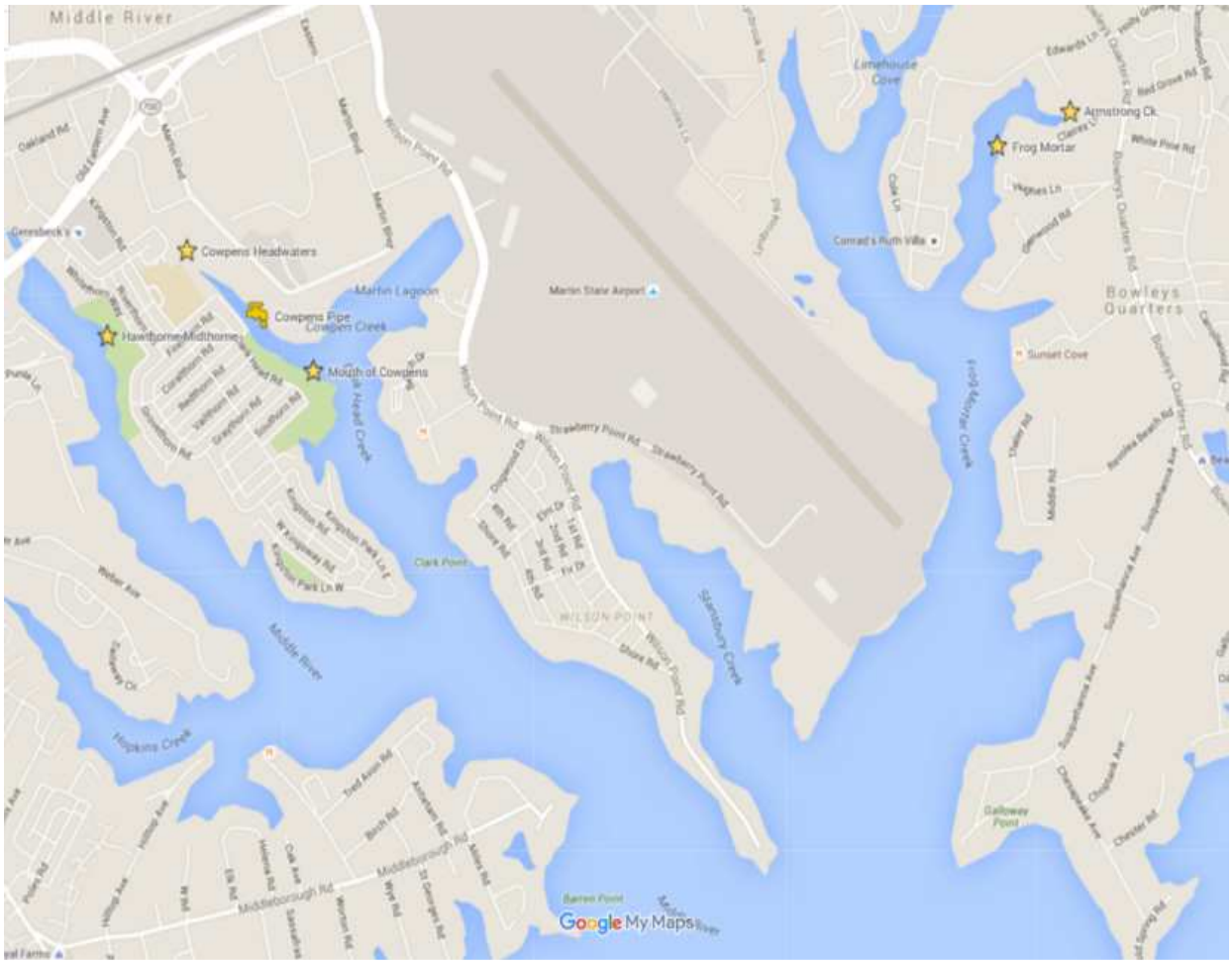


Figure 4: Middle River Fish Kill Investigation. Events of November 16, 2015.

In response to the citizen's report, biologists began by investigating a small discharge occurring from a pipe in the bank in Cowpens Creek, approximately 300 yards west of the old seaplane ramp. A small trickle of grayish water, with a mild organic-chemical odor was found discharging from an old 8" iron pipe (Figure 5). This pipe is shown on historical site map records to be an outfall from Tilley Chemical stormwater pond as provided by Tilley Chemical to MDE (see "SW-Outfall (OF-001)" in Figure 7).

Figure 5: Discharge into Cowpens Creek.

At 11:40 AM two water samples were extracted from the discharge pipe and archived awaiting results from contemporaneous MDE WMA Inspection and Compliance water sampling initiatives, which included this discharge pipe, a trench drain and stormwater pond on the Tilley Chemical property (Figure 7).

Figure 6: Zoomed out view showing pipe in Cowpens Creek obstructed by large pieces of concrete, possibly put in place for bank stabilization.

A water sample was also collected near the mouth of Cowpens Creek. Analysis revealed that no *K. veneficum* was present during this period, the water was clear and the bottom was plainly visible.

The head of Cowpens Creek was also investigated on November 16th during low tide. During this time thousands of fish were unnaturally concentrated up the creek to the high tide line. Numerous live fish were congregating in the flowing part of the stream. Many had been stranded on the bank and gravel bars during previous ebb tides. Biologists observed approximately fifty dead fish every twenty feet of streambed, which was approximately ten feet wide. Dead fish included yellow perch, pumpkinseed sunfish, largemouth bass, golden shiner, chain pickerel, bluegill sunfish, gizzard shad, carp, and white perch. One struggling gizzard shad was necropsied and placed in 10% formalin for histological exam. The histological results indicated death was most likely from acute respiratory failure as a result of pathological changes to the architecture of the gills. The observed lesions are consistent with published reports of exposure to karlotoxin from *K. veneficum*.

The head of Frogmortar Creek (Armstrong Creek) was investigated at Claires Lane. Hundreds of fish were again unnaturally concentrated up into the intertidal headwaters. Several hundred live fish were observed swimming in the flowing stream, which was approximately 5 feet wide. Approximately 500 dead fish were observed along a fifty foot stretch. They included spottail shiner, carp, and sunfish species. A water sample was taken for future analysis. One spottail shiner was collected for histological analysis. As with the other fish samples collected, the gills of this fish were damaged in a way consistent with exposure to karlotoxin.

Frogmortar Creek was also investigated at the end of Claires Lane. Approximately 90 dead fish/85 yards were observed evenly distributed from the shoreline out to a depth where the bottom could no longer be seen.

At 14:30, Middle River at Hawthorne-Midthorne Park, below the Rt. 150 bridge was investigated. Approximately 100 evenly distributed dead fish were observed from the pier at the park. Fish included yellow perch, bluegill sunfish, and largemouth bass.

Compliance Investigation Timeline and Findings

During the fish kill investigation the Department also received citizen complaints regarding potential illicit discharges to Cowpens and Dark Head Creeks from the Lockheed Martin soil remediation site and Tilley Chemical distribution facility. Compliance staff from MDE's Land Management Administration (LMA) and Water Management Administration (WMA) responded by performing the following on-site inspections.

November 16

WMA inspected the Tilley Chemical property (Figure 7). The connection between the stormwater pond and outfall was confirmed through the use of historical site map records provided by Tilley Chemical. No discharge violations were observed. However, follow up inspections were scheduled to sample the Tilley Chemical stormwater pond and its mapped discharge point, and investigate the adjoining Lockheed Martin property.

November 17

LMA inspected the Tilley property and found permit violations. However, there was no evidence of a major spill that could have caused a fish kill. WMA collected a water sample from the small stormwater outfall pipe ("SW Outfall (OF-001)", see Figure 7) into Cowpens Creek. Another potential discharge point was identified, but submerged by high tide. Inspectors planned to return and sample during a storm/runoff event.

November 19

WMA re-sampled, during a storm event producing runoff, the small stormwater outfall pipe ("SW Outfall (OF-001)") and collected samples from a stormwater management pond and a trench system at the Tilley Pond (Figure 7). Also, an inspection of stormwater outfalls on the Lockheed property was performed. No other outfalls of concern were identified.

November 20

LMA issued Tilley Chemical a site complaint for their noted violations and is continuing site inspections to ensure violations are corrected and identify any potential additional violations.

November 24

WMA continued inspections at Lockheed and Tilley. Noncompliance issues regarding secondary containment and general housekeeping issues were noted by WMA at Tilley Chemical. Compliance inspections will continue to verify corrective actions have been implemented and that the facility maintains the correct stormwater permit coverage.

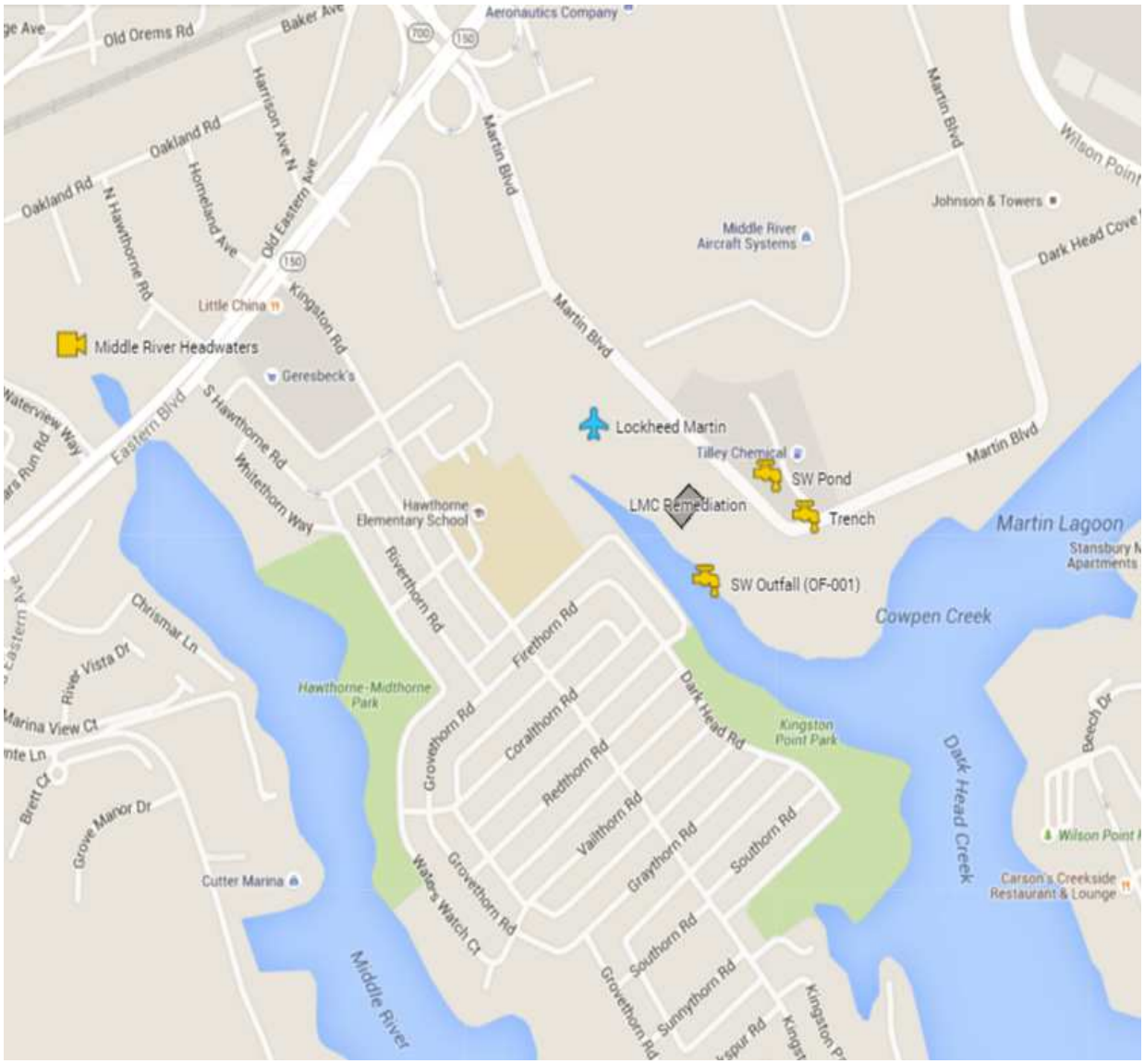


Figure 7: Middle River Fish Kill Investigation. Events of November 17-24, 2015.

Compliance Findings

No compliance issues were identified at the Lockheed soil remediation site. Site inspections of the Tilley Chemical facility identified compliance issues related to hazardous waste labeling, storage, record keeping/reporting, and chemical containment. In addition, the sampling results (see Appendix 3) from the storm drain system indicate that trace pollutants (organics, semi-volatile and volatile compounds) are mixing with storm water discharges in the upland drainage area. The investigation into the corrective actions necessary continues within WMA and LMA. Tilley Chemical has hired professional contractors to address all compliance issues to MDE's specifications.

The compliance issues identified during this investigation were determined to have no connection to the fish kill event. The reason for this conclusion is that the other water quality, algal toxin, and fish pathology results detailed in the Fish Kill Investigation and Findings section establish a clear scientific basis for the fish kill that is also consistent with the broad geographical scale and magnitude of the event. Furthermore, there is no scientifically credible explanation where the small volume of discharges identified during compliance investigations could produce a simultaneous fish kill over such broad and hydrologically distinct areas.

