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Office of Water / Office of Wastewater Management/
Water Permits Division

Sampling Report
Simulated Ballast Water Intake Characterization Study for High and Low Suction Sea Chests on Lakers

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SECTION 1
INTRODUCTION

This Sampling Report describes efforts by the U.S. Environmental Protection Agency (EPA) to characterize ambient water at varying depths at a Great Lakes ballast water loading port. The objective of the sampling and analysis activities was to determine whether the characteristics of ambient water drawn near the lake bed through low sea chests on Great Lakes bulk carriers (Lakers[1]) would meaningfully differ from those of ambient water withdrawn higher in the water column through the Lakers' side sea chests. The sampling took place on May 28, 2014 at the Port of Indiana - Burns Harbor on Lake Michigan under the direction of the Office of Wastewater Management of the EPA.

Samples were collected in accordance with procedures specified in the *Sampling and Analysis Plan for the Vessel General Permitting Program Ballast Water Intake Characterization Sampling* (SAP) and the *Quality Assurance Project Plan for Technical Support for the Vessel General Permitting Program – Ballast Water Intake Characterization Sampling* (QAPP). Samples collected for analysis of turbidity were analyzed on-site by Eastern Research Group, Inc. (ERG), and samples collected for analysis of total suspended solids and particulate organic carbon were analyzed by TriMatrix Laboratories in Grand Rapids, Michigan. The SAP is provided in Appendix A.

Section 2.0 describes the sample collection methods and deviations from the SAP. Section 3.0 presents and analyzes the analytical data collected during the sampling episode. Section 4.0 describes the quality assurance and quality control (QA/QC) procedures and results, and Section 5.0 presents references used in this document.

1.1 BACKGROUND

This sampling episode is part of EPA's on-going efforts to minimize the release of non-indigenous invasive species in ballast water discharges to the Great Lakes. Part 2.2.3.3 of EPA's 2013 Vessel General Permit (VGP) require vessels, where feasible, to use the high sea suction when the clearance is less than 5 meters (approximately 15 feet) to the lower edge of the sea chest, or when the vessel is dockside, to reduce sediment intake. Also, Part 2.2.3.4 of the VGP requires Lakers to minimize complete ballasting dockside and wait until the vessel is in deeper water when practical and safe to further reduce sediment uptake. These permit requirements assume that sediment concentrations are higher nearer the lake bottom than they are at the top of the water column, and that ballast water pulled from lower in the water column is more likely to result in higher concentrations of sediment deposited into ballast tanks.

Vessel operators have confirmed EPA's assumptions anecdotally. A senior representative from American Steamship Company, which currently operates 17 Lakers, has noted that uptake

[1] "Laker" is the common name for the large and uniquely designed and constructed dry bulk vessels (or carriers) used to transport bulk material commodities throughout the Great Lakes system. Thousand-foot Lakers transport goods on only the four upper Great Lakes and connecting channels, as these vessels are limited by their size from transiting the Welland Canal. Smaller "Lakers" also serve Lake Erie, and in some cases, they exit the St. Lawrence Seaway to serve ports on the St. Lawrence River, or act as seagoing vessels by serving as vessels engaged in coastal trade along the Canadian or U.S. Atlantic seaboard. The primary commodities transported by the Lakers include iron ore pellets, coal, grain, limestone, cement, sand, and salt.

of ballast during cargo off-loading is generally delayed as long as possible to raise the level of the ballast intake sea chests as far above the bottom of the slip/dock as possible in an effort to reduce sediment uptake. He also added that one of their Lakers, the Walter J. McCarthy Jr, was retrofit with ballast intake sea chests at a vertical position much closer to the water line than the ship's original sea chest location on the bottom shell of the ship, and that raising the sea chest has significantly reduced the amount of sediment drawn in with ballast water.[2]

EPA's intent with these BMPs is to limit the amount of sediment potentially containing live aquatic organisms being drawn into ballast tanks during ballasting in Great Lakes ports. Sediments have been shown to harbor living organisms including resting stages – eggs, spores and cysts (Johengen et al., 2005), and these organisms can then be transported between Great Lakes ports in ballast tank sediments. During ballast water discharge, a portion of the sediments can be discharged resulting in the potential to spread non-indigenous invasive species among multiple Great Lakes ports. Additionally, sediment in suspension in the ballast water reduces the effectiveness of UV radiation and ultrasonic treatments and requires significantly higher dosages of chlorine, ozone, hydrogen peroxide, and other chemicals for effective treatment (Sano et al., 2003 and 2004).

1.2 OBJECTIVES AND SCOPE

The primary objective of this sampling program is to collect primary data that will be used to:

- Determine if water taken dockside and collected from lower in the water column has a higher concentration of sediment than water collected from higher in the water column;
- Determine whether the suction created by the ballast pumps on Lakers increases sediment intake; and
- Determine if the amount of sediment transferred into ballast tanks on Lakers would decrease if vessels collected ballast water from higher in the water column (e.g., by using side or upper sea chests) rather than closer to the lake bottom (e.g., by using bottom or lower sea chests).

1.3 PORT LOCATION SELECTION

EPA selected the Port of Indiana at Burns Harbor (Burns Harbor) for collection of samples based on the number of bulk cargo vessels (both Lakers and over-seas vessels) entering the port annually, its location on Lake Michigan where turbidity levels are less influenced by precipitation events as compared to ports located within a river system, and accessibility of the port by EPA's ERG sampling team. Figure 1-1 is a diagram of the port at Burns Harbor. Dock location 4 on the East Harbor Arm within the port of Burns Harbor was selected for sampling because this location is frequently used by Lakers to off-load bulk cargo and load ballast water,

[2] Information provided by Mr. Noel Basset, Vice President of Operations of American Steamship Company on November 14, 2014 in response to EPA's questions regarding management of sea chests and sediment on board Lakers.

and because no vessels were scheduled to arrive at this dock location during the sampling period.[3]

[3] Personal conversation between Mark Briggs, ERG and Mr. Rick Heimann, Port Director for the Port of Indiana at Burns Harbor on May 27, 2014.