Estimation of Total Fish Mortalities

Dead fish were observed in several areas (assessment units) throughout the Middle River system. The number of fish in each assessment unit was estimated. Then the sum of dead fish in all assessment units where dead fish were observed was totaled (Figure 8) to estimate the magnitude of the fish kill.

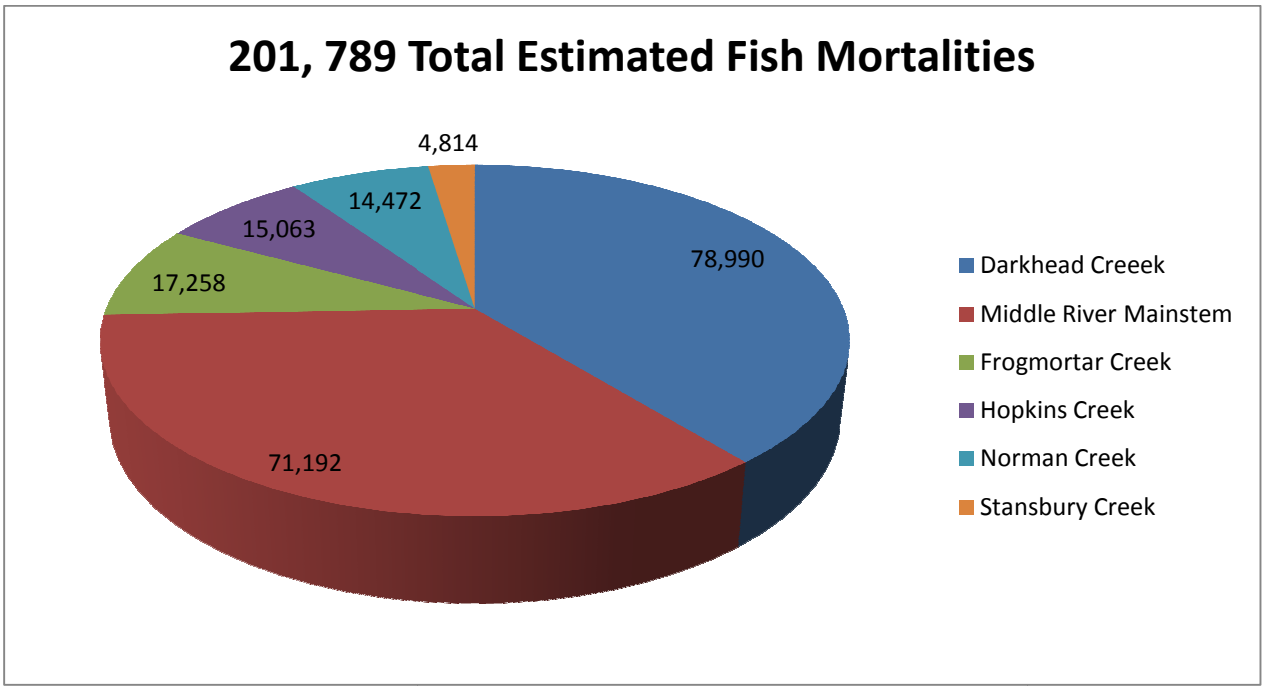


Figure 8: Total Estimated Fish Mortalities Across All Assessment Units.

Depending on the concentration of fish and the overall size of an assessment unit, one of two methods was used to estimate the dead fish in the unit.

1. For assessment units where there was a high concentration of dead fish in a small area, biologists either counted all the dead fish or delineated and sub sampled a portion of the total area to create a small assessment unit. An example of small, concentrated assessment units are the extreme tidal headwaters of some of the affected tributaries that are likely flowing streams during low tide.
2. For assessment units where there was a lower concentration of dead fish over a larger area, counts of dead fish were made over a subsection of shoreline. MDE biologists estimated the length of these shoreline subsections by counting their steps when walking and converting those steps to linear feet. These counts (or their means) within the assessment units were then extrapolated over the total length of the shoreline in the unit. A digital mapping program was used to determine the total length of shorelines affected by the fish kill. Examples of large areas with lower concentrations of dead fish are the lower tidal portions of the tributaries (Frogmortar Ck, Hopkins Ck, Norman Creek, Darkhead Creek) and the Middle River mainstem between Rt. 150 and Wilson Point.

Most counts of dead fish were made by MDE biologists. Some counts made by citizen reports were also used and the methods used for those counts are unknown. In the lower tidal tributaries, counts were made by boat or by walking the shoreline and docks. Because the tributaries are wide, many of the fish were on the bottom, and the bottom was not visible near the channels, it is likely that the estimates are less than the actual number of dead fish.

Conclusions

A very large fish kill occurred in early November 2015 throughout the upper Middle River and its tributaries, including Norman Creek, Hopkins Creek, Darkhead Creek, Cowpens Creek, and Frogmortar Creek. The fish kill probably began on the evening of Sunday, Nov. 8 or early morning of Monday the 9th. Within 48 hours an estimated 201,789 fish died. The cause of the fish kill was concluded to be gill damage and respiratory failure caused by karlotoxin, a fish killing toxin produced by a bloom of the dinoflagellate, *Karlodinium veneficum* (Deeds, JR 2006). The effects of the toxin were exacerbated by osmotic stress associated with rising salinity. Since the fish kill involved predominately freshwater species it is likely they formed schools in the headwaters by rising salinity, leaving no escape route from the algal bloom and its associated toxins.

The data collected demonstrates that conditions (salinity over 8ppt and temperature over 60°F) favorable for a widespread bloom of Karlodinium veneficum occurred in Middle River for a finite period. DNR Fisheries data (Jim Uphoff, personal communication) demonstrates that salinity rose in the headwaters of the system from 2-4 parts per thousand (ppt) during July through September, to 8.5 ppt by early November. The increase in salinity was caused by dry

weather and low freshwater input into the region, allowing the underlying salt wedge to encroach farther upstream into the system.

At the time when the rising salinity reached 8 ppt, water temperatures were still above 60F and the bloom formed. Excess nutrients are required for algal blooms. There are many sources of nutrients in the Chesapeake Bay (e.g. legacy, stormwater runoff, agriculture, fertilizers, septic and sewage treatment systems). We suggest that this bloom was fed by nutrients that came from both the Middle River watershed (in runoff and nutrient recycling from other biomass) and from nutrients carried upstream with the encroaching salt wedge.

By November 8th or 9th, the bloom had formed and reached its maximum cell count, likely much higher than 15,000 cells/milliliter(ml). The sample with the highest concentration for *K. veneficum* (14,382 cells/ml), was collected on the 10th, more than 24 hours after the fish kill had begun. Two days later, cell counts had fallen to 586 and 707 cells/ml. By the 16th the algae was not found. This die-off trend, if extrapolated to the day before the kill began, implies cell counts were likely much higher on the 8th. The total karlotoxin level was 50 ng/g (sufficient to cause significant damage when fish are exposed for several hours in duration) on the 10th at the mouth of Hopkins Creek.

As water temperatures fell below 60°F, and available nutrients (and, or other essential elements such as prey) potentially became too scarce to sustain the bloom, it died off (Adolf, JE et al 2008, Fu Fei-xue et al, 2010, Hall, NS 2008, Hallegraeff, G 2010). As essential elements (including nutrients) decrease for a *K. veneficum* bloom, the cells undergo physiological changes to enable them to become more heterotrophic or predatory, and therefore more toxic (Sheng Jian et al 2009, Bachvaroff, TR 2009).

Several citizens voiced concerns that runoff or illicit discharges from discrete sources had caused this fish kill. All reports were investigated by the appropriate authorities and, where noncompliance was discovered, the appropriate enforcement response has been taken. No evidence of a discharge that could have caused a fish kill was found. Furthermore, this fish kill took place nearly simultaneously in several remote tributaries. It is impossible for a toxic discharge to travel from one affected location, undiluted, to the other locations without many tidal flows and ebbs over several days. The fact that live fish were concentrated in, not away from, several extreme headwaters, also exonerates those headwaters as the source of any toxic discharge. The timing of events and geographical remoteness of the affected areas clearly points to environmental conditions endemic to the Middle River system as the source of the stressor(s) that concentrated and killed more than 200,000 fish.

References

Adolf JE, Bachvaroff T, Place AR (2008) Can cryptophyte abundance trigger toxic Karlodinium veneficum blooms in eutrophic estuaries? Harmful Algae 8: 119–128.

Bachvaroff, T. R., Adolf, J. E., Squier, A., Harvey, H. R. and Place, A. R. (2008). Liquid Chromatographic-Mass Spectroscopic Characterization, Detection and Quantification of Karlotoxins. Harmful Algae 7; 473-484.

Bachvaroff TR, Adolf JE, Place AR (2009) Strain variation in Karlodinium veneficum (Dinophyceae): Toxin profiles, pigments, and growth characteristics. J Phycol 45: 137–153.

Deeds JR, Reimschuessel R, Place AR (2006) Histopathological effects in fish exposed to the toxins from Karlodinium micrum (Dinophyceae). J Aquat Anim Health 18: 136–148.

Fu Fei-xue et al. (2010) Co2 and Phosphate Availability Control to Toxicity of the Harmful Bloom Dinoflagellate Karlodinium veneficum, Aquatic Microbial Ecology, Vol 59: 55-65

Hallegraeff, G, Mooney B., Evans K., (2010) What Triggers Fish Killing Karlodinium veneficum Dinoflagellate Blooms in the Swan Canning River System? Swan Canning Research and Innovation Program, Final Report

Hall, NS (2008) Environmental Factors Contributing to the Development and Demise of a Toxic Dinoflagellate (Karlodinium veneficum) Bloom in a Shallow, Eutrophic, Lagoonal Estuary, Estuaries and Coasts:JCERF 31:402-418

Huan Zhang, Wayne Litaker, Mark W. Vandersea, Patricia Tester and Senjie Lin (2008) Geographic distribution of *Karlodinium veneficum* in the US east coast as detected by ITS-Ferredoxin Real-Time PCR assay. Oxford University Press

Place A.R., Bowers H.A., Tsetvan R.B., (2012) Karlodinium veneficum- The little dinoflagellate with a big bite. Harmful Algae (14) 179-195

Sheng Jian et al. (2009) A Dinoflagellate Exploits Toxins to Immobilize Prey Prior to Ingestion. Harvard University, Cambridge M.A.

Uphoff, J (2015) Personal Communication. Maryland DNR Fisheries Service

Appendix 1: Histology Report

Mark Matsche, MS
Fisheries Pathobiologist
Cooperative Oxford Laboratory
Phone: 410-226-5421 x129
Fax: 410-226-0120
Email: mark.matsche@maryland.gov

Accession #:	15-MR-XX	Study:	Fish Kill
Species:	Various		
Date Collected:	11/12/2015 and 11/16/2015	Notes:	
Collection Site:	Middle River and sub-tributaries		

History: From Charlie Poukish - The fish kill was first reported last Monday (November 9th) in a tributary of MIddle River (Norman Creek). On Tuesday we collected a sample in Hopkins Creek that had a bloom of Karlodinium venificum at potential lethal levels (14,382 cells/ml). Samples were taken to Dr Place for Karlotoxin analysis, however he has been away at an algae toxin conference all week and will not be able to analyze it until next week. The kill incorporates all of the upper Middle River area, involving over 200,000 fish. Thus far, no illicit discharge has been identified, however the investigation is continuing. The fish appeared to all die at the same time.

In all likelihood this algae bloom was present for an extended period during late fall as the water temperatures stayed unseasonably warm well into the beginning of November. We are theorizing that the fish kill commenced after the water temperature dropped below the lower lethal limit of 62F resulting in sudden release of toxin.

Sample Comments: Samples were delivered to the COL either trimmed or intact and in 10%NBF. Signs of autolysis and insufficient fixation were evident in internal organs in intact fish (opening made ventrally). Suggest basic dissection in the field to enhance fixation.

Histological Results for Fish 1-5

Organ Analyzed	Yellow Perch 15-MR-YP-1	Yellow perch 15-MR-YP-2	Gizzard shad 15-MR-GZ-3	Pumkinseed 15-MR-PM-4	Pumkinseed 15-MR-PM-5
	11/12/2015	11/12/2015	11/16/2015	11/12/2015	11/12/2015
	Middle River cove near Kingston Park	Middle River cove near Kingston Park	Cow Pen Creek	Middle River cove near Kingston Park	Middle River cove near Kingston Park
Skin	X	X	X		
Eye	G in retial capillaries-1f	X		X	X
Nares					
Muscle	X	X	X		X
Gills	club-2d, fuse-4,eros-4d, tel-2m, hem-4d, vasodil-3m, slough-3d	fuse-4,eros-4d, hem-4d, vasodil-4m, slough-2d, ↑eosinophils, protozoan-like cells inter- and intra-lamellar 12-18µm	Epitheliocystis-1, epith lifting-2d, congestion-3, club-2, eros-2d	Digeneans-2, eros-4, fuse-4, slough-4, hem-3, epith necrosis-3, proto-like cells	Club-3, fuse-5, epith hyperplasia-3, slough-1, eros-2
Pseudobranch					

Fish 1-5 Continued

Organ Analyzed	15-MR-YP-1	15-MR-YP-1	15-MR-GZ-3	15-MR-PM-4	15-MR-PM-5
Liver	X lg-2	X lg-1	X lg-1	Digenean metacercariae-3, lg-2	X lg-3
Esophagus					
Stomach					
Intestine					
Peritoneum					
Swim bladder					
Pancreas	Islets in liver and mesenteries	X	X		
Spleen		Dorso-vent flattened, reduced red pulp, few peripheral RBC		Digeneans-3, ↑mac aggs, ↓red pulp	↑mac aggs
Head Kidney	X	X		Digeneans-3	
Trunk Kidney		Hydropic swelling-2,vacuolar degeneration of tubule epith-1	X		Digeneans-3, hydropic swelling-2f
Repro		X male		Female, pre-vitellogenic, digeneans-2	

Fish 1-5 Continued

Organ Analyzed	15-MR-YP-1	15-MR-YP-1	15-MR-GZ-3	15-MR-PM-4	15-MR-PM-5
Brain					
Nervous	X-spinal column				
Misc.					

Histological Results for Fish 6-7

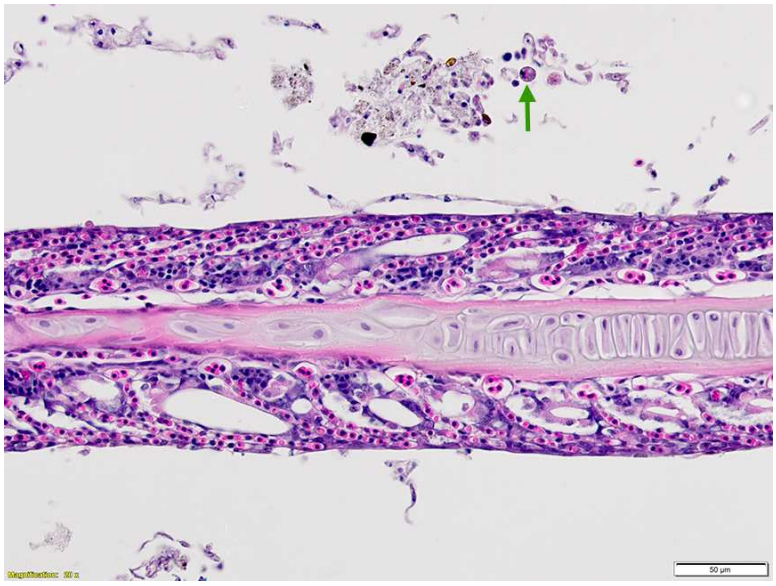
Organ Analyzed	Spottail shiner 15-MR-PY-6	Bluegill 15-MR-BG-7
	11/16/2015	11/12/2015
	Frogmortar, Armstrong cove	Middle River
Skin	X	X
Eye		X
Nares		
Muscle	X	Digeneans with focal inflammatory cells-3
Gills	fuse-1,eros-2d, epithel lifting-2, congestion-2, ↑eosinophils	fuse-4,eros-4d, hem-4d, vasodil-4m, slough-2d, ↑eosinophils, protozoan-like cells inter- and intra-lamellar 12-18µm
Pseudobranch		

Fish 6-7 Continued

Organ Analyzed	15-MR-PY-6	15-MR-BG-7
Liver	X lg-2	Lipid accunmulation-3, granulation of hepatocytes-3, necrosis-2d, pycnotic and karyorrhectic nuclei-3
Esophagus		
Stomach		
Intestine		
Peritoneum		
Swim bladder		
Pancreas		X
Spleen		X
Head Kidney		
Trunk Kidney	X	
Repro		
Brain		
Nervous	X-spinal column	
Misc.		

Results Comments: Lesions were primarily restricted to the gills and indicated a reaction to an acute irritant. In most fish, filament collapse and fusion, and erosion and sloughing of the epithelium were extensive. Vasodilation in the arches, hemorrhage, clubbing and shortening of the filaments, and increased numbers of granular eosinophils were also commonly observed in the gills. In all but one fish (pm-5), there was little hyperplasia of epithelial tissue, necrosis or other signs of a longer (chronic) pathological process. Tissue reaction in these fish indicated an acute event. In pumpkinseed-5, there was marked hyperplasia of the interlamellar epithelium with reduced sloughing, but with no signs of necrosis. Gill lesions in pm-5 would have taken longer to form than other fish, but are still not considered chronic. It is also possible that differences in gill lesions are related to severity of stressor. Only a single liver showed marked lesions (fish bg-7). However the liver damage in bg-7 appeared to be chronic in nature and likely not associated with this event. Spleens from yp and pm showed signs of contraction, which is consistent with exposure to an acute stressor. Gill lesions were less severe in fish from Frogmortar and Cowpen Creeks than in fish from Middle River mainstem. Few protozoan-like cells were found among the epithelial slough or within lamellae.

Conclusion: In general, primary lesion was collapsed and fusion of gill tissue, which is a common acute reaction to an irritant. Death was most likely from acute respiratory failure as a result of these pathological changes to the architecture of the gills. Lesions are consistent to published reports of exposure to toxins from *Karlodinium* sp., which was found at the site of the event in potentially lethal concentrations. However, the gill pathologies are a common reaction to a variety of irritants.



Appendix 2: Toxin Analysis

Allen R. Place Ph.D.
Professor
Institute of Marine and Environmental Technology (IMET)
University of Maryland Center
Phone: 410-234-8828
Fax: 410-234-8896
Email: place@umces.edu

History: From Charlie Poukish - The fish kill was first reported last Monday (November 9th) in a tributary of Middle River (Norman Creek). On Tuesday we collected a sample in Hopkins Creek that had a bloom of K*arlodinium venificum* at potential lethal levels (14,382 cells/ml). Frozen samples were taken to Dr Place for Karlotoxin analysis, however he was away at an algae toxin conference all week and was not able to analyze the frozen water sample until December 2, 2015. The kill incorporates all of the upper Middle River area, involving over 200,000 fish. Thus far, no illicit discharge has been identified, however the investigation is continuing. The fish appeared to all die at the same time.

Sample Preparation: Filter water samples and frozen samples were delivered to the IMET and kept until analysis.

Karlotoxin Analysis: The filter samples were analyzed as described before (Bachvaroff et al. 2008) but were below the detection limit (MS not used). Accordingly, 200 mls of the frozen water sample was passed through a 3 mL packed volume tC-18 solid phase extraction cartridge column (Waters Corp., Milford, MA, USA). After the filtrate was loaded onto the column, it was washed with 12 mL of increasing concentrations of methanol／water from 0% methanol to 80% methanol in 20% increments. The 80% methanol fraction was collected, dried under a vacuum, resuspended in 1 mL of methanol, and filtered with a GF／B filter prior to HPLC analysis. Toxin samples were injected onto a C8 (LiChrosphere, 125 mm · 4 mm 5 micron bead size RP-8, Agilent) column and subjected to a 1 mL per min 10% to 95% methanol:water gradient over 25 min using an Agilent 1100 HPLC. Toxin peaks were detected using an Agilent Diode Array Detector (Model# G1315B) with a micro high-pressure flow cell (G1315B#020; 6 mm pathlength, 1.7 lK volume) over the wavelength range 190 to 350 nm. Based on the UV spectra, the absorption at 225 nm was used to detect KmTx 1 & 3, while absorption at 235 nm was used to detect KmTx 2.

The chromatograph of isolated material is presented below indicating the presence of sulphated and unsulphated form of KmTx 1 and KmTx 3. Based on the amount injected and the area of the peaks we estimate a total of 50 ng/ml in the original frozen water sample.

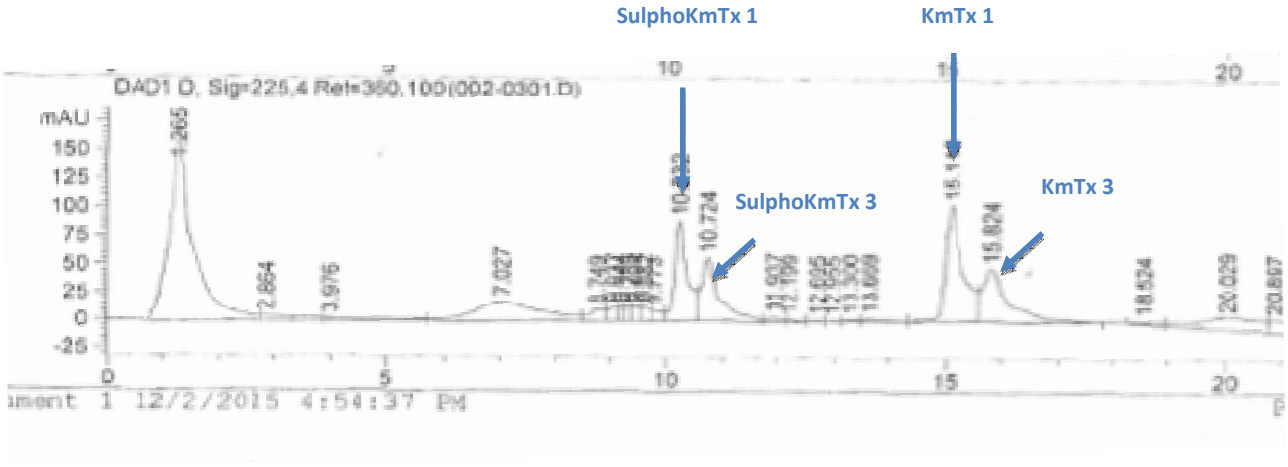
The Middle River Toxins Fish Erthrocyte Hemolytic Assay: To test the biological activity of the isolated material a fish hemolytic assay was performed. Gilthead seabream (*Sparus aurata*) erythrocytes were extracted from the caudal vein, and the blood washed three times with three volumes of buffer per mL of packed erythrocytes using the incubation buffer described below minus $CaCl_2$. Following the third

wash, the cells were resuspended in 3 mL of buffer per mL of packed cells. The resuspended cells were diluted 1:20 in buffer (pH 7.5; 150 mM NaCl, 3.2 mM KCl, 1.25 mM $MgSO_4$, 12.2 mM Tris Base, and 3.75 mM $CaCl_2$) and 200 µL of diluted, washed erythrocytes were incubated for 1 hour at 25 ^{o}C in the presence of purified toxins serially diluted in methanol for testing. After incubation, remaining intact erythrocytes were pelleted by centrifugation, and the OD at 540 nm was read using a Molecular Devices Vmax (Sunnyvale, CA, USA) microtiter plate spectrophotometer. Saponin (0 to 20 µg) (from Quillaja bark; Sigma-Aldrich, S-4521, St Louis, MO, USA) was used as a positive control. The dose response curves [Fractional Hemolysis vs. log (µg mL^{-1} of karlotoxin)] were fitted to the Hill equation below using a nonlinear regression (Igor 6.02, Wavemetrics, Lake Oswego, OR, USA). In all cases, convergence to defined parameters was observed.

Fractional Hemolysis = Base Hemolysis + (Maximal Hemolysis - Base Hemolysis)/[1+ (Toxin giving 50% hemolysis)$^{\text{Rate of Hemolysis}}$

Known aliquots of the purified toxins were placed onto a tared aluminum weigh boat in triplicate, dried at 60°C overnight, and weighed the following day on a Mettler UMT2 microgram balance (Mettler, 900 Polaris Parkway, Columbus, OH, USA).

A 125 dilution of the purified toxins resulted in 50% hemolysis of the fish red blood cells in 1 hour. This is equivalent ~200 ng/ml of purified KmTx 1 or KmTx 3 which is consistent with the estimate obtained by HPLC.