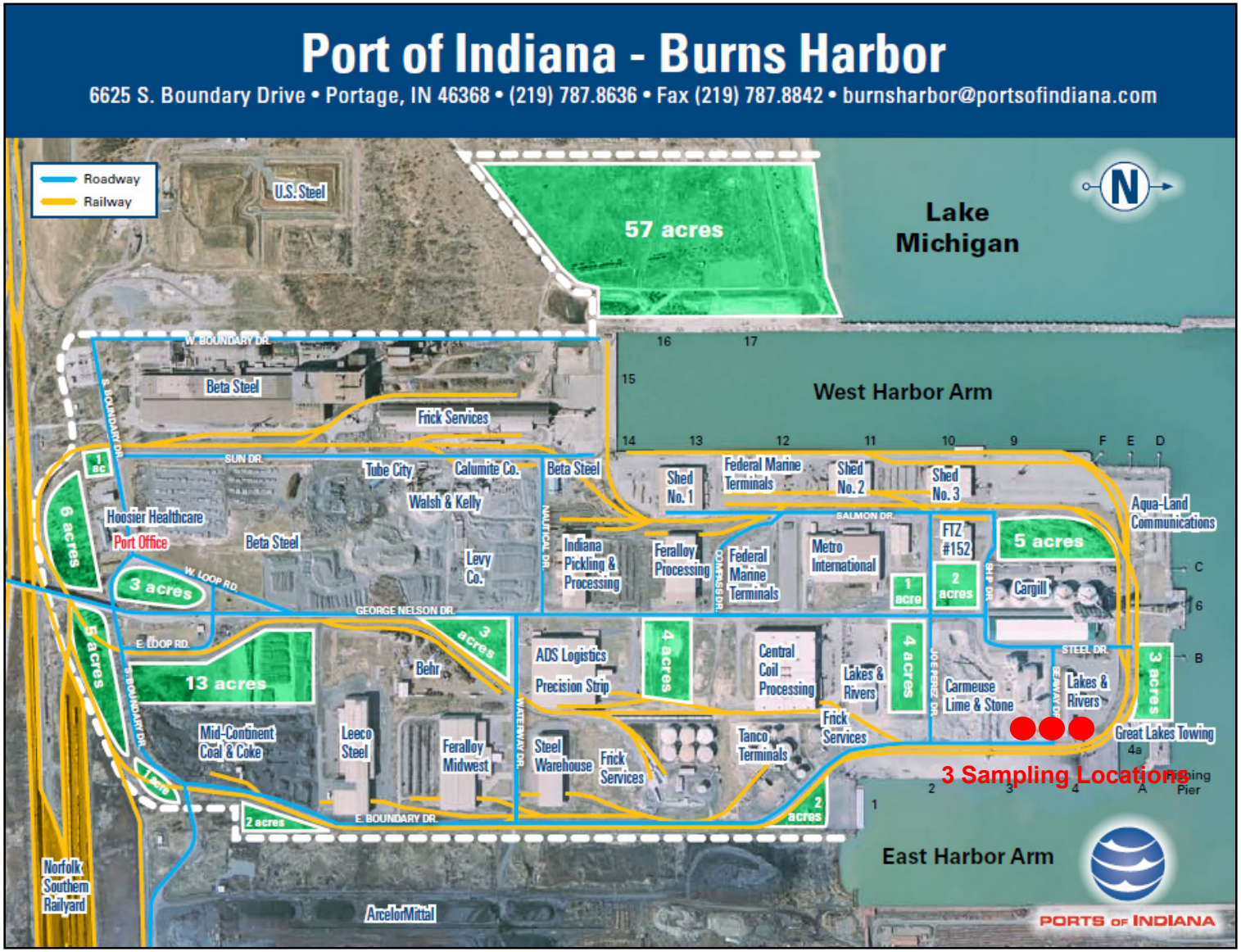

Figure 1-1. Diagram of the Port at Burns Harbor with Red Circles Indicating where on the Pier Sampling Occurred

SECTION 2
SAMPLE COLLECTION METHODS

This section describes the sampling procedures used to collect ambient water samples at various depths using a Kemmerer sampler and a simulated ballast pump to determine if sediment concentrations change with depth and whether pumping of ballast water increases sediment loads.

2.1 SAMPLE COLLECTION METHODOLOGY

The sampling team collected samples at various depths from the ambient water adjacent to a pier in Burns Harbor where Lakers typically load ballast water. The sampling team used two separate techniques performed sequentially. Using the first technique, the sampling crew collected discrete grab samples of the water column using a Kemmerer sampler to determine the concentrations of suspended solids, particulate organic carbon, and turbidity. This first sampling technique was intended to collect water column samples relatively quiescently, with minimal suspension of sediment from the lake/river bottom. For the second technique, the sampling team then used a pump to extract ambient water at the same depths as the Kemmerer sampler to determine if the suction created by the pump resulted in increased concentrations of turbidity, suspended solids and particulate organic carbon in the samples. This second technique was intended to simulate ballasting by a vessel, including using a similar pump type and pumping rates as full-scale vessel ballast pumps (see further discussion in Part 2.1.2).

Samples were collected at 4-foot intervals with both the Kemmerer sampler and the pump, beginning at a depth of 6 feet below the lake surface and ending at a depth of 22 feet below the lake surface. The distance to the water surface from the top of the seawall was 14 feet. A total of 3 replicates sample sets were collected, with each replicate set of samples (Kemmerer and pump) being collected at a location on the pier 60 feet from the previous sample set to prevent sediment which may have been re-suspended during collection of the previous sample set from impacting the subsequent sample sets. Figure 2-1 depicts the Kemmerer and pump sampling depths and locations. Figure 2-2 shows the spatial relationship between the three sampling locations.

Normal sea chest intake occurs between 12 and 14 feet below the waterline; however, when dockside, the sea chest operates anywhere from 1 to 15 feet (Noel Basset, Personal communication). In extreme cases the raised side sea chest intake may reach 2 feet above the waterline when the vessel has no cargo.[4] The total depth of the lakebed at the sampling locations was 23 feet. For perspective, the minimum depth that American Steamship Line vessels can operate in is 22 feet, so that the propellers are fully immersed.[4]

[4] Information provided by Mr. Noel Basset, Vice President of Operations of American Steamship Company on November 14, 2014 in response to EPA's questions regarding management of sea chests and sediment on board Lakers.

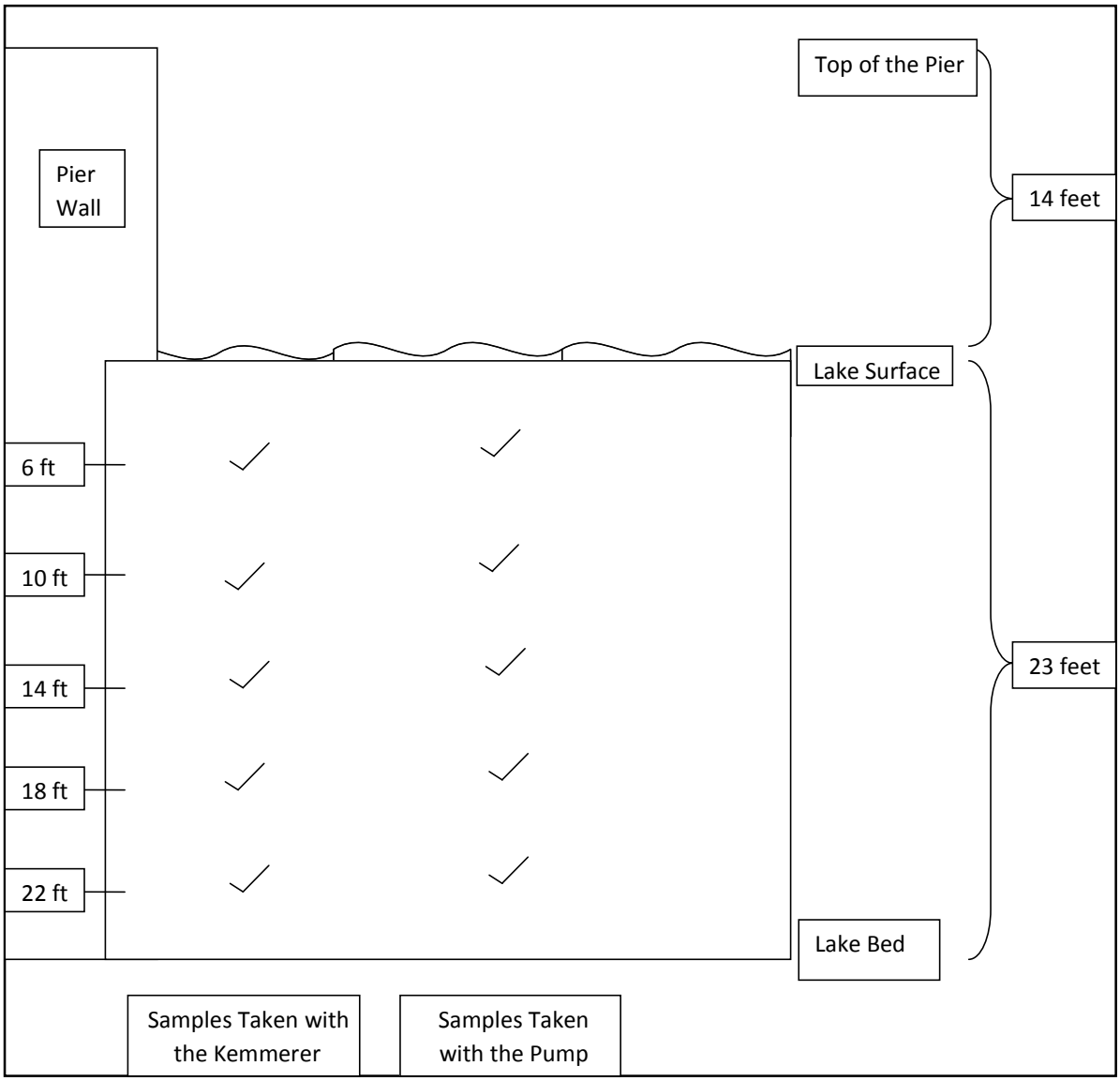

Figure 2-1. Sampling Depths and Pier Height at Burns Harbor During Sample Collection

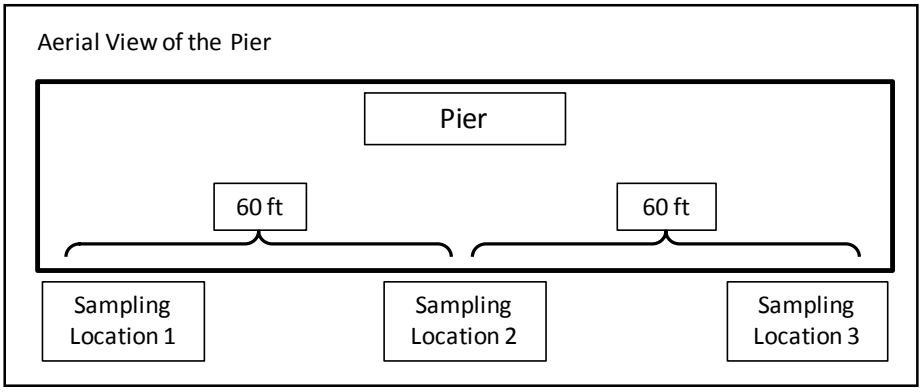

Figure 2-2. Spatial Relationship Between the Three Replicate Sampling Locations

2.1.1 Kemmerer Sampling

Samples were collected using a 1.2-liter Kemmerer sampler lowered to the target depth and then closed to collect a discrete sample. A rope attached to the Kemmerer sampler having pre-measured 4 foot increments was used to ensure the sampler was lowered to the desired depths. Once the Kemmerer sampler was closed, the water sampler was brought to the surface and the sample drained directly into the appropriate sample bottles. The process was repeated at each target depth until all the sample bottles were filled.

2.1.2 Pump Sampling

The sampling pump used to simulate a Laker ballast pump was a Honda gasoline powered centrifugal trash pump with a 2-inch diameter flexible intake hose. EPA selected this pump because it uses the same centrifugal pumping technology as ballast pumps used onboard Lakers. According to design data for Lakers, ballast water pumping rates for centrifugal pumps range between 30.6 and 42.6 gpm/in^2 based on pipe sizes ranging between 10 inches and 30 inches in diameter (USGS, 2013). Using these design data, ballast pumping rates onboard Lakers average 36.6 gpm/in^2. Therefore, the target pump rate for the portable pump was 115 gpm, which provides a pumping rate of approximately 36.6 gpm/in^2 through the 2" suction hose.

Prior to sampling, the pump flow rate was calibrated to ensure the pumping rate would be similar to that of a Laker ballast pump. To calibrate the pump, the flexible intake hose was lowered over the seawall and into the water column to a depth of 10 feet and the pump started. Once the pump was operating at steady state conditions, as determined by the consistency of the water stream from the discharge hose, the time was recorded to fill a 30-gallon plastic trash container. Based on an average time of 15 seconds to fill the 30-gallon plastic container, EPA estimated the pump flow rate to be 120 gallons per minute (gpm) at the hydrostatic head conditions observed during sample collection. For a 2-inch diameter flexible suction hose and a measured flow rate of 120 gpm, the flow rate per area of hose was calculated to be 38.2 gpm/in^2. Since the measured flow rates per area from the pump were within 5 percent of the target flow rate per area of 36.6 gpm/in^2 needed to simulate a Laker ballast pumping rate, EPA considered the flow rate to be appropriate for testing.

The flexible intake hose was then lowered into the water column to premeasured depths, and the pump was allowed to operate for 1 minute to flush the intake and discharge hoses before a sample was collected in a 5-gallon plastic pail. The sample from the pail was immediately poured into individual sample bottles, which were submitted to the laboratory for analysis of total suspended solids and particulate organic carbon. During pour-off into the individual sample bottles, the pail was manually shaken and swirled to prevent solids from settling.

Note that while the overall design and pumping rates of the simulated and actual Laker ballast pumps are similar, there are significant differences between these pumps in physical size and configuration. For example, the ballast pump on some Interlake Steamship Company vessels have 30-inch diameter impellers with a 30^o blade angle, a 2.5-inch gap between the outer edge of the impeller and the cavity walls and operate at speeds of 690 revolutions per minute (RPM).[5] In

[5] Main ballast pump design data provided by Phil Moore at Interlake Steamship Company to Mark Briggs at ERG via email on July 11, 2014.

contrast, the impeller diameter on the pump used for this study was 5 inches and had a 0.008 to 0.014 inch gap between the outer edge of the impeller and the cavity walls. The angle of the blades and the speed of the impeller in the pump used in this study were unknown. However, these differences in physical size and configuration are not expected to impact the concentrations of suspended solids, particulate organic carbon, and turbidity of the water pulled through the two types of pumps; concentrations of these constituents are believed to be impacted primarily by the pump suction created by the pumping rate (target 36.6 gpm/in^2).

2.2 SAMPLE ANALYSIS METHODOLOGY

Samples collected from both the Kemmerer sampler and the pump were analyzed for total suspended solids (TSS), particulate organic carbon (POC) and turbidity. Samples collected for analysis of TSS and POC were analyzed by TriMatrix Laboratories using the analytical methods shown in Table 2-1. Due to the short holding time for turbidity (24 hours), samples for turbidity were analyzed in the field using Standard Method 2130 B.

Table 2-1. Analytical Methods and Detection Limits for Sampled Analytes

Analyte	Method Number	MDL	Units
Total Suspended Solids (TSS)	SM 2540 D	1	mg/L
Particulate Organic Carbon (POC)	LG-207[a]	1.1	mg/L
Turbidity	SM 2130 B	0.05	NTU

SM = Standard Methods.

MDL = Method Detection Limit.

NTU = Nephelometric Turbidity Units.

[a] Method LG-207 developed by USEPA GLNPO for measuring POC in the Great Lakes.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

Laboratory and field quality control was evaluated by analyzing duplicate samples and calculating the relative percent difference (RPD). Duplicate laboratory and field analytical data are discussed in Sections 4.1 and 4.2, respectively. Other field quality control samples prepared for this sampling episode included an equipment blank which is discussed in Section 4.2.1.

2.4 DEVIATIONS FROM THE SAMPLING AND ANALYSIS PLAN

The sampling episode proceeded as specified in the SAP with the deviations described in Table 2-2.

Table 2-2. Deviations from the Sampling and Analysis Plan

Deviation	Description
Sampling Depth and Sampling Interval	The water depth of the harbor on the day of sampling was 23 feet and not 28 feet as anticipated in the SAP. As a result, the first sample was collected at a depth of 6 feet below the water surface and then subsequently at 4 foot intervals to a depth of 22 feet. Figure 3-1 in the SAP was based on a total water depth of 28 feet and therefore samples were anticipated to be collected at 5-foot intervals to a depth of 28 feet, with the first sample beginning at 8 feet below the water surface.
Laboratory and Field Duplicates	ERG had intended to collect extra volume for the laboratory to perform a duplicate analysis of selected samples; however, the extra sample volume was not collected. Instead, the extra volume collected for field duplicate analysis was analyzed and used to evaluate both laboratory precision and field precision. The result is there were no blind field duplicates provided to the laboratory.
MS/MSD for POC	The SAP and associated QAPP had intended for the laboratory to conduct matrix spike and matrix spike duplicate (MS/MSD) analysis of POC samples; however, the analytical method does not allow for MS/MSD analysis for quality control. Instead, the method relies on analysis of laboratory duplicate samples. Accordingly, ERG amended the QAPP to incorporate this change.

SECTION 3
RESULTS AND DISCUSSION

This section presents the data collected during this sampling episode. Analytical results for turbidity, TSS and POC from both the Kemmerer sampler and the pump at each sampling depth and each sampling location are presented in Section 3.1. Section 3.2 is a summary of the data including graphic representations along with a discussion of how the data may be used to compare sediment loading into Laker ballast tanks if high-suction sea chests are used rather than low-suction sea chests. All raw analytical data provided by the contract laboratory is provided in Appendix B of this report.

3.1 LABORATORY AND FIELD ANALYTICAL RESULTS

Analytical results for turbidity, TSS and POC at the three sampling locations are provided in Table 3-1 through Table 3-3. The three tables represent the three locations where samples were collected on the pier at Burns Harbor (see Figure 1-1). The locations are separated by approximately 60 feet to prevent sediments that may have been disturbed by the pump from being entrained into the next sample set.

Turbidity was detected in the Kemmerer sampler equipment blank (flagged by a "b" in Table 3-1 through Table 3-3; see Table 4-2 for equipment blank results). Both TSS and turbidity were detected in the pump equipment blank (flagged by a "c" in Table 3-1 through Table 3-3; see Table 4-2 for equipment blank results). The small amounts of turbidity and TSS in the equipment blanks may have contributed to a minor portion of the TSS and turbidity measured in the samples.