Appendix 3 : Compliance Sampling Results

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

December 8, 2015

Ms. Heather Nelson
MDE-Compliance Program
1800 Washington Blvd
Baltimore, MD 21230

Certificate of Analysis

Project Name:	**Of-001**	Workorder:	**2108679**
Purchase Order:		Workorder ID:	**Of-001**

Dear Ms. Nelson:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, November 17, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Amy K Borden (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

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ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Shailaja Polasi , Ms. Elizabeth Reicks , Mr. Jesse Salter , Mr. Kevin Weis

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2108679 Of-001

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2108679001	Of-001	Water	11/17/2015 13:22	11/17/2015 19:30	Ms. Shailaja Polasi
2108679002	Of-001	Water	11/17/2015 13:26	11/17/2015 19:30	Ms. Shailaja Polasi
2108679003	Of-001	Water	11/17/2015 13:32	11/17/2015 19:30	Ms. Shailaja Polasi
2108679004	Of-001	Water	11/17/2015 13:35	11/17/2015 19:30	Ms. Shailaja Polasi
2108679005	Of-001	Water	11/17/2015 13:25	11/17/2015 19:30	

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SAMPLE SUMMARY

Workorder: 2108679 Of-001

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

PROJECT SUMMARY

Workorder: 2108679 Of-001

Sample Comments

Lab ID: 2108679004 **Sample ID:** Of-001 **Sample Type:** SAMPLE

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679001** Date Collected: 11/17/2015 13:22 Matrix: Water

Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Biochemical Oxygen Demand	1910	2	mg/L	2.0	S5210B-11			11/26/15 10:20	GMM	B
Nitrate/Nitrite-N	ND		mg/L	0.20	EPA 300.0			11/19/15 09:01	MBW	B
Phosphorus, Total	3.5		mg/L	0.10	EPA 365.1	12/7/15	NV	12/8/15 04:21	LJF	C
Total Kjeldahl Nitrogen	13.3		mg/L	4.0	S4500NH3G-11	11/18/15	DRM	11/19/15 18:29	DRM	C
Total Nitrogen	13.3		mg/L	1.00	Calculation			11/25/15 22:35	CF	C
Total Suspended Solids	33		mg/L	5	S2540D-11			11/24/15 20:31	NV	B
MICROBIOLOGY										
Fecal Coliform	1640	1	col/100mL	10	S9222D-97			11/17/15 20:17	LLJ	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID:	**2108679002**	Date Collected:	11/17/2015 13:26	Matrix:	Water
Sample ID:	**Of-001**	Date Received:	11/17/2015 19:30		

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Chemical Oxygen Demand (COD)	8140		mg/L	100	EPA 410.4		11/19/15 06:30	JAM	A

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679003** Date Collected: 11/17/2015 13:32 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
SEMIVOLATILES										
Acenaphthene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Acenaphthylene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Acetophenone	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Aniline	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Anthracene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Atrazine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Azobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzaldehyde	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzidine	ND		ug/L	46.7	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzo(a)anthracene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzo(a)pyrene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzo(b)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzo(g,h,i)perylene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzoic acid	98.6		ug/L	15.0	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzo(k)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Benzyl Alcohol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Biphenyl	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
4-Bromophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Butylbenzylphthalate	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Caprolactam	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Carbazole	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
4-Chloro-3-methylphenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
4-Chloroaniline	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
bis(2-Chloroethoxy)methane	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
bis(2-Chloroethyl)ether	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
bis(2-Chloroisopropyl)ether	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Chloronaphthalene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Chlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
4-Chlorophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Chrysene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
mp-Cresol	277		ug/L	37.4	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
o-Cresol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
n-Decane	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Di-n-Butylphthalate	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Di-n-Octylphthalate	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Dibenzo(a,h)anthracene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Dibenzofuran	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679003** Date Collected: 11/17/2015 13:32 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
2,3-Dichloroaniline	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,2-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,3-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,4-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
3,3-Dichlorobenzidine	ND		ug/L	15.0	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4-Dichlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,6-Dichlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Diethylphthalate	403		ug/L	37.4	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
Dimethoate	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4-Dimethylphenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Dimethylphthalate	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,2-Dinitrobenzene	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,3-Dinitrobenzene	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,4-Dinitrobenzene	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4-Dinitrophenol	ND		ug/L	15.0	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,6-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,4-Dioxane	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Diphenylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,2-Diphenylhydrazine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Di(2-Ethylhexyl)adipate	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
bis(2-Ethylhexyl)phthalate	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Fluoranthene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Fluorene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
n-Heptadecane	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Hexachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Hexachlorobutadiene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Hexachlorocyclopentadiene	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Hexachloroethane	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Indeno(1,2,3-cd)pyrene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Isophorone	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Methyl-4,6-dinitrophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Naphthylamine	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Naphthalene	6.4		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
3-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679003** Date Collected: 11/17/2015 13:32 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
4-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Nitrobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Nitrophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
4-Nitrophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitrosodi-n-butylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitrosodiethylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitrosodimethylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitrosodiphenylamine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
N-Nitrosopyrrolidine	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Pentachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Pentachlorophenol	ND		ug/L	5.6	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Phenanthrene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Phenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Pyrene	ND		ug/L	1.4	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Pyridine	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Resorcinol	ND	1	ug/L	112	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
alpha-Terpineol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,2,4,5-Tetrachlorobenzene	ND	2	ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,3,4,6-Tetrachlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
1,2,4-Trichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4,5-Trichlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2,4,6-Trichlorophenol	ND		ug/L	7.5	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	96.6		%	40 - 125	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
2,4,6-Tribromophenol (S)	99.6		%	40 - 125	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Fluorobiphenyl (S)	81		%	50 - 110	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
2-Fluorobiphenyl (S)	80.2		%	50 - 110	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
2-Fluorophenol (S)	47.1		%	20 - 75	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
2-Fluorophenol (S)	47		%	20 - 75	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Nitrobenzene-d5 (S)	81.8		%	40 - 110	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Nitrobenzene-d5 (S)	87.9		%	40 - 110	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
Phenol-d5 (S)	0	3	%	13 - 49	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
Phenol-d5 (S)	33		%	13 - 49	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A
Terphenyl-d14 (S)	88.8		%	50 - 122	SW846 8270D	11/23/15	CAC	11/24/15 13:08	CGS	A
Terphenyl-d14 (S)	89		%	50 - 122	SW846 8270D	11/23/15	CAC	11/24/15 01:56	DHF	A

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID:	**2108679003**	Date Collected:	11/17/2015 13:32	Matrix:	Water
Sample ID:	**Of-001**	Date Received:	11/17/2015 19:30		

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679004** Date Collected: 11/17/2015 13:35 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
VOLATILE ORGANICS									
Acetone	2040		ug/L	50.0	SW846 8260B		11/20/15 16:38	TMP	A
Acetonitrile	ND		ug/L	100	SW846 8260B		11/20/15 16:38	TMP	A
Acrolein	ND		ug/L	125	SW846 8260B		11/20/15 16:38	TMP	A
Acrylonitrile	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
tert-Amyl methyl ether	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Benzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Benzyl Chloride	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Bromobenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Bromochloromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Bromodichloromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Bromoform	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Bromomethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
2-Butanone	149		ug/L	50.0	SW846 8260B		11/20/15 16:38	TMP	A
tert-Butyl Alcohol	ND		ug/L	50.0	SW846 8260B		11/20/15 16:38	TMP	A
n-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
tert-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
sec-Butylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Carbon Disulfide	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Carbon Tetrachloride	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Chloroacetonitrile	ND		ug/L	125	SW846 8260B		11/20/15 16:38	TMP	A
Chlorobenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1-Chlorobutane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Chlorodibromomethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Chloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
2-Chloroethylvinyl ether	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Chloroform	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1-Chlorohexane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Chloromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Chloroprene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
3-Chloro-1-propene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
o-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
p-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Cyclohexane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2-Dibromo-3-chloropropane	ND		ug/L	35.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2-Dibromoethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Dibromomethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679004** Date Collected: 11/17/2015 13:35 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
trans-1,4-Dichloro-2-butene	ND		ug/L	15.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1-Dichloro-2-Propanone	ND		ug/L	125	SW846 8260B		11/20/15 16:38	TMP	A
1,2-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,3-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,4-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Dichlorodifluoromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
cis-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
trans-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Dichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,3-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
2,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
cis-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
trans-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,3-Dichloropropene, Total	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Diisobutylene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Diisopropyl ether	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,4-Dioxane	ND		ug/L	1600	SW846 8260B		11/20/15 16:38	TMP	A
Ethyl Ether	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Ethyl Methacrylate	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Ethyl Acetate	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Ethyl tert-butyl ether	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Ethylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Freon 113	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Heptane	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Hexachlorobutadiene	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Hexachloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Hexane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
2-Hexanone	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Iodomethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Isobutyl alcohol	ND		ug/L	375	SW846 8260B		11/20/15 16:38	TMP	A
Isopropyl Alcohol	1140		ug/L	125	SW846 8260B		11/20/15 16:38	TMP	A
Isopropylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
p-Isopropyltoluene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679004** Date Collected: 11/17/2015 13:35 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Methacrylonitrile	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Methyl methacrylate	ND		ug/L	15.0	SW846 8260B		11/20/15 16:38	TMP	A
Methyl acetate	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Methyl acrylate	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Methyl cyclohexane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Methyl t-Butyl Ether	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Methylene Chloride	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Naphthalene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
Nitrobenzene	ND		ug/L	125	SW846 8260B		11/20/15 16:38	TMP	A
2-Nitropropane	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Octane	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Pentachloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Pentane	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
n-Propanol	10800		ug/L	10000	SW846 8260B		11/23/15 17:31	TMP	B
Propionitrile	ND		ug/L	50.0	SW846 8260B		11/20/15 16:38	TMP	A
n-Propylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Styrene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1,1,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1,2,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Tetrachloroethene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Tetrahydrofuran	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Toluene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Total Xylenes	ND		ug/L	15.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2,3-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2,4-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1,1-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,1,2-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Trichloroethene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Trichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2,3-Trichloropropane	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A
1,2,4-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
1,3,5-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
Vinyl Acetate	ND		ug/L	25.0	SW846 8260B		11/20/15 16:38	TMP	A
Vinyl Chloride	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
o-Xylene	ND		ug/L	5.0	SW846 8260B		11/20/15 16:38	TMP	A
mp-Xylene	ND		ug/L	10.0	SW846 8260B		11/20/15 16:38	TMP	A

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679004** Date Collected: 11/17/2015 13:35 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	101		%	62 - 133	SW846 8260B			11/23/15 17:31	TMP	B
1,2-Dichloroethane-d4 (S)	96.8		%	62 - 133	SW846 8260B			11/20/15 16:38	TMP	A
4-Bromofluorobenzene (S)	95.9		%	79 - 114	SW846 8260B			11/20/15 16:38	TMP	A
4-Bromofluorobenzene (S)	95.3		%	79 - 114	SW846 8260B			11/23/15 17:31	TMP	B
Dibromofluoromethane (S)	92.5		%	78 - 116	SW846 8260B			11/23/15 17:31	TMP	B
Dibromofluoromethane (S)	90.5		%	78 - 116	SW846 8260B			11/20/15 16:38	TMP	A
Toluene-d8 (S)	99.1		%	76 - 127	SW846 8260B			11/23/15 17:31	TMP	B
Toluene-d8 (S)	96.1		%	76 - 127	SW846 8260B			11/20/15 16:38	TMP	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2108679 Of-001

Lab ID: **2108679005** Date Collected: 11/17/2015 13:25 Matrix: Water
Sample ID: **Of-001** Date Received: 11/17/2015 19:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Aluminum, Total	0.30		mg/L	0.050	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Antimony, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Arsenic, Total	ND		mg/L	0.0050	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Barium, Total	0.092		mg/L	0.0050	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Beryllium, Total	ND		mg/L	0.0020	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Cadmium, Total	ND		mg/L	0.0010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Chromium, Total	ND		mg/L	0.0025	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Cobalt, Total	ND		mg/L	0.0025	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Copper, Total	0.0058		mg/L	0.0050	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Iron, Total	10.7		mg/L	0.030	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Lead, Total	ND		mg/L	0.0030	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Magnesium, Total	12.6		mg/L	0.050	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Manganese, Total	0.22		mg/L	0.0025	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	11/24/15	MNP	11/24/15 13:05	MNP	A2
Nickel, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Potassium, Total	6.4		mg/L	0.25	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Selenium, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Silver, Total	ND		mg/L	0.0020	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Sodium, Total	70.1		mg/L	0.25	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Thallium, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Tin, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Titanium, Total	ND		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Vanadium, Total	0.0044		mg/L	0.0025	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1
Zinc, Total	0.12		mg/L	0.010	EPA 200.7	11/19/15	JPS	11/20/15 00:08	TSS	A1

Amy K Borden

Ms. Amy K Borden
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2108679001	1	Of-001	S9222D-97	Fecal Coliform
This is an estimated result.				
2108679001	2	Of-001	S5210B-11	Biochemical Oxygen Demand
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
2108679003	1	Of-001	SW846 8270D	Resorcinol
The QC sample type LCS for method SW846 8270D was outside the control limits for the analyte Resorcinol. The % Recovery was reported as 0 and the control limits were to .				
2108679003	2	Of-001	SW846 8270D	1,2,4,5-Tetrachlorobenzene
The QC sample type LCS for method SW846 8270D was outside the control limits for the analyte 1,2,4,5-Tetrachlorobenzene. The % Recovery was reported as 49.2 and the control limits were 50 to 102.				
2108679003	3	Of-001	SW846 8270D	Phenol-d5
The surrogate Phenol-d5 for method SW846 8270D was outside of control limits. The % Recovery was reported as 0 and the control limits were 13 to 49. This result was reported at a dilution of 5.				

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

A

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1
Courier:
Tracking #:

21086795

Co. Name: MDE
Contact (Report to): Shailaja Polasi Phone: 443-250-4597
Address: 1800 Washington Blvd Baltimore MD

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. Date Required:
[ ] Rush-Subject to ALS approval and surcharges. Approved By:

Email? [X] -Y
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	fecal	COD	TM	SVOCs	VOCs	TN, TP	BOD, TSS			
***Container Type						PL	PL	PL	CG	CG	PL	PL			
***Container Size									Sol-tho						
*** Preservative						~~HNO3~~	H_2SO_4	HNO3	~~H2SO4~~	HCL	H_2SO_4	ice			
						Enter Number of Containers Per Analysis									
1 OF-001		11/17	1:22 pm	G	Wi	1	~~5~~	~~4~~	~~2~~	~~2~~	~~1~~	~~1~~	SP		
2 OF-001		11/17	1:26 pm	G			1								
3 OF-001	MICRO REC'D	11/17	1325	G				1							
4 OF-001		11/17	1332	G					2						
5 OF-001		11/17	1335	G						2 vials					
6 OF-001	11/17/15	11/17	1322	G							1				
7 OF-001		11/17	1321	G	W							1			
8															

SAMPLED BY (Please Print): SHAILAJA POLASI

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Shailaja Polasi	11/17/15	1527	2 [signature] /ALS	11/17	1527
3 [signature]	11/17	1528	4 [signature]	11/17	1530
5 [signature]	11/17	1530	6 [signature]	11/17	1530
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
SDWA Forms? yes / yes / yes / yes
State Samples Collected in? MD / NJ / NY / PA
Other
PWSID No.
DOD Criteria Required?