Table 3-1. Sample Results for Location 1

	Kemmerer Sampler				Pump			
Sample Depth (ft)[a]	Sample No.	TSS (mg/L)	POC (mg/L)	Turbidity[b] (NTU)	Sample No.	TSS[c] (mg/L)	POC (mg/L)	Turbidity[c] (NTU)
6	001	5.4	ND(1.1)	2.2	016	2.1	ND(1.1)	2.4
10	004	2.1	ND(1.1)	2.6	019 031 034	1.5[d]	ND(1.1)	2.0
14	007	2.6	ND(1.1)	2.0	022	1.7	ND(1.1)	3.1
18	010	2.3	ND(1.1)	1.5	025	21.7	ND(1.1)	30.8
22	013	2.4	ND(1.1)	3.6	028	69.4	3.1	85.6

ND = Not detected (number in parentheses is detection limit).

NTU = Nephelometric Turbidity Units

[a] Depth below the water surface.

[b] Turbidity was detected in the Kemmerer equipment blank at a concentration of 0.6 NTU.

[c] TSS and turbidity were detected in the pump equipment blank at concentrations of 6 mg/L and 1.7 NTU, respectively.

[d] Average of triplicate data. Triplicate samples collected to determine precision.

Table 3-2. Sample Results for Location 2

Sample Depth (ft)[a]	Kemmerer Sampler				Pump			
	Sample No.	TSS (mg/L)	POC (mg/L)	Turbidity[b] (NTU)	Sample No.	TSS[c] (mg/L)	POC (mg/L)	Turbidity[c] (NTU)
6	002	2	ND(1.1)	3.2	017	2.3	ND(1.1)	2.7
10	005	1.8	ND(1.1)	2.6	020 032	7.4[d]	1.1	5.9[d]
14	008	2.2	ND(1.1)	2.5	023	13.1	ND(1.1)	2.1
18	011	1.8	ND(1.1)	2.5	026	65.6	1.9	66.2
22	014	2.3	ND(1.1)	2.3	029	40.6	2.3	68.1

ND = Not detected (number in parentheses is detection limit).

NTU = Nephelometric Turbidity Units

[a] Depth below the water surface.

[b] Turbidity was detected in the Kemmerer equipment blank at a concentration of 0.6 NTU.

[c] TSS and turbidity were detected in the pump equipment blank at concentrations of 6 mg/L and 1.7 NTU, respectively.

[d] Average of duplicate data. Duplicate samples collected to determine precision.

Table 3-3. Sample Results for Location 3

Sample Depth (ft)[a]	Kemmerer Sampler				Pump			
	Sample No.	TSS (mg/L)	POC (mg/L)	Turbidity[b] (NTU)	Sample No.	TSS[c] (mg/L)	POC (mg/L)	Turbidity[c] (NTU)
6	003	1.2	ND (1.1)	1.7	018	1.3	ND(1.1)	1.8
10	006	1.3	ND (1.1)	2.7	021 033	2.8[d]	ND(1.1)	2.5[d]
14	009	ND (1.0)	ND(1.1)	1.0	024	2.3	ND(1.1)	2.5
18	012	1.4	ND (1.1)	1.7	027	8.7	ND(1.1)	9.6
22	015	2.3	1.5	2.6	030	65.2	2.4	54.2

ND = Not detected (number in parentheses is detection limit).

NTU = Nephelometric Turbidity Units

[a] Depth below the water surface.

[b] Turbidity was detected in the Kemmerer equipment blank at a concentration of 0.6 NTU.

[c] TSS and turbidity were detected in the pump equipment blank at concentrations of 6 mg/L and 1.7 NTU, respectively.

[d] Average of duplicate data. Duplicate samples collected to determine precision.

3.2 DATA ANALYSIS AND DISCUSSION

To analyze the data from the three separate locations, EPA averaged the Kemmerer data at each depth and the pump data at each depth (see Table 3-4). For TSS and POC results less than the detection limit, EPA used one-half the detection limit in calculations. EPA also plotted the average TSS, POC and turbidity data by depth (see Figure 3-1, Figure 3-2 and Figure 3-3, respectively.

Table 3-4. Average (± 1 Standard Deviation) Sample Results for All Locations

Sample Depth (ft)[b]	Kemmerer Sampler[a]			Pump[a]		
	TSS (mg/L)	POC (mg/L)	Turbidity[c,e] (NTU)	TSS[d] (mg/L)	POC (mg/L)	Turbidity[d,e] (NTU)
6	2.9 ± 2.2	0.55 ± 0.0	2.4 ± 0.8	1.9 ± 0.5	0.55 ± 0.0	2.3 ± 0.5
10	1.7 ± 0.4	0.55 ± 0.0	2.7 ± 0.04	3.9 ± 3.1	0.64 ± 0.2	3.5 ± 2.1
14	1.8 ± 1.1	0.55 ± 0.0	1.9 ± 0.8	5.7 ± 6.4	0.55 ± 0.0	2.6 ± 0.5
18	1.8 ± 0.4	0.55 ± 0.0	1.9 ± 0.6	32.0 ± 29.8	1.0 ± 0.8	35.6 ± 28.6
22	2.3 ± 0.1	0.87 ± 0.6	2.8 ± 0.7	58.4 ± 15.6	2.6 ± 0.4	69.3 ± 15.7

[a] Average calculated from three locations. For concentrations less than the method detection limit, one-half the method detection limit was used in calculating average concentrations.

[b] Depth below the water surface.

[c] Turbidity was detected in the Kemmerer equipment blank at a concentration of 0.6 NTU.

[d] TSS and turbidity were detected in the pump equipment blank at concentrations of 6 mg/L and 1.7 NTU, respectively.

[e] NTU = Nephelometric Turbidity Units

As expected, the data presented in Table 3-4 and shown graphically in Figure 3-1, Figure 3-2 and Figure 3-3 verify that pumping ballast water near the lake bed significantly increases the amount of suspended solids, POC, and turbidity drawn into ballast tanks when compared to pumping ballast water from higher in the water column. TSS and turbidity levels entering the pump intake within 1 foot of the lake bottom were more than 10 times greater than those at intake depths in the middle of the water column. POC concentrations in ballast water would more than double near the lake bed as compared to the middle of the water column. These data also show that, for the port at Burns Harbor, there does not appear to be a discernable direct relationship between TSS and POC during this sampling event.

The results also show that the vacuum action caused by the pump significantly increases TSS, turbidity, and POC as compared to the quiescent sampling technique employed using the Kemmerer sampler. Even near the lake bed, concentrations of TSS and turbidity in samples collected by the Kemmerer were more than 40 times lower than those in samples collected with the pump. POC concentrations in samples collected near the lake bed using the Kemmerer sampler were 3 times lower than POC concentrations in samples collected by the pump at the same depth.

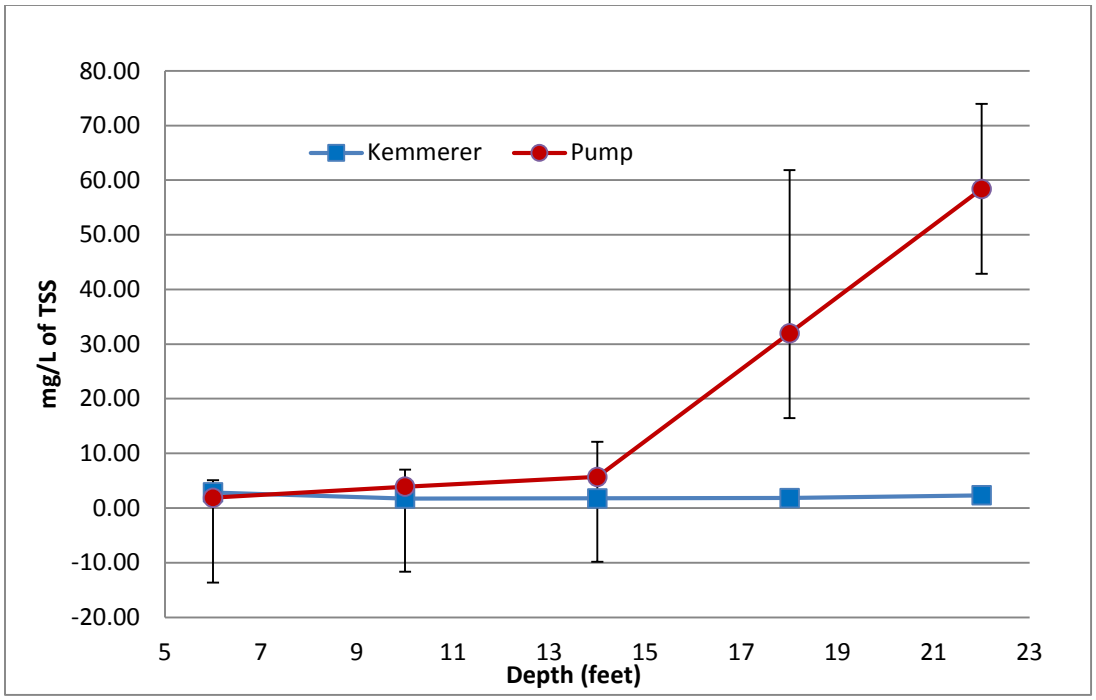

Figure 3-1. TSS Concentration (± 1 Standard Deviation) with Depth and Sampling Technique

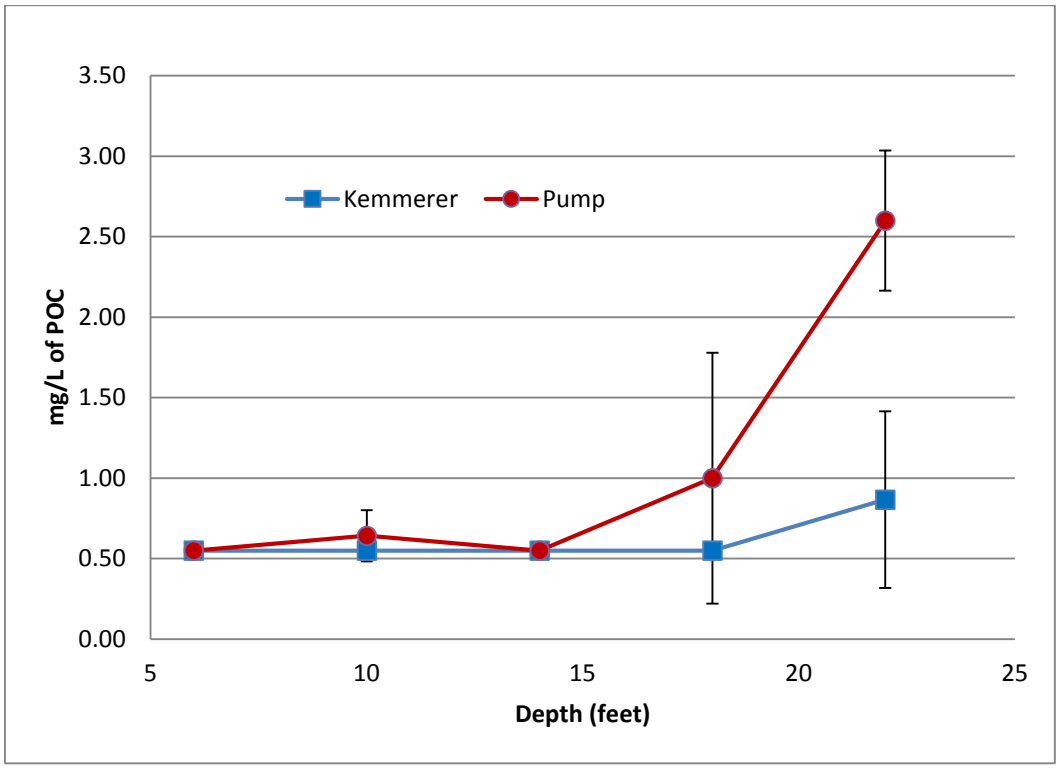

Figure 3-2. Particulate Organic Carbon Concentration (± 1 Standard Deviation) by Depth and Sampling Method

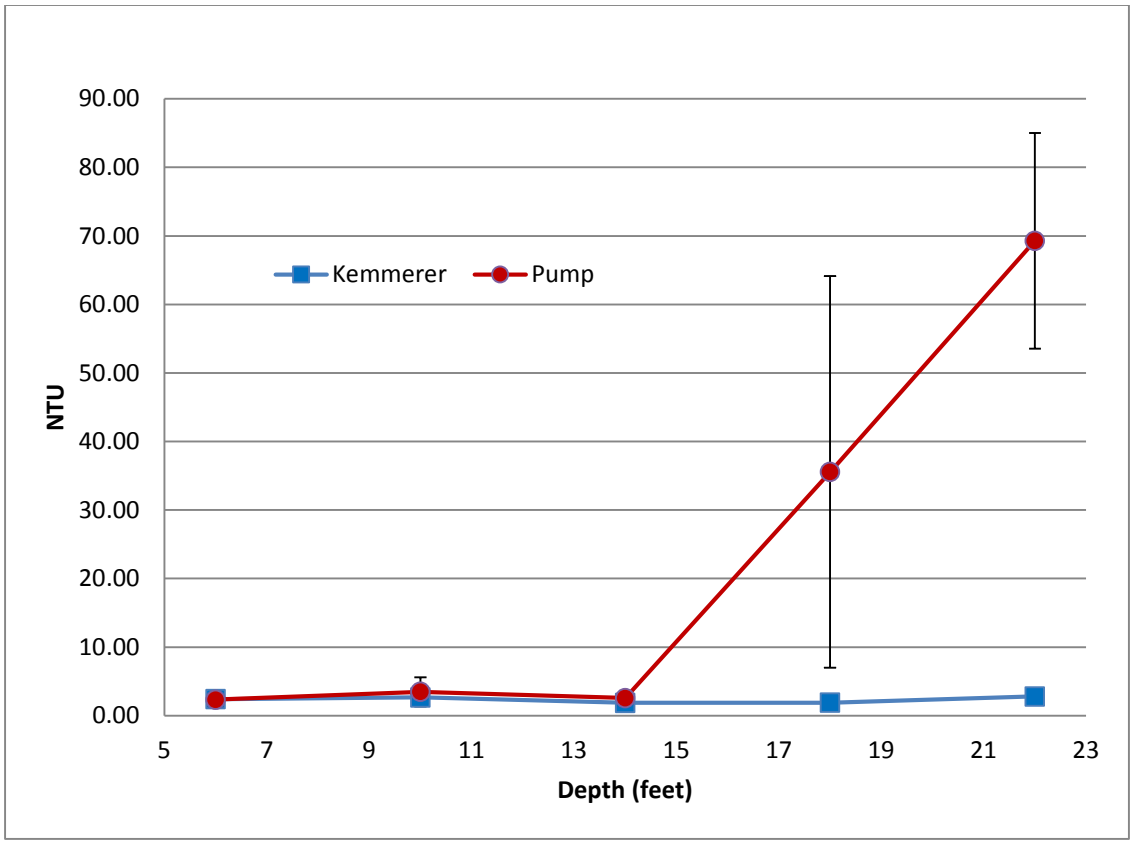

Figure 3-3. Turbidity Concentration (± 1 Standard Deviation) by Depth and Sampling Method

For Lakers ballasting in locations such as Burns Harbor, using high sea chests rather than low sea chests could have a significant impact on the amount of sediment entering ballast tanks. For example, large capacity thousand foot class Lakers have a total ballast capacity of 62,000 metric tons (mt) (16,365,000 gallons) (USCG, 2013). If a Laker withdraws 62,000 metric tons of ballast water through their bottom sea chest at Burns Harbor, extrapolating from these bench scale results, the vessel could also be drawing nearly 0.75 metric tons of suspended solids into the ballast tanks, a portion of which will likely settle in the vessel's ballast tanks. However, if the same Laker draws 62,000 metric tons of ballast water through a side sea chest located in the mid-point of the water column (e.g., 10 to 14 feet below the water surface), extrapolating from these bench scale results, the suspended solids drawn into the ballast tanks could decrease to approximately 0.06 metric tons.

SECTION 4
DATA QUALITY

QA/QC procedures applicable to this sampling episode are outlined in the QAPP for this program, approved by EPA on May 16, 2014, and its amendment dated May 23, 2014. This section describes the quality control (QC) practices used to assess the precision and accuracy of the analytical data presented in Section 3.0. QC practices used for this sampling episode include the analysis of duplicate samples and QC standard checks.

4.1 ANALYTICAL QUALITY CONTROL

EPA verified that laboratory performance was acceptable by verifying that all samples received by the laboratory were analyzed within the method-specific holding times and that the quality checks of the analytical data, as specified by the QAPP, were conducted. Data review chemists from the contract laboratory prepared written data review narratives (Appendix C) describing any qualifications of the analytical data. The following summarizes the laboratory analytical QC measures for analysis of TSS, POC, and turbidity samples.