Receipt Information (completed by Sample Receiver)
Performed by:
Cooler Temp: 1
Therm. ID: 284
No. of Coolers:
Notes:

	Y	N
Correct containers?	Y	N
Correct sample volume?	Y	N
Correct preservation?	Y	N
Headspace/Volatiles?	Y	N
Circle appropriate Y or N		
Custody seals Present?	Y	N
(If present) Seals intact?	Y	N
Received on ice?	Y	N
COC/Labels complete/accurate?	Y	N
Container in good condition?	Y	N

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

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December 7, 2015

Ms. Heather Nelson
MDE-Compliance Program
1800 Washington Blvd
Baltimore, MD 21230

Certificate of Analysis

Project Name:	**OF-001**	Workorder:	**2109205**
Purchase Order:		Workorder ID:	**OF-001**

Dear Ms. Nelson:

Enclosed are the analytical results for samples received by the laboratory on Thursday, November 19, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Amy K Borden (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Shailaja Polasi , Ms. Elizabeth Reicks , Mr. Jesse Salter , Mr. Kevin Weis

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2109205 OF-001

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2109205001	OF-001	Water	11/19/2015 10:23	11/19/2015 19:50	Ms. Shailaja Polasi
2109205002	OF-001	Water	11/19/2015 10:27	11/19/2015 19:50	Ms. Shailaja Polasi
2109205003	OF-001	Water	11/19/2015 10:25	11/19/2015 19:50	Ms. Shailaja Polasi
2109205004	OF-001	Water	11/19/2015 10:30	11/19/2015 19:50	Ms. Shailaja Polasi
2109205005	OF-001	Water	11/19/2015 10:20	11/19/2015 19:50	Ms. Shailaja Polasi
2109205006	OF-001	Water	11/19/2015 10:37	11/19/2015 19:50	Ms. Shailaja Polasi
2109205007	OF-001	Water	11/19/2015 10:21	11/19/2015 19:50	Ms. Shailaja Polasi

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SAMPLE SUMMARY

Workorder: 2109205 OF-001

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2109205 OF-001

Sample Comments

Lab ID: 2109205006 **Sample ID:** OF-001 **Sample Type:** SAMPLE

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

Lab ID: 2109205007 **Sample ID:** OF-001 **Sample Type:** SAMPLE

See attached subcontracted results from Fountain Valley Analytical Laboratory, Inc. for fecal results. SB 11/20/15.

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205001** Date Collected: 11/19/2015 10:23 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Biochemical Oxygen Demand	36.1		mg/L	2.0	S5210B-11		11/20/15 21:15	NAK	A
Total Suspended Solids	66	1	mg/L	5	S2540D-11		11/29/15 17:01	NV	A

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205002** Date Collected: 11/19/2015 10:27 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Aluminum, Total	0.26		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/24/15 16:06	TSS	A1
Antimony, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Arsenic, Total	ND		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Barium, Total	0.11		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Beryllium, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Cadmium, Total	ND		mg/L	0.0010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Chromium, Total	ND		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Cobalt, Total	0.0038		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Copper, Total	ND		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Iron, Total	21.2		mg/L	0.030	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Lead, Total	ND		mg/L	0.0030	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Magnesium, Total	20.9		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Manganese, Total	0.38		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/1/15	MNP	12/1/15 12:13	MNP	A2
Nickel, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Potassium, Total	5.1		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Selenium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Silver, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Sodium, Total	97.3		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Thallium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Tin, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Titanium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Vanadium, Total	0.0081		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1
Zinc, Total	0.064		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:12	TSS	A1

Amy K Borden

Ms. Amy K Borden
Project Coordinator

ALS Environmental
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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205003** Date Collected: 11/19/2015 10:25 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Nitrate/Nitrite-N	0.13		mg/L	0.10	EPA 353.2		12/1/15 14:42	THB	A
Phosphorus, Total	1.4		mg/L	1.0	EPA 365.1	11/23/15 NV	12/5/15 05:09	LJF	A
Total Kjeldahl Nitrogen	4.5		mg/L	4.0	S4500NH3G-11	11/21/15 J1H	11/23/15 13:47	DRM	A
Total Nitrogen	4.63		mg/L	1.00	Calculation		12/2/15 14:27	NJA	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205004** Date Collected: 11/19/2015 10:30 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Chemical Oxygen Demand (COD)	4760		mg/L	50	EPA 410.4		11/20/15 07:00	JAM	A

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205005** Date Collected: 11/19/2015 10:20 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
SEMIVOLATILES										
Acenaphthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Acenaphthylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Acetophenone	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Aniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Atrazine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Azobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzaldehyde	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzidine	ND		ug/L	45.9	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzo(a)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzo(a)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzo(b)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzo(g,h,i)perylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzoic acid	52.4		ug/L	14.7	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzo(k)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Benzyl Alcohol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Biphenyl	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
4-Bromophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Butylbenzylphthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Caprolactam	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Carbazole	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
4-Chloro-3-methylphenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
4-Chloroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
bis(2-Chloroethoxy)methane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
bis(2-Chloroethyl)ether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
bis(2-Chloroisopropyl)ether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Chloronaphthalene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Chlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
4-Chlorophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Chrysene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
mp-Cresol	138		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
o-Cresol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
n-Decane	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Di-n-Butylphthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Di-n-Octylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Dibenzo(a,h)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Dibenzofuran	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205005** Date Collected: 11/19/2015 10:20 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
2,3-Dichloroaniline	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,2-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,3-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,4-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
3,3-Dichlorobenzidine	ND		ug/L	14.7	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4-Dichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,6-Dichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Diethylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Dimethoate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4-Dimethylphenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Dimethylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,2-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,3-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,4-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4-Dinitrophenol	ND		ug/L	14.7	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,6-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,4-Dioxane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Diphenylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,2-Diphenylhydrazine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Di(2-Ethylhexyl)adipate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
bis(2-Ethylhexyl)phthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Fluorene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
n-Heptadecane	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Hexachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Hexachlorobutadiene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Hexachlorocyclopentadiene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Hexachloroethane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Indeno(1,2,3-cd)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Isophorone	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Methyl-4,6-dinitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Naphthylamine	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Naphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
3-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205005** Date Collected: 11/19/2015 10:20 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
4-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Nitrobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Nitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
4-Nitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitrosodi-n-butylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitrosodiethylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitrosodimethylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitrosodiphenylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
N-Nitrosopyrrolidine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Pentachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Pentachlorophenol	ND		ug/L	5.5	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Phenanthrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Phenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Pyridine	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Resorcinol	ND		ug/L	110	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
alpha-Terpineol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,3,4,6-Tetrachlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
1,2,4-Trichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4,5-Trichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2,4,6-Trichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	89.6		%	40 - 125	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Fluorobiphenyl (S)	56.1		%	50 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
2-Fluorophenol (S)	23.4		%	20 - 75	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Nitrobenzene-d5 (S)	54.7		%	40 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Phenol-d5 (S)	19.1		%	13 - 49	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A
Terphenyl-d14 (S)	79		%	50 - 122	SW846 8270D	11/25/15	CAC	11/25/15 18:00	CGS	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205006** Date Collected: 11/19/2015 10:37 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
VOLATILE ORGANICS									
Acetone	513		ug/L	50.0	SW846 8260B		11/24/15 17:12	DD	A
Acetonitrile	ND		ug/L	100	SW846 8260B		11/24/15 17:12	DD	A
Acrolein	ND		ug/L	125	SW846 8260B		11/24/15 17:12	DD	A
Acrylonitrile	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
tert-Amyl methyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Benzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Benzyl Chloride	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Bromobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Bromochloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Bromodichloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Bromoform	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Bromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
2-Butanone	157		ug/L	50.0	SW846 8260B		11/24/15 17:12	DD	A
tert-Butyl Alcohol	ND		ug/L	50.0	SW846 8260B		11/24/15 17:12	DD	A
n-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
tert-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
sec-Butylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Carbon Disulfide	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Carbon Tetrachloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Chloroacetonitrile	ND		ug/L	125	SW846 8260B		11/24/15 17:12	DD	A
Chlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1-Chlorobutane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Chlorodibromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Chloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
2-Chloroethylvinyl ether	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Chloroform	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1-Chlorohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Chloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Chloroprene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
3-Chloro-1-propene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
o-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
p-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Cyclohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,2-Dibromo-3-chloropropane	ND		ug/L	35.0	SW846 8260B		11/24/15 17:12	DD	A
1,2-Dibromoethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Dibromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205006** Date Collected: 11/19/2015 10:37 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
trans-1,4-Dichloro-2-butene	ND		ug/L	15.0	SW846 8260B		11/24/15 17:12	DD	A
1,1-Dichloro-2-Propanone	ND		ug/L	125	SW846 8260B		11/24/15 17:12	DD	A
1,2-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,3-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,4-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Dichlorodifluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,2-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
cis-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
trans-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Dichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,3-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
2,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
cis-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
trans-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,3-Dichloropropene, Total	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Diisobutylene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Diisopropyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,4-Dioxane	ND		ug/L	1600	SW846 8260B		11/24/15 17:12	DD	A
Ethyl Ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Ethyl Methacrylate	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Ethyl Acetate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Ethyl tert-butyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Ethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Freon 113	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Heptane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Hexachlorobutadiene	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Hexachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Hexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
2-Hexanone	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Iodomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Isobutyl alcohol	ND		ug/L	375	SW846 8260B		11/24/15 17:12	DD	A
Isopropyl Alcohol	1350		ug/L	125	SW846 8260B		11/24/15 17:12	DD	A
Isopropylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
p-Isopropyltoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205006** Date Collected: 11/19/2015 10:37 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Methacrylonitrile	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Methyl methacrylate	ND		ug/L	15.0	SW846 8260B		11/24/15 17:12	DD	A
Methyl acetate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Methyl acrylate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Methyl cyclohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Methyl t-Butyl Ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Methylene Chloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Naphthalene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
Nitrobenzene	ND		ug/L	125	SW846 8260B		11/24/15 17:12	DD	A
2-Nitropropane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Octane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Pentachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Pentane	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
n-Propanol	11100		ug/L	5000	SW846 8260B		11/26/15 05:48	CJG	B
Propionitrile	ND		ug/L	50.0	SW846 8260B		11/24/15 17:12	DD	A
n-Propylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Styrene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1,1,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1,2,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Tetrachloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Tetrahydrofuran	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Toluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Total Xylenes	ND		ug/L	15.0	SW846 8260B		11/24/15 17:12	DD	A
1,2,3-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
1,2,4-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
1,1,1-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,1,2-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Trichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Trichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,2,3-Trichloropropane	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A
1,2,4-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
1,3,5-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
Vinyl Acetate	ND		ug/L	25.0	SW846 8260B		11/24/15 17:12	DD	A
Vinyl Chloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
o-Xylene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:12	DD	A
mp-Xylene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:12	DD	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID: **2109205006** Date Collected: 11/19/2015 10:37 Matrix: Water
Sample ID: **OF-001** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	95.6		%	62 - 133	SW846 8260B			11/26/15 05:48	CJG	B
1,2-Dichloroethane-d4 (S)	101		%	62 - 133	SW846 8260B			11/24/15 17:12	DD	A
4-Bromofluorobenzene (S)	89.6		%	79 - 114	SW846 8260B			11/26/15 05:48	CJG	B
4-Bromofluorobenzene (S)	98.4		%	79 - 114	SW846 8260B			11/24/15 17:12	DD	A
Dibromofluoromethane (S)	87.8		%	78 - 116	SW846 8260B			11/24/15 17:12	DD	A
Dibromofluoromethane (S)	86.1		%	78 - 116	SW846 8260B			11/26/15 05:48	CJG	B
Toluene-d8 (S)	86.9		%	76 - 127	SW846 8260B			11/26/15 05:48	CJG	B
Toluene-d8 (S)	94		%	76 - 127	SW846 8260B			11/24/15 17:12	DD	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109205 OF-001

Lab ID:	**2109205007**	Date Collected:	11/19/2015 10:21	Matrix:	Water
Sample ID:	**OF-001**	Date Received:	11/19/2015 19:50		

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
SUBCONTRACTED ANALYSIS									
Subcontracted Analysis	See Attached				Subcontract		11/20/15 11:15	CLT	A

Ms. Amy K Borden
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2109205001	1	OF-001	S2540D-11	Total Suspended Solids

This sample was analyzed after the 7 day holding time for total suspended solids had expired.