4.1.1 Laboratory Duplicate Sample Analysis

Laboratory duplicate samples were analyzed for TSS, POC, and turbidity at a frequency of 10 percent, and the RPDs between the duplicate samples were calculated to determine if the target of $\pm$ 20 percent was achieved. TSS and POC samples were analyzed by the contract laboratory, and turbidity samples were analyzed in the field by the sampling team. Table 4-1 shows the results of the duplicate sample analysis and the calculated RPDs. For the laboratory duplicate samples, the laboratory analyzes two separate sample volumes collected by the field crew for a specific sampling depth and location and compares the results to evaluate precision. For this study, the field duplicate samples also served as the laboratory duplicate samples.

Table 4-1. Duplicate Sample Results and RPDs

Sample No.	TSS (mg/L)	TSS Dup (mg/L)	TSS RPD (%)	POC (mg/L)	POC Dup (mg/L)	POC RPD (%)	Turbidity (NTU)	Turbidity Dup (NTU)	Turbidity RPD
022	1.7	1.4	19.4	ND (1.1)	ND (1.1)	NC	3.1	2.1	38.5
023	13.1	7.1	59.4	ND (1.1)	ND (1.1)	NC	2.1	9.7	-128.8
024	2.3	1.6	35.9	ND (1.1)	ND (1.1)	NC	2.5	3.0	-18.2

NTU = Nephelometric Turbidity Units

ND = Not detected (number in parentheses is detection limit).

NC = Not calculated.

For POC, all results were below detection; however, for TSS and turbidity, the RPD was achieved for only 1 of the 3 duplicate samples. According to the contract laboratory's data review narratives for TSS (Appendix B), RPDs calculated from sample results that are less than 5 times the method detection limit (MDL) of 1 mg/L should not be considered as quantifiable. For sample 023, the sample results are greater than 5 times the MDL, and therefore the RPD of

59.4 percent is valid but outside the ± 20 percent target. Although the RPDs for two of the three TSS and turbidity duplicates are outside the target range, ERG recommended that EPA consider the entire data usable since ERG's experience is that achieving the target RPD for TSS and turbidity for duplicate samples is difficult at low concentrations. TSS and turbidity measure suspended particles, and any particles that are collected in the large receiving vessel are then split between two sample bottles. Small variations in the number of particles entering the two duplicate sample bottles can result in different concentrations. At the low concentrations measured in the duplicate sample bottles, slight differences result in the calculated RPDs becoming elevated.

4.1.2 Laboratory Quality Control Standards

The contract laboratory prepares and analyzes laboratory control standards (LCS) that include method blanks and method blanks that have been spiked with specific concentrations to verify recoveries. Method blanks are included with each batch of samples and are prepared by analyzing Millipore water that is processed through the same procedure as the samples. None of the method blanks analyzed by the laboratory had either TSS or POC concentrations above their respective method detection limits. Table 4-2 provides the method blank spike recoveries prepared by the laboratory. As indicated in Table 4-2, the blank spike recovery results for both TSS and POC are within the QC limit recovery ranges specified by the laboratory.

Table 4-2. Method Blank Spike Recoveries

Analyte	Spiked Concentration (mg/L)	Analyzed Concentration (mg/L)	Recovery (%)	QC Limit Recovery Range (%)
TSS	200	199	100	88 – 104
TSS	200	199	100	88 – 104
POC	3.14	3.02	96	0 - 200

For POC analysis, the contract laboratory also prepares and analyzes initial and continuing calibration check standards to verify the method is providing accurate analytical results. Table 4-3 shows the calibration check standard results for POC. All calibration check standards are within the QC limit recovery range.

Table 4-3. Calibration Check Standard Results

Analyte	Spiked Concentration (mg/L)	Analyzed Concentration (mg/L)	Recovery (%)	QC Limit Recovery Range (%)
POC	33.4	33.3	100	± 20
POC	29.1	29.1	100	± 20
POC	28.9	29.6	103	± 20
POC	25.4	25.6	101	± 20
POC	33.6	34.6	103	± 20
POC	28.7	29.6	103	± 20

4.2 FIELD QUALITY CONTROL

Field QC is monitored by preparing equipment blank samples and field duplicate samples. Each of these field QC measures is provided in the subsections below.

4.2.1 Equipment Blanks

The sampling team collected equipment blanks to assess the potential introduction of contaminants by sample collection equipment. Equipment blanks were prepared by filling the sampling equipment with Millipore water provided by TriMatrix Laboratories and then collecting that water in the appropriate sample bottles and submitting those samples to the laboratory for analysis. The sample collection equipment used to collect the equipment blanks were the same as those used at the sampling locations: the Kemmerer sampler and the pump with its associated hose and transfer lines. Table 4-4 shows the equipment blank results for the Kemmerer sampler and the pump.

Table 4-4. Equipment Blank Results for the Kemmerer Sampler and Pump

Equipment	Sample No.	Analysis	Units	Concentration
Kemmerer	035	TSS	mg/L	ND (1.0)
Kemmerer	035	POC	mg/L	ND (1.1)
Kemmerer	035	Turbidity	NTU	0.6
Pump	036	TSS	mg/L	6.0
Pump	036	POC	mg/L	ND (1.1)
Pump	036	Turbidity	NTU	1.7

ND = Not detected (number in parentheses is detection limit).
NTU = Nephelometric Turbidity Units

The equipment blank results for the Kemmerer sampler indicate the equipment was not introducing either TSS or POC to the samples. The Kemmerer may be adding 0.6 NTU of turbidity to the samples.

Turbidity and TSS measured in samples collected by the pump and its associated hose and transfer lines may be influenced by the collection equipment. The data in Table 4-4 shows TSS concentrations of 6.0 mg/L in the equipment blank. Therefore, up to 6 mg/L of the TSS measured in samples collected by the pump may be attributed to the sampling equipment. Turbidity measured in the pump and associated equipment was 1.7 NTU. Therefore, up to 1.7 NTU of the turbidity measured in samples from the pump may be attributed to the pump and associated hoses.

4.2.2 Field Duplicate Samples

Field duplicate samples were collected to assess the precision of the entire sample collection, handling, preparation, and analysis process. For this study, field duplicates were prepared by collecting the ambient water in the receiving container and then pouring this water into two separate sample containers. When transferring the water between the receiving container and the sample bottles, the receiving container was continuously swirled to prevent solids from settling. As stated previously, the field duplicate samples also served as the

laboratory duplicate samples since the analytical methods for duplicates do not require additional procedures or changes to the sample matrix. The RPDs between the two duplicate sample results are calculated and compared to the data quality objective. For this program, the QAPP provides an RPD target for field duplicate samples as less than 30% for TSS, POC, and turbidity. Table 4-5 shows the duplicate sample results.

Table 4-5. Field Duplicate Sample Results

Analyte	Unit	Sample Numbers		Original Result	Duplicate Result	RPD (%)
		Original	Duplicate			
TSS	mg/L	022	034	1.7	1.3	26.7
POC	mg/L	022	034	ND (1.1)	ND (1.1)	NC
Turbidity	NTU	022	034	3.1	2.1	38.5
TSS	mg/L	023	032	13.1	7.1	59.4
POC	mg/L	023	032	ND (1.1)	ND (1.1)	NC
Turbidity	NTU	023	032	2.1	9.7	129
TSS	mg/L	024	033	2.3	1.6	35.9
POC	mg/L	024	033	ND (1.1)	ND (1.1)	NC
Turbidity	NTU	024	033	2.5	3.0	18.2

ND = Not detected (number in parentheses is detection limit).

NC = Not calculated.

NTU = Nephelometric Turbidity Units

The field duplicate results in Table 4-5 show the TSS and turbidity RPDs for two duplicate samples were outside the 30% target. Although the RPDs for these samples are outside the target, EPA believes all the data collected for this study are usable. ERG noted to EPA that, based on their experience, achieving the target RPDs for TSS and turbidity for duplicate samples is difficult at low concentrations. TSS and turbidity measure suspended particles, and any particles that are collected in the large receiving vessel are then split between two sample bottles. Small variations in the number of particles entering the two duplicate sample bottles can result in different concentrations. At the low concentrations measured in the duplicate sample bottles, slight differences result in the calculated RPDs becoming elevated.

SECTION 5
REFERENCES

1. ERG, *Sampling and Analysis Plan for the Vessel General Permitting Program Ballast Water Intake Characterization Sampling*, May 2014.

2. ERG, *Quality Assurance Project Plan Addendum for Technical Support for the Vessel General Permitting Program – Ballast Water Intake Characterization Sampling*, May 2014.