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALS

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Page ___ of ___
Courier:
Tracking #:

210920.5

Co. Name: Shailaja Polasi 443-250-4597
Contact (Report to): Phone:
Address: 1800 Washington Blvd Baltimore MD 21230

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:

Email? [ ] Y
Fax? [ ] Y No.:

11/19/15 SP

	*Container Type	*Container Size	Preservative
	P		ice
	P		HNO3
	P		H2SO4
	P		H2SO4
	G		thio
	G		HCl
	P		EDTA

ANALYSES/METHOD REQUESTED

Enter Number of Containers Per Analysis

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal	TPH (SP)		
1	OF-001		11/19	10:23	G	WW	1									
2				10:27	G	WW		1								
3				10:25	G	WW			1							
4				10:30	G	WW				1						
5				10:20	G	WW					2					
6				10:37	G	WW						2				
7				10:21	G	WW							1			
8																

LMG 11/20/15 0809

Receipt Information (completed by Sample Receiving)
Performed by: MB
Cooler Temp: 1
Therm. ID: 244
No. of Coolers:
Notes:

	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
	Y N	Y N	Y N	Y N	
	Y N	Y N	Y N	Y N	
	Y N	Y N	Y N	Y N	

	Custody seals Present?	(If present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?
	Y N	Y N	Y N	Y N	Y N

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments:

	Relinquished By / Company Name	Date (SP)	Time	Received By / Company Name	Date	Time
1	Shailaja Polasi, MDE	11/19/15	14:18	2 [signature]	11-19	1418
3		11/19/15	(SP)	4		
5	[signature]	11/19	1806	6 [signature]	11/19	1606
7	[signature]	11/19	1950	8 [signature]	11/19	1950
9				10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
DOD Criteria Required?
SDWA Forms? yes yes yes yes
State Samples Collected In? MD NJ NY PA Other
Enter PWSID No.

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

2109205

FOUNTAIN VALLEY ANALYTICAL LABORATORY, INC.
1413 Old Taneytown Rd. Westminster, MD (410) 848-1014 (410) 876-4554 FAX (410) 848-0298

REPORT OF ANALYSIS

Laboratory ID #:	104353	Account #:	1036
Reference:	Shailaja Polasi	Company:	ALS Environmental
Location:	1800 Washington Blvd	Requested By:	Shannon Butler
	Baltimore, MD 21230	Source:	Waste Water
Date/ Time Collected:	11/19/2015 1021	Site:	of-001
Date/Time Rec'd:	11/19/2015 1705	Submitted By:	S. Polasi

PARAMETERS	RESULTS	UNITS	DL*	METHOD	DATE/TIME/ANALYST
Bacteria, Coliform, Fecal, MPN	1553.1	MPN/ 100 ml	1.0	SM18 9221 E.	11/20/2015 / 1115 / BCD

NOTES

1 MPN/ 100 ml = Most Probable Number [of viable bacteria] per 100 ml of sample.

2 Sample collected by client, analyzed as received

Reason for Test : MDE

* DL: Detection Limit

Date Reported: 11/20/2015

MD State Certification # 133

ALS Environmental

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Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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Page ___ of ___
Courier:
Tracking #:

2109205

Co. Name: Shailaja Polasi 443-250-4597
Contact (Report to): Phone:
Address: 1800 Washington Blvd
Baltimore MD 21280

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:

Email? [ ] -Y
Fax? [ ] -Y No.:

11/19/15 SP

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal	TPH (SP)		
							Enter Number of Containers Per Analysis									
1	OF-001		11/19	10:23	G	WW	1									
2				10:27	G	WW		1								
3				10:25	G	WW			1							
4				10:30	G	WW				1						
5				10:20	G	WW					2					
6				10:37	G	WW						2				
7				10:21	G	WW							1			
8																

	***Container Type	***Container Size	Preservative
BOD, TSS	P		ICE
TM (Total Metals)	P		HNO3
TP, TN	P		H2SO4
COD	P		H2SO4
SVOCs	G		thio
VOCs	G		HCl
fecal	P		EDTA
TPH (SP)			

ANALYSES/METHOD REQUESTED

Receipt Information (complete if in Sample Receipt)
Performed by: AVG MVG
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

	Y	N
Correct containers?	Y	N
Correct sample volume?	Y	N
Correct preservation?	Y	N
Headspace/Volatiles?	Y	N
Circle appropriate Y or N.		
Custody seals Present?	Y	N
(if present) Seals intact?	Y	N
Received on Ice?	Y	N
COC/Labels complete/accurate?	Y	N
Container in good condition?	Y	N

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments:

Relinquished By / Company Name	Date (SP)	Time	Received By / Company Name	Date	Time
1 Shailaja Polasi, MDE	11/19/15	14:18	2 [signature]	11-19	1418
3	11/19/15 (SP)		4		
5 [signature]	11-19	1506	6 [signature] ALS	11/19	1545
7 [signature]	11/19	1705	8 [signature]	11/19	1705
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
DOD Criteria Required?

SDWA Forms? ⇒ yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected in? MD [ ] NJ [ ] NY [ ] PA [ ]
Other

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

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December 7, 2015

Ms. Heather Nelson
MDE-Compliance Program
1800 Washington Blvd
Baltimore, MD 21230

Certificate of Analysis

Project Name:	**Pond**	Workorder:	**2109206**
Purchase Order:		Workorder ID:	**Pond**

Dear Ms. Nelson:

Enclosed are the analytical results for samples received by the laboratory on Thursday, November 19, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Amy K Borden (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Shailaja Polasi , Ms. Elizabeth Reicks , Mr. Jesse Salter , Mr. Kevin Weis

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2109206 Pond

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2109206001	Pond	Water	11/19/2015 12:16	11/19/2015 19:50	Ms. Shailaja Polasi
2109206002	Pond	Water	11/19/2015 12:18	11/19/2015 19:50	Ms. Shailaja Polasi
2109206003	Pond	Water	11/19/2015 12:14	11/19/2015 19:50	Ms. Shailaja Polasi
2109206004	Pond	Water	11/19/2015 12:12	11/19/2015 19:50	Ms. Shailaja Polasi
2109206005	Pond	Water	11/19/2015 12:15	11/19/2015 19:50	Ms. Shailaja Polasi
2109206006	Pond	Water	11/19/2015 12:21	11/19/2015 19:50	Ms. Shailaja Polasi
2109206007	Pond	Water	11/19/2015 12:19	11/19/2015 19:50	Ms. Shailaja Polasi
2109206008	Pond	Water	11/19/2015 12:20	11/19/2015 19:50	Ms. Shailaja Polasi

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SAMPLE SUMMARY

Workorder: 2109206 Pond

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2109206 Pond

Sample Comments

Lab ID: 2109206007 **Sample ID:** Pond **Sample Type:** SAMPLE

See attached subcontracted results from Fountain Valley Analytical Laboratory, Inc. for fecal results. SB 11/20/15.

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206001** Date Collected: 11/19/2015 12:16 Matrix: Water

Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Biochemical Oxygen Demand	875	2	mg/L	2.0	S5210B-11		11/30/15 12:05	GMM	A
Total Suspended Solids	108	1	mg/L	5	S2540D-11		11/29/15 17:01	NV	A

Ms. Amy K Borden
Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206002** Date Collected: 11/19/2015 12:18 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Aluminum, Total	0.37		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/24/15 16:14	TSS	A1
Antimony, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Arsenic, Total	ND		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Barium, Total	0.049		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Beryllium, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Cadmium, Total	ND		mg/L	0.0010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Chromium, Total	0.0034		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Cobalt, Total	ND		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Copper, Total	0.026		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Iron, Total	1.7		mg/L	0.030	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Lead, Total	0.0060		mg/L	0.0030	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Magnesium, Total	3.1		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Manganese, Total	0.051		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/1/15	MNP	12/1/15 12:20	MNP	A2
Nickel, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Potassium, Total	5.7		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Selenium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Silver, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Sodium, Total	50.1		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Thallium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Tin, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Titanium, Total	0.011		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Vanadium, Total	0.0046		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1
Zinc, Total	0.26		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:20	TSS	A1

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206003** Date Collected: 11/19/2015 12:14 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Nitrate/Nitrite-N	0.48		mg/L	0.10	EPA 353.2		12/1/15 14:44	THB	A
Phosphorus, Total	1.9		mg/L	0.50	EPA 365.1	11/23/15 NV	12/5/15 05:09	LJF	A
Total Kjeldahl Nitrogen	27.7		mg/L	4.0	S4500NH3G-11	11/21/15 J1H	11/23/15 13:47	DRM	A
Total Nitrogen	28.2		mg/L	1.00	Calculation		12/2/15 14:27	NJA	A

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206004** Date Collected: 11/19/2015 12:12 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Chemical Oxygen Demand (COD)	2700		mg/L	50	EPA 410.4		11/20/15 07:00	JAM	A

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206005** Date Collected: 11/19/2015 12:15 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
SEMIVOLATILES										
Acenaphthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Acenaphthylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Acetophenone	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Aniline	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Atrazine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Azobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzaldehyde	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzidine	ND		ug/L	45.5	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzo(a)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzo(a)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzo(b)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzo(g,h,i)perylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzoic acid	129		ug/L	14.5	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzo(k)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Benzyl Alcohol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Biphenyl	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
4-Bromophenyl-phenylether	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Butylbenzylphthalate	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Caprolactam	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Carbazole	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
4-Chloro-3-methylphenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
4-Chloroaniline	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
bis(2-Chloroethoxy)methane	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
bis(2-Chloroethyl)ether	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
bis(2-Chloroisopropyl)ether	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Chloronaphthalene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Chlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
4-Chlorophenyl-phenylether	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Chrysene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
mp-Cresol	13.3		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
o-Cresol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
n-Decane	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Di-n-Butylphthalate	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Di-n-Octylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Dibenzo(a,h)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Dibenzofuran	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206005** Date Collected: 11/19/2015 12:15 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
2,3-Dichloroaniline	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,2-Dichlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,3-Dichlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,4-Dichlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
3,3-Dichlorobenzidine	ND		ug/L	14.5	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4-Dichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,6-Dichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Diethylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Dimethoate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4-Dimethylphenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Dimethylphthalate	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,2-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,3-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,4-Dinitrobenzene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4-Dinitrophenol	ND		ug/L	14.5	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4-Dinitrotoluene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,6-Dinitrotoluene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,4-Dioxane	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Diphenylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,2-Diphenylhydrazine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Di(2-Ethylhexyl)adipate	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
bis(2-Ethylhexyl)phthalate	3.9		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Fluorene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
n-Heptadecane	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Hexachlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Hexachlorobutadiene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Hexachlorocyclopentadiene	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Hexachloroethane	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Indeno(1,2,3-cd)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Isophorone	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Methyl-4,6-dinitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Naphthylamine	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Naphthalene	11.4		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Nitroaniline	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
3-Nitroaniline	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206005** Date Collected: 11/19/2015 12:15 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
4-Nitroaniline	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Nitrobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Nitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
4-Nitrophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitrosodi-n-butylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitrosodiethylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitrosodimethylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitroso-di-n-propylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitrosodiphenylamine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
N-Nitrosopyrrolidine	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Pentachlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Pentachlorophenol	ND		ug/L	5.5	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Phenanthrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Phenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Pyridine	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Resorcinol	ND		ug/L	109	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
alpha-Terpineol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,3,4,6-Tetrachlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
1,2,4-Trichlorobenzene	ND		ug/L	2.7	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4,5-Trichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2,4,6-Trichlorophenol	ND		ug/L	7.3	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	96.4		%	40 - 125	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Fluorobiphenyl (S)	68.5		%	50 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
2-Fluorophenol (S)	40.8		%	20 - 75	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Nitrobenzene-d5 (S)	83.6		%	40 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Phenol-d5 (S)	28.3		%	13 - 49	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A
Terphenyl-d14 (S)	79.4		%	50 - 122	SW846 8270D	11/25/15	CAC	11/25/15 18:50	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206006** Date Collected: 11/19/2015 12:21 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
VOLATILE ORGANICS									
Acetone	395		ug/L	10.0	SW846 8260B		11/24/15 16:50	DD	A
Acetonitrile	ND		ug/L	20.0	SW846 8260B		11/24/15 16:50	DD	A
Acrolein	ND		ug/L	25.0	SW846 8260B		11/24/15 16:50	DD	A
Acrylonitrile	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
tert-Amyl methyl ether	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Benzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Benzyl Chloride	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Bromobenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Bromochloromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Bromoform	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Bromomethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
2-Butanone	27.9		ug/L	10.0	SW846 8260B		11/24/15 16:50	DD	A
tert-Butyl Alcohol	ND		ug/L	10.0	SW846 8260B		11/24/15 16:50	DD	A
n-Butylbenzene	6.1		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
tert-Butylbenzene	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
sec-Butylbenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Chloroacetonitrile	ND		ug/L	25.0	SW846 8260B		11/24/15 16:50	DD	A
Chlorobenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1-Chlorobutane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Chloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
2-Chloroethylvinyl ether	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Chloroform	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1-Chlorohexane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Chloromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Chloroprene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
o-Chlorotoluene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
p-Chlorotoluene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Cyclohexane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B		11/24/15 16:50	DD	A
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Dibromomethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A

ALS Environmental
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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206006** Date Collected: 11/19/2015 12:21 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B		11/24/15 16:50	DD	A
1,1-Dichloro-2-Propanone	ND		ug/L	25.0	SW846 8260B		11/24/15 16:50	DD	A
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Dichlorofluoromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,3-Dichloropropane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
2,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1-Dichloropropene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,3-Dichloropropene, Total	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Diisobutylene	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Diisopropyl ether	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,4-Dioxane	ND		ug/L	320	SW846 8260B		11/24/15 16:50	DD	A
Ethyl Ether	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Ethyl Methacrylate	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Ethyl Acetate	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Ethyl tert-butyl ether	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Freon 113	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Heptane	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Hexachlorobutadiene	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Hexachloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Hexane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
2-Hexanone	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Iodomethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Isobutyl alcohol	ND		ug/L	75.0	SW846 8260B		11/24/15 16:50	DD	A
Isopropyl Alcohol	849		ug/L	25.0	SW846 8260B		11/24/15 16:50	DD	A
Isopropylbenzene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
p-Isopropyltoluene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206006** Date Collected: 11/19/2015 12:21 Matrix: Water

Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Methacrylonitrile	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Methyl methacrylate	ND		ug/L	3.0	SW846 8260B		11/24/15 16:50	DD	A
Methyl acetate	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Methyl acrylate	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Methyl cyclohexane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Methyl t-Butyl Ether	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Methylene Chloride	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Naphthalene	21.1		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
Nitrobenzene	ND		ug/L	25.0	SW846 8260B		11/24/15 16:50	DD	A
2-Nitropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Octane	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Pentachloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Pentane	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
n-Propanol	270		ug/L	200	SW846 8260B		11/24/15 16:50	DD	A
Propionitrile	ND		ug/L	10.0	SW846 8260B		11/24/15 16:50	DD	A
n-Propylbenzene	1.0		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Styrene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Tetrahydrofuran	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Toluene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Total Xylenes	5.2		ug/L	3.0	SW846 8260B		11/24/15 16:50	DD	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A
1,2,4-Trimethylbenzene	11.1		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
1,3,5-Trimethylbenzene	3.1		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B		11/24/15 16:50	DD	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
o-Xylene	1.6		ug/L	1.0	SW846 8260B		11/24/15 16:50	DD	A
mp-Xylene	3.6		ug/L	2.0	SW846 8260B		11/24/15 16:50	DD	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206006** Date Collected: 11/19/2015 12:21 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	99.4		%	62 - 133	SW846 8260B			11/24/15 16:50	DD	A
4-Bromofluorobenzene (S)	101		%	79 - 114	SW846 8260B			11/24/15 16:50	DD	A
Dibromofluoromethane (S)	88.8		%	78 - 116	SW846 8260B			11/24/15 16:50	DD	A
Toluene-d8 (S)	95.9		%	76 - 127	SW846 8260B			11/24/15 16:50	DD	A

Amy K Borden

Ms. Amy K Borden
Project Coordinator

ALS Environmental
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ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID:	**2109206007**	Date Collected:	11/19/2015 12:19	Matrix:	Water
Sample ID:	**Pond**	Date Received:	11/19/2015 19:50		

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
SUBCONTRACTED ANALYSIS									
Subcontracted Analysis	See Attached				Subcontract		11/19/15 11:15	CLT	A

Ms. Amy K Borden
Project Coordinator

ALS Environmental
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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109206 Pond

Lab ID: **2109206008** Date Collected: 11/19/2015 12:20 Matrix: Water
Sample ID: **Pond** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Oil/Grease Silica Gel Treated	ND		mg/L	2.1	EPA 1664B		11/20/15 12:50	AT	A

Ms. Amy K Borden
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2109206001	1	Pond	S2540D-11	Total Suspended Solids
This sample was analyzed after the 7 day holding time for total suspended solids had expired.				
2109206001	2	Pond	S5210B-11	Biochemical Oxygen Demand
The sample was originally run within hold time, but required further analysis that exceeded hold time.				

ALS Environmental

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Middletown, PA 17057
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F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #:

2109206

Co. Name: Shailaja Polasi 443-250-4597
Contact (Report to): Phone:
Address: 1800 Washington Blvd Baltimore MD 21230

Bill to (if differs than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:

Email? [ ] -Y
Fax? [ ] -Y No.:

11/19/15 SP

***Container Type			P	P	P	P	G	G	P	G						
***Container Size																
*** Preservative			ice	HNO_3	H_2SO_4	H_2SO_4	HNO_3	HCl	edta	H_2SO_4						
ANALYSES/METHOD REQUESTED			BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal	TPH						
Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	Enter Number of Containers Per Analysis										
1 Pond		11/19/15	12:16	G	ww	1										
2			12:18	G	ww		1									
3			12:14	G	ww			1								
4			12:12	G	ww				1							
5			12:15	G	ww					1						
6			12:21	G	ww						2					
7			12:19	G	ww							1				
8			12:20	G	ww								1			

12:20 SP

Receipt Information (completed by Sample Receiving)
Performed by: INITIALS: JB
Cooler Temp: 1
Therm. ID: 214
No. of Coolers:
Notes:

	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Circle appropriate Y or N:	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Custody seals Present?	(If present) Seals Intact?	Received on Ice?	COC/Labels complete/accurate?	Container in good condition?							

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments: UMG 11/20/15 0812

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Shailaja Polasi, MDE	11/19/15	14:18	2 [signature]	11-19	1418
3 [signature]	11-19	16:00	4 [signature]	11/19	1600
5 [signature]	11/19	1950	6 [signature] HS	11/19	1958
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other

EDDs Required? [ ] If yes, format type:

SDWA Forms? ⇨ yes [ ] yes [ ] yes [ ] yes [ ]

State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ] Other

→ Enter PWSID No.

DOD Criteria Required?

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: Air=Air; DW=Drinking Water; GW=Groundwater; Oil=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

2109206

FOUNTAIN VALLEY ANALYTICAL LABORATORY, INC.
1413 Old Taneytown Rd. Westminster, MD (410) 848-1014 (410) 876-4554 FAX (410) 848-0298

REPORT OF ANALYSIS

Laboratory ID #:	104355	Account #:	1036
Reference:	Shailaja Polasi	Company:	ALS Environmental
Location:	1800 Washington Blvd	Requested By:	Shannon Butler
	Baltimore, MD 21230	Source:	Waste Water
Date/ Time Collected:	11/19/2015 1219	Site:	Pond
Date/Time Rec'd:	11/19/2015 1705	Submitted By:	S. Polasi

PARAMETERS	RESULTS	UNITS	DL *	METHOD	DATE/TIME/ANALYST
Bacteria, Coliform, Fecal, MPN	>2419.6	MPN/ 100 ml	1.0	SM18 9221 E.	11/20/2015 / 1115 / BCD

NOTES

1 MPN/ 100 ml = Most Probable Number [of viable bacteria] per 100 ml of sample.
2 Sample collected by client, analyzed as received

Reason for Test : MDE

* DL: Detection Limit

Date Reported: 11/20/2015

MD State Certification # 133

ALS Environmental

34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #:
2109206

Co. Name: Shailaja Polasi
Contact (Report to): 443-250-4597 Phone:
Address: 1800 washington Blvd
Baltimore MD 21230

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. Date Required:
[ ] Rush-Subject to ALS approval and surcharges. Approved By:

Email? [ ] -Y
Fax? [ ] -Y No.:

11/19/15 (SP)

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal	TPH		
							Enter Number of Containers Per Analysis									
1	Pond		11/19/15	12:16	G	ww	1									
2				12:18	G	ww		1								
3				12:14	G	ww			1							
4				12:12	G	ww				1						
5				12:15	G	ww					1					
6				12:21	G	ww						2				
7				12:19	G	ww							1			
8				12:20	G	ww								~~12:12~~ 1 (SP)		

	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal	TPH		
***Container Type	P	P	P	P	G	G	P	G		
***Container Size										
Preservative	ice	HNO3	H2SO4	H2SO4	HNO3	HCl	edta	H2SO4		

ANALYSES/METHOD REQUESTED

Receipt Information (completed by Sample Receiver)
Received by: INITIAL HERE
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

	Y	N	Y	N	Y	N	Y	N	Circle appropriate Y or N.
	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Custody seals Present?	(If present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Shailaja Polasi, MDE	11/19/15	14:18	2 [signature]	11/19	1418
3 [signature]	11/19	16:00	4 [signature] / Lab	11/19	1545
5 [signature] / Lab	11/19	1705	6 BDFUM	11/19	1705
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
SDWA Forms?⇒ yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
Other
DOD Criteria Required?

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

December 7, 2015

Ms. Heather Nelson
MDE-Compliance Program
1800 Washington Blvd
Baltimore, MD 21230

Certificate of Analysis

Project Name:	**Trench**	Workorder:	**2109207**
Purchase Order:		Workorder ID:	**Trench**

Dear Ms. Nelson:

Enclosed are the analytical results for samples received by the laboratory on Thursday, November 19, 2015.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Amy K Borden (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

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ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Shailaja Polasi , Ms. Elizabeth Reicks , Mr. Jesse Salter , Mr. Kevin Weis

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2109207 Trench

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2109207001	Trench	Water	11/19/2015 11:47	11/19/2015 19:50	Ms. Shailaja Polasi
2109207002	Trench	Water	11/19/2015 11:55	11/19/2015 19:50	Ms. Shailaja Polasi
2109207003	Trench	Water	11/19/2015 11:50	11/19/2015 19:50	Ms. Shailaja Polasi
2109207004	Trench	Water	11/19/2015 11:53	11/19/2015 19:50	Ms. Shailaja Polasi
2109207005	Trench	Water	11/19/2015 11:45	11/19/2015 19:50	Ms. Shailaja Polasi
2109207006	Trench	Water	11/19/2015 11:55	11/19/2015 19:50	Ms. Shailaja Polasi
2109207007	Trench	Water	11/19/2015 11:46	11/19/2015 19:50	Ms. Shailaja Polasi

SAMPLE SUMMARY

Workorder: 2109207 Trench

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2109207 Trench

Sample Comments

Lab ID: 2109207006 **Sample ID:** Trench **Sample Type:** SAMPLE

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

Lab ID: 2109207007 **Sample ID:** Trench **Sample Type:** SAMPLE

See attached subcontracted results from Fountain Valley Analytical Laboratory, Inc. for fecal results. SB 11/20/15.

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207001** Date Collected: 11/19/2015 11:47 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Biochemical Oxygen Demand	2840		mg/L	2.0	S5210B-11		11/30/15 12:05	GMM	A
Total Suspended Solids	35	1	mg/L	5	S2540D-11		11/29/15 17:01	NV	A

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207002** Date Collected: 11/19/2015 11:55 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Aluminum, Total	0.34		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/24/15 16:10	TSS	A1
Antimony, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Arsenic, Total	ND		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Barium, Total	0.081		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Beryllium, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Cadmium, Total	ND		mg/L	0.0010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Chromium, Total	ND		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Cobalt, Total	ND		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Copper, Total	0.0062		mg/L	0.0050	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Iron, Total	8.4		mg/L	0.030	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Lead, Total	ND		mg/L	0.0030	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Magnesium, Total	11.1		mg/L	0.050	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Manganese, Total	0.17		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Mercury, Total	ND		mg/L	0.00020	EPA 245.1	12/1/15	MNP	12/1/15 12:15	MNP	A2
Nickel, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Potassium, Total	5.4		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Selenium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Silver, Total	ND		mg/L	0.0020	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Sodium, Total	75.8		mg/L	0.25	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Thallium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Tin, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Titanium, Total	ND		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Vanadium, Total	0.0075		mg/L	0.0025	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1
Zinc, Total	0.088		mg/L	0.010	EPA 200.7	11/20/15	ECG	11/23/15 22:16	TSS	A1

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207003** Date Collected: 11/19/2015 11:50 Matrix: Water
Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Nitrate/Nitrite-N	0.71		mg/L	0.10	EPA 353.2		12/1/15 14:43	THB	A
Phosphorus, Total	2.0		mg/L	1.0	EPA 365.1	11/23/15 NV	12/5/15 05:09	LJF	A
Total Kjeldahl Nitrogen	10.5		mg/L	4.0	S4500NH3G-11	11/21/15 J1H	11/23/15 13:47	DRM	A
Total Nitrogen	11.2		mg/L	1.00	Calculation		12/2/15 14:27	NJA	A