3. Johengen, T., Reid, D, and Fahnenstiel, G., and MacIsaac, H. Assessment of Transoceanic NOBOB Vessels and Low-Salinity Ballast Water as Vectors for Non-indigenous Species Introductions into the Great Lakes. NOAA-Great Lakes Environmental Research Laboratory, Ann Arbor, Michigan. 2005.

4. Sano, L.L., R.A. Moll, A.M. Krueger, and P.F. Landrum *Assessing the potential efficacy of glutaraldehyde for biocide treatment of un-ballasted transoceanic vessels*. Journal of Great Lakes Research 29: 545-557. 2003.

5. Sano, L.L., M. Mapili, A. Sano, E. Krueger, D.G. Garcia, K. Phillips, and P.F. Landrum *Comparative efficacy of potential chemical disinfectants for treating unballasted vessels*. Journal of Great Lakes Research 30: 201-216. 2004.

6. USEPA, GLNPO WQS, *Standard Operating Procedure for the Analysis of Particulate-Phase Organic Carbon*. Method LG-207, Revision 03. December 2002.

7. USCG, *Ballast Water Treatment, U.S. Great Lakes Bulk Carrier Engineering and Cost Study*, Report No. CG-D-12-13 (Volume I of II), November, 2013.

Appendix A:
SAMPLING AND ANALYSIS PLAN

Sampling and Analysis Plan for the Vessel General Permitting Program Ballast Water Intake Characterization Sampling

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May 13, 2014

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Work Assignment 1-53

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1. INTRODUCTION

The U.S. Environmental Protection Agency (EPA) is conducting a sampling program to evaluate the environmental benefits of loading ballast water from higher in the water column on Great Lakes bulk carriers (Lakers)[1]. This sampling plan provides general sampling procedures and methods to be followed when conducting sampling activities at a selected ballast water loading port. Sampling will be performed by EPA and/or EPA's technical contractor Eastern Research Group, Inc. (ERG), who will collect samples of lake water off the dock of a selected Great Lakes port. This document, in combination with the addendum to the Quality Assurance Project Plan (QAPP), is intended to serve as a guide to the field sampling crews, as well as a study review mechanism for EPA personnel.

1.1 Background

The intake of ambient water into ballast tanks for vessel ballasting activities results in the uptake of sediment which can accumulate in ballast tanks as sediments settle out of the water while stored in ballast tanks. The accumulation of sediment entrained into ballast tanks during uptake is especially problematic because it reduces the effectiveness of ballast-exchange treatment and other treatment approaches and serves as a reservoir for some live aquatic organisms including resting stages – eggs, spores, and cysts (Johengen, 2005). Ballast tank sediments may contain live aquatic organisms in resting stages (eggs, spores, and cysts) that are resistant to adverse conditions and accumulated over numerous previous ballasting operations making ballast-exchange less effective. Additionally, sediment in suspension in the ballast water reduces the effectiveness of UV radiation and ultrasonic treatments and requires the addition of significantly higher dosages of chlorine, ozone, hydrogen peroxide, and other chemicals currently under consideration for treatment approaches (Sano et al. 2003, 2004).

Conditions in Part 2.2.3.3 of the Vessel General Permit (VGP) (USEPA, 2013) require vessels to use best management practices (BMPs) to lighten the ship as much as practical in order to elevate water intakes (sea chests) before ballasting. This requirement is intended to minimize sediment uptake while accounting for boom list, hull stress, and bending moments. Another BMP at VGP Part 2.2.3.4 requires Lakers to forgo complete ballasting until the vessel is in deeper water to avoid further sediment uptake. These BMPs assume that sediment concentrations are higher nearer the lake bottom than they are at the top of the water column.

1.2 Objectives and Scope

The primary objective of this sampling program is to collect primary data that will be used to:

[1] "Laker" is the common name for the large and uniquely designed and constructed dry bulk vessels (or carriers) used to transport bulk material commodities throughout the Great Lakes system. U. S. flag Lakers usually only transport goods on the four upper Great Lakes and connecting channels, as *most* are limited by their size from transiting the Welland Canal. The primary commodities transported by the Lakers include iron ore pellets, coal, grain, limestone, cement, sand, and salt.

- Determine if water collected from lower in the water column has a higher concentration of sediment than water collected from higher in the water column;

- Determine whether the suction created by the ballast pumps on Lakers increases sediment intake; and

- Determine if the amount of sediment transferred into ballast tanks on Lakers would decrease if vessels collected ballast water from higher in the water column (e.g., by using side or upper sea chests) rather than close to the lake bottom (e.g., by using bottom or lower sea chests).

2. PORT LOCATION SELECTION

In general, EPA will select for sampling a port in the Great Lakes where cargo is off-loaded and ballast water loaded, and where a variety of Laker types frequent. The port should also be operated by a public entity such as a port authority rather than a privately-owned port which will limit access by EPA. In addition, the ambient water turbidity of ports located on lakes will have less interference from rain runoff than from ports located in a river. Therefore the port selected for sampling should be an open-water Great Lakes port and not a river port on the Great Lakes. The water depth adjacent to the docks should be at least 28 feet to accommodate a fully ballasted 1,000-foot Laker having a draft of 27.8 feet (aft).

To select an appropriate port for sampling, ERG summarized the characteristics on the top 10 ballast water loading ports on the Great Lakes (USCG, 2013). The top 10 ballast water loading ports along with port characteristics are provided in Table 2-1.

Table 2-1. Characteristics of the Top 9 Great Lakes Ballast Water Loading Ports

United States Great Lakes Port	Annual Ballast Water Loaded (mt/yr)[a]	Port Type	Port Operating Responsibility[b]	Vessel Types Entering Port[c]
Gary	4,534,821	Harbor	United States Steel and Leigh Portland Cement	1,000' Lakers and Intermediate Lakers
Indian Harbor	3,742,141	River	U.S. Army Corp of Engineers	1,000' Lakers and Intermediate Lakers, River Class Lakers
Saint Clair River and Port Huron	3,313,204	River	Port Huron Maritime Commission	River Class Lakers
Monroe	3,119,239	River	Monroe Port Commission	Intermediate Lakers and River Class Lakers
Cleveland	2,662,340	Harbor	Cleveland and Cuyahoga County Port Authority	1,000' Lakers and Intermediate Lakers
Burns Harbor	2,487,640	Harbor	Ports of Indiana Port Authority (State of Indiana)	1,000' Lakers and Intermediate Lakers
Detroit	2,283,156	River	Detroit and Wayne County Port Authority	1,000' Lakers and Intermediate Lakers
Conneaut	1,810,050	River	Canadian National Railroad	1,000' Lakers and Intermediate Lakers
Ashtabula	1,511,532	Harbor	Ashtabula City Port Authority	1,000' Lakers and Intermediate Lakers

[a] USCG, 2013.

[b] World Port Source and www.worldportsource.com.

[c] Estimated based on docking or berthing lengths provided on the port websites.

Based on the information in Table 2-1, the ports at Astabula, Burns Harbor, and Cleveland are the top candidates for sampling. The final decision on which single port will be sampled will be based on sampling team and laboratory logistics.

3. SAMPLE COLLECTION METHODS

This section describes the sampling procedures and associated analytical methods the sampling crew will use to determine if sediment concentrations change with depth at ballast water loading ports, and if pumping of ballast water increases sediment loadings.

3.1 Sampling Approach

The sampling crew will collect samples at various depths from water adjacent to a pier at which Lakers may operate. However, the sampling crew will select locations along the pier that have not seen recent Laker activities such as ballasting and deballasting to eliminate this potential source of sampling variability. The crew will use two separate techniques performed sequentially. Using the first technique, the sampling crew will collect discrete grab samples of the water column using a Kemmerer sampler to determine the concentrations of suspended solids, organic carbon, and turbidity. The crew will collect samples at approximately 5-foot increments beginning approximately 8 feet below the surface and ending near the harbor bottom. Based on anticipated harbor depths ranging between 28 feet and 30 feet, ERG expects to collect samples at 5 depths from each sampling location. Figure 3-1 shows where and what type of samples will be collected at various locations and depths along the pier. This first sampling technique is intended to collect water column samples relatively quiescently, with minimal suspension of sediment from the lake/river bottom. The second technique will employ a portable pumping system having a similar intake velocity as a Laker ballast water pumping system. Using the pump, the sampling crew will collect samples at the same depths as those collected using the Kemmerer sampler, and these samples will also be analyzed for suspended solids, organic carbon, and turbidity. This second technique is intended to simulate ballasting by a vessel. The sampling crew will tether the pump hose to either a weight or stiff pipe to prevent the hose from moving within the water column, and to keep the hose at the desired depths. In addition, both sampling apparatuses will be deployed from a pulley system that will extend the sampling equipment about 3 feet away from the pier to minimize any influence by the pier.