Amy K Borden

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Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207004** Date Collected: 11/19/2015 11:53 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
WET CHEMISTRY									
Chemical Oxygen Demand (COD)	7050		mg/L	50	EPA 410.4		11/20/15 07:00	JAM	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207005** Date Collected: 11/19/2015 11:45 Matrix: Water
Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
SEMIVOLATILES										
Acenaphthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Acenaphthylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Acetophenone	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Aniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Atrazine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Azobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzaldehyde	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzidine	ND		ug/L	46.3	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzo(a)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzo(a)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzo(b)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzo(g,h,i)perylene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzoic acid	59.4		ug/L	14.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzo(k)fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Benzyl Alcohol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Biphenyl	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
4-Bromophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Butylbenzylphthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Caprolactam	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Carbazole	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
4-Chloro-3-methylphenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
4-Chloroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
bis(2-Chloroethoxy)methane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
bis(2-Chloroethyl)ether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
bis(2-Chloroisopropyl)ether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Chloronaphthalene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Chlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
4-Chlorophenyl-phenylether	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Chrysene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
mp-Cresol	205		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
o-Cresol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
n-Decane	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Di-n-Butylphthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Di-n-Octylphthalate	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Dibenzo(a,h)anthracene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Dibenzofuran	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207005** Date Collected: 11/19/2015 11:45 Matrix: Water
Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
2,3-Dichloroaniline	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,2-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,3-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,4-Dichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
3,3-Dichlorobenzidine	ND		ug/L	14.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4-Dichlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,6-Dichlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Diethylphthalate	425		ug/L	13.9	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
Dimethoate	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4-Dimethylphenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Dimethylphthalate	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,2-Dinitrobenzene	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,3-Dinitrobenzene	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,4-Dinitrobenzene	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4-Dinitrophenol	ND		ug/L	14.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,6-Dinitrotoluene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,4-Dioxane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Diphenylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,2-Diphenylhydrazine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Di(2-Ethylhexyl)adipate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
bis(2-Ethylhexyl)phthalate	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Fluoranthene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Fluorene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
n-Heptadecane	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Hexachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Hexachlorobutadiene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Hexachlorocyclopentadiene	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Hexachloroethane	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Indeno(1,2,3-cd)pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Isophorone	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Methyl-4,6-dinitrophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Methylnaphthalene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Naphthylamine	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Naphthalene	7.6		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
3-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207005** Date Collected: 11/19/2015 11:45 Matrix: Water
Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
4-Nitroaniline	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Nitrobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Nitrophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
4-Nitrophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitrosodi-n-butylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitrosodiethylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitrosodimethylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitroso-di-n-propylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitrosodiphenylamine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
N-Nitrosopyrrolidine	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Pentachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Pentachlorophenol	ND		ug/L	5.6	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Phenanthrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Phenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Pyrene	ND		ug/L	1.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Pyridine	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Resorcinol	ND		ug/L	111	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
alpha-Terpineol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,3,4,6-Tetrachlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
1,2,4-Trichlorobenzene	ND		ug/L	2.8	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4,5-Trichlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4,6-Trichlorophenol	ND		ug/L	7.4	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	89.7		%	40 - 125	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2,4,6-Tribromophenol (S)	90.8		%	47 - 128	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
2-Fluorobiphenyl (S)	73.4		%	50 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
2-Fluorobiphenyl (S)	79.3		%	52 - 118	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
2-Fluorophenol (S)	45.9		%	20 - 87	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
2-Fluorophenol (S)	42.1		%	20 - 75	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Nitrobenzene-d5 (S)	95.4		%	27 - 139	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
Nitrobenzene-d5 (S)	90.7		%	40 - 110	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Phenol-d5 (S)	30		%	10 - 81	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A
Phenol-d5 (S)	27.4		%	13 - 49	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Terphenyl-d14 (S)	80.3		%	50 - 122	SW846 8270D	11/25/15	CAC	11/25/15 18:25	CGS	A
Terphenyl-d14 (S)	84.7		%	46 - 133	SW846 8270D	11/25/15	CAC	11/29/15 17:02	GEC	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID:	**2109207005**	Date Collected:	11/19/2015 11:45	Matrix:	Water
Sample ID:	**Trench**	Date Received:	11/19/2015 19:50		

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*

Ms. Amy K Borden
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207006** Date Collected: 11/19/2015 11:55 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
VOLATILE ORGANICS									
Acetone	ND		ug/L	50.0	SW846 8260B		11/24/15 17:34	DD	A
Acetonitrile	ND		ug/L	100	SW846 8260B		11/24/15 17:34	DD	A
Acrolein	ND		ug/L	125	SW846 8260B		11/24/15 17:34	DD	A
Acrylonitrile	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
tert-Amyl methyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Benzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Benzyl Chloride	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Bromobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Bromochloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Bromodichloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Bromoform	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Bromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
2-Butanone	117		ug/L	50.0	SW846 8260B		11/24/15 17:34	DD	A
tert-Butyl Alcohol	ND		ug/L	50.0	SW846 8260B		11/24/15 17:34	DD	A
n-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
tert-Butylbenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
sec-Butylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Carbon Disulfide	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Carbon Tetrachloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Chloroacetonitrile	ND		ug/L	125	SW846 8260B		11/24/15 17:34	DD	A
Chlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1-Chlorobutane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Chlorodibromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Chloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
2-Chloroethylvinyl ether	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Chloroform	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1-Chlorohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Chloromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Chloroprene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
3-Chloro-1-propene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
o-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
p-Chlorotoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Cyclohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,2-Dibromo-3-chloropropane	ND		ug/L	35.0	SW846 8260B		11/24/15 17:34	DD	A
1,2-Dibromoethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Dibromomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207006** Date Collected: 11/19/2015 11:55 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
trans-1,4-Dichloro-2-butene	ND		ug/L	15.0	SW846 8260B		11/24/15 17:34	DD	A
1,1-Dichloro-2-Propanone	ND		ug/L	125	SW846 8260B		11/24/15 17:34	DD	A
1,2-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,3-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,4-Dichlorobenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Dichlorodifluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,2-Dichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
cis-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
trans-1,2-Dichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Dichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,3-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
2,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,2-Dichloropropane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
cis-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
trans-1,3-Dichloropropene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,3-Dichloropropene, Total	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Diisobutylene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Diisopropyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,4-Dioxane	ND		ug/L	1600	SW846 8260B		11/24/15 17:34	DD	A
Ethyl Ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Ethyl Methacrylate	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Ethyl Acetate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Ethyl tert-butyl ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Ethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Freon 113	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Heptane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Hexachlorobutadiene	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Hexachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Hexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
2-Hexanone	29.7		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Iodomethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Isobutyl alcohol	ND		ug/L	375	SW846 8260B		11/24/15 17:34	DD	A
Isopropyl Alcohol	1930		ug/L	125	SW846 8260B		11/24/15 17:34	DD	A
Isopropylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
p-Isopropyltoluene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207006** Date Collected: 11/19/2015 11:55 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
Methacrylonitrile	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Methyl methacrylate	ND		ug/L	15.0	SW846 8260B		11/24/15 17:34	DD	A
Methyl acetate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Methyl acrylate	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Methyl cyclohexane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Methyl t-Butyl Ether	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Methylene Chloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Naphthalene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
Nitrobenzene	ND		ug/L	125	SW846 8260B		11/24/15 17:34	DD	A
2-Nitropropane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Octane	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Pentachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Pentane	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
n-Propanol	12200		ug/L	5000	SW846 8260B		11/26/15 06:05	CJG	B
Propionitrile	ND		ug/L	50.0	SW846 8260B		11/24/15 17:34	DD	A
n-Propylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Styrene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1,1,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1,2,2-Tetrachloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Tetrachloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Tetrahydrofuran	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Toluene	5.2		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Total Xylenes	ND		ug/L	15.0	SW846 8260B		11/24/15 17:34	DD	A
1,2,3-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
1,2,4-Trichlorobenzene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
1,1,1-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,1,2-Trichloroethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Trichloroethene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Trichlorofluoromethane	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,2,3-Trichloropropane	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A
1,2,4-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
1,3,5-Trimethylbenzene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
Vinyl Acetate	ND		ug/L	25.0	SW846 8260B		11/24/15 17:34	DD	A
Vinyl Chloride	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
o-Xylene	ND		ug/L	5.0	SW846 8260B		11/24/15 17:34	DD	A
mp-Xylene	ND		ug/L	10.0	SW846 8260B		11/24/15 17:34	DD	A

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ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207006** Date Collected: 11/19/2015 11:55 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	100		%	62 - 133	SW846 8260B			11/24/15 17:34	DD	A
1,2-Dichloroethane-d4 (S)	95.1		%	62 - 133	SW846 8260B			11/26/15 06:05	CJG	B
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			11/24/15 17:34	DD	A
4-Bromofluorobenzene (S)	90.5		%	79 - 114	SW846 8260B			11/26/15 06:05	CJG	B
Dibromofluoromethane (S)	87.1		%	78 - 116	SW846 8260B			11/24/15 17:34	DD	A
Dibromofluoromethane (S)	87.9		%	78 - 116	SW846 8260B			11/26/15 06:05	CJG	B
Toluene-d8 (S)	95.9		%	76 - 127	SW846 8260B			11/24/15 17:34	DD	A
Toluene-d8 (S)	88.1		%	76 - 127	SW846 8260B			11/26/15 06:05	CJG	B

Amy K Borden

Ms. Amy K Borden
Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2109207 Trench

Lab ID: **2109207007** Date Collected: 11/19/2015 11:46 Matrix: Water

Sample ID: **Trench** Date Received: 11/19/2015 19:50

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	*Cntr*
SUBCONTRACTED ANALYSIS									
Subcontracted Analysis	See Attached				Subcontract		11/19/15 17:15	CLT	A

Ms. Amy K Borden
Project Coordinator

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2109207001	1	Trench	S2540D-11	Total Suspended Solids

This sample was analyzed after the 7 day holding time for total suspended solids had expired.

ALS Environmental

34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

AVB

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #:

2109207

Co. Name: Shailaja Polasi 443-250-4597
Contact (Report to): Phone:
Address: 1800 Washington Blvd Baltimore MD

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:

Email? [ ] -Y
Fax? [ ] -Y No.:

SP 11/19/15

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal			
							***Container Type	P	P	P	P	G	G	P		
							***Container Size									
							Preservative	ICE	HNO_3	H_2SO_4	H_2SO_4	HNO_3	HCl	EDTA		
							ANALYSES/METHOD REQUESTED									
							Enter Number of Containers Per Analysis									
1	Trench -		11/19	11:47	G	WW	1									
2			SP	11:55	G	WW		1								
3				11:50	G	WW			1							
4				11:53	G	WW				1						
5				11:45	G	WW					2					
6				11:55	G	WW						2				
7				11:46	G	WW							1			
8																

Receipt Information (completed by Sample Receiver)
Performed by: MTW HFR
Cooler Temp: 7
Therm. ID: 294
No. of Coolers:
Notes:

	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
	Y	Y	Y	Y	
	Y	N	N	N	N
	Y	Y	Y		

	Custody seals Present?	(If present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?
	Y	Y	Y		

LMG 11/20/15 CBK

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments:

	Relinquished By / Company Name	Date	Time		Received By / Company Name	Date	Time
1	Shailaja Polasi, MDE	11/19/15	14:18	2	[signature]	11-19	1418
3	[signature]	11-19	1500	4	[signature]	11/19	1600
5	[signature]	11/19	1750	6	[signature]	11/19	1950
7				8			
9				10			

Data Deliverables: [ ] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
DOD Criteria Required?
SDWA Forms? yes / yes / yes / yes
State Samples Collected In? MD / NJ / NY / PA / Other

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

2109207

FOUNTAIN VALLEY ANALYTICAL LABORATORY, INC.
1413 Old Taneytown Rd. Westminster, MD (410) 848-1014 (410) 876-4554 FAX (410) 848-0298

REPORT OF ANALYSIS

Laboratory ID #:	104354	Account #:	1036
Reference:	Shailaja Polasi	Company:	ALS Environmental
Location:	1800 Washington Blvd	Requested By:	Shannon Butler
	Baltimore, MD 21230	Source:	Waste Water
Date/ Time Collected:	11/19/2015 1146	Site:	Trench
Date/Time Rec'd:	11/19/2015 1705	Submitted By:	S. Polasi

PARAMETERS	RESULTS	UNITS	DL *	METHOD	DATE/TIME/ANALYST
Bacteria, Coliform, Fecal, MPN	613.1	MPN/ 100 ml	1.0	SM18 9221 E.	11/20/2015 / 1715 / BCD

NOTES

1 MPN/ 100 ml = Most Probable Number [of viable bacteria] per 100 ml of sample.

2 Sample collected by client, analyzed as received

Reason for Test : MDE

* DL: Detection Limit

Date Reported: 11/20/2015

MD State Certification # 133

ALS Environmental

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F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #:
2109207

Co. Name: Shailaja Polasi 443-250-4597
Contact (Report to): Phone:
Address: 1800 washington Blvd Baltimore MD

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #:

TAT: [X] Normal-Standard TAT is 10-12 business days. Date Required:
[ ] Rush-Subject to ALS approval and surcharges. Approved By:

Email? -Y
Fax? -Y No.:

SP 11/19/15

	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	BOD, TSS	TM (Total Metals)	TP, TN	COD	SVOCs	VOCs	fecal			
							Enter Number of Containers Per Analysis									
1	Trench		11/19	11:47	G	ww	1									
2			SP	11:55	G	ww		1								
3				11:50	G	ww			1							
4				11:53	G	ww				1						
5				11:45	G	ww					2					
6				11:55	G	ww						2				
7				11:46	G	ww							1			
8																

	***Container Type	P	P	P	P	G	G	P			
	***Container Size										
	*** Preservative	ice	HNO_3	H_2SO_4	H_2SO_4	HNO_3	HCl	EDTA			

ANALYSES/METHOD REQUESTED

Receipt Information (completed by Sample Receiver)
Performed by: Name etc.
Cooler Temp:
Therm. ID:
No. of Coolers:
Notes:

	Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
	Y N	Y N	Y N	Y N	
	Custody seals Present?	(If present) Seals intact?	Received on ice?	COC/Labels complete/accurate?	Container in good condition?
	Y	Y	Y	Y	Y
	N	N	N	N	N

SAMPLED BY (Please Print): Shailaja Polasi

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Shailaja Polasi, MDE	11/19/15	14:18	2 [signature]	11-19	1418
3 [signature]	11-19	1500	4 [signature]		1548
5 [signature] lab	11/19	1705	6 BD/FUAL	11/19/15	1705
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-Like [ ] NJ-Reduced [ ] NJ-Full [ ] other
EDDs Required? [ ] If yes, format type:
DOD Criteria Required?
SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
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ALS FIELD SERVICES
[ ] Pickup
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* G=Grab; C=Composite
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Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.
Rev 01-2013