A total of 3 replicates sample sets will be collected. A sample set consists of the samples collected at a specific location on the pier at each of the series of specified depths by both the Kemmerer sampler and the pump. Following completion of a sample set, the sampling equipment will be moved to a new location on the pier and another sample set completed. Sample sets will be separated by a minimum of 60 feet to prevent sediment which may have been re-suspended during collection of the previous sample set from impacting the subsequent sample sets.

The sample results from the Kemmerer sampler and the portable pump will then be compared to determine the effect of the pump on sediment entrainment and loading. The following subsections provide details on the use of the Kemmerer sampler and pump for collection of samples from the water column.

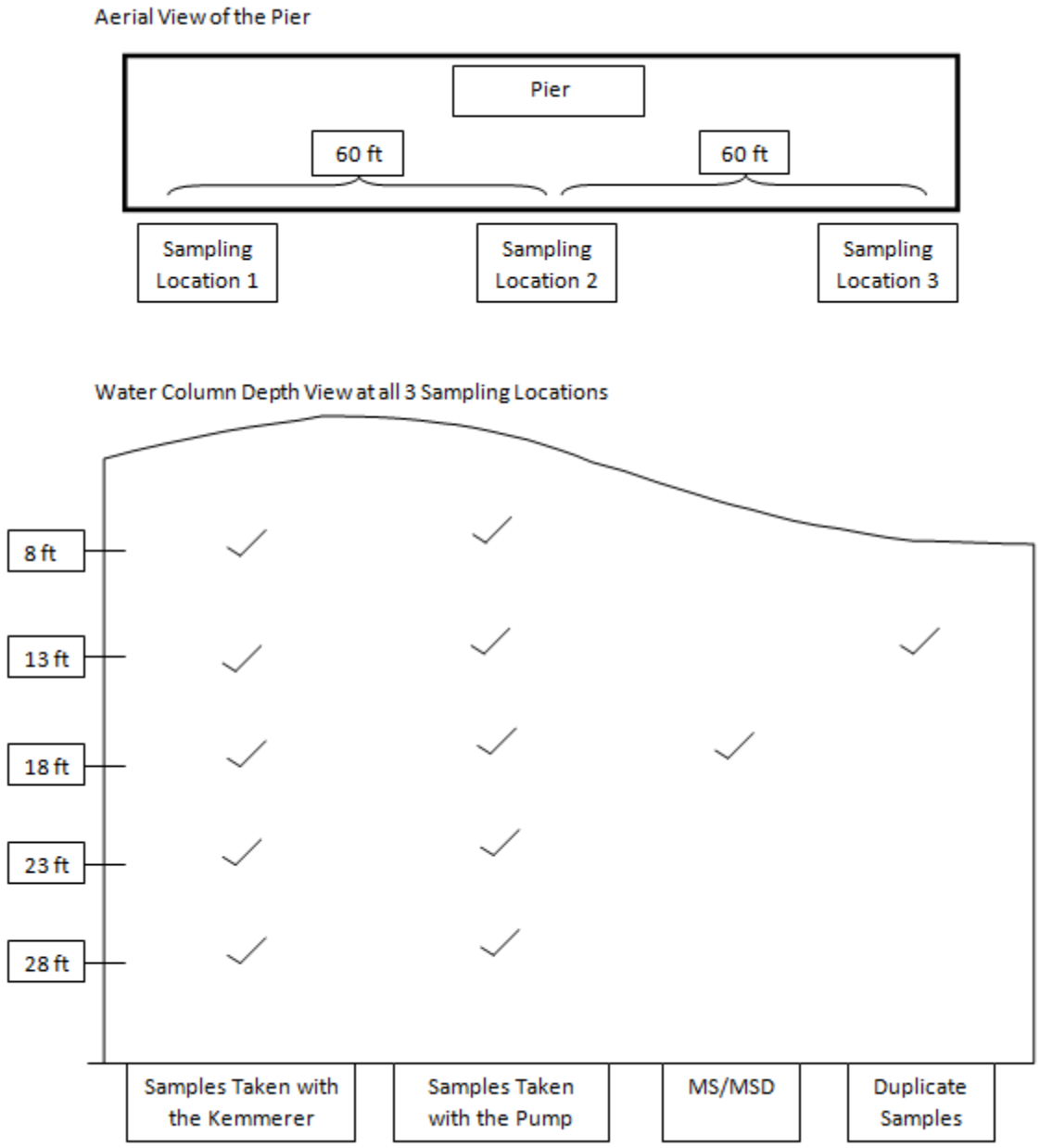


Figure 3-1. Sampling Diagram

3.1.1 Kemmerer Sample Collection

Samplers will use a 1.2-liter Kemmerer sampler to collect samples at various depths (see Figure 3-2 and Appendix A for manufacturer instructions). The rope attached to the Kemmerer sampler will be pre-measured with 6-inch increments and the Kemmerer will be lowered to the desired depth. Once the Kemmerer sampler reaches the desired depth, the unit will be closed, the collected water sample will be brought to the surface, and the collected sample will drained into

the appropriate sample bottles. The process will be repeated at each target depth until all planned samples have been collected.

Figure 3-2. Kemmerer Sampler

3.1.2 Pump Sample Collection

The sampling pump used to simulate a Laker ballast pump will be a Honda WB20X (or equivalent) fitted with a 2-inch diameter flexible intake hose lowered in the water column to the same depths as the Kemmerer sampler. Using information provided in the literature, ballast pumping rates on board Lakers averages 36.7 gpm/in^2. Therefore, the pumping rate on the portable pump will be set to 115 gpm which provides a rate of approximately 36.7 gpm/in^2 through the 2" suction hose. The pump will be calibrated at the sampling location to 115 gpm prior to the sampling event. Prior to sample collection at each location and depth, the pump hoses will be flushed with ambient water for at least 1 minute to remove any residuals from the previous sampling location. Effluent from the pump's discharge line during line flushing and sampling will be directed away from the sampling area to avoid sediment disturbance.

Because of the high pump flow rate, the pump discharge hose cannot be used to fill the sample bottles. Instead, the pump discharge will be directed into a clean 5-gallon plastic pail, and then the pail will be used to fill the individual sample bottles. The pail will be manually shaken and swirled during filling of the sample jars to prevent solids from settling.

3.2 Analyte Selection

To determine sediment concentrations, ERG will contract for laboratory analysis for total suspended solids (TSS) and particulate organic carbon (POC). The sampling crew will measure turbidity in the field. Table 3-1 lists the analytes, laboratory methods, and their detection limits.

Table 3-1. Analytical Methods and Detection Limits for Sampled Analytes

Analyte	Method Number	MRL	Units
Total Suspended Solids (TSS)	SM 2540 D	3	mg/L
Particulate Organic Carbon (POC)	UWM-LECO	1	mg/L
Turbidity	SM 2130 B	0.05	NTU

MRL = Method Reporting Limit.

3.3 Sample Fractions, Bottle Sets and Sampling Collection

ERG will split samples collected by each technique at each depth into bottles designated for TSS and POC analysis. Separate bottles will be used for TSS and POC since a total of 3 liters is needed for analysis and the laboratory has an inventory of 1-liter bottles on hand. Table 3-2 lists the estimated number of samples, sample bottles, sample volume, preservation method, and sample holding time for each type of analysis. In addition, quality assurance/quality control samples will be collected. These include duplicate samples collected at a rate of 10 percent for each analyte, and extra sample volumes collected at a rate of 10 percent for laboratory matrix spike and matrix spike duplicate (MS/MSD) analyses of POC. Extra volume MS/MSD analysis will include two additional 1 liter plastic bottles for each set of matrix spike and matrix spike duplicates.

The sampling crew will pack samples in ice chests with a sufficient quantity of wet ice to maintain a temperature of ≤6°C until the samples can be packaged and transferred to the analytical laboratory. Each package delivered to the laboratory will contain a temperature blank and the temperature will be taken and noted on the Chain of Custody report at the time of shipping. The temperature of the temperature blank will also be recorded by the laboratory upon receipt of samples.

Table 3-2. Summary Number of Samples, Sample Bottles, Preservation, and Holding Time Requirements

Parameter	Estimated Number of Samples[b,c,d]	Sample Bottle and Volume	Preservation	Holding Time
TSS	35	1 1-L Plastic Bottle	Cool, ≤6°C	7 days
POC	38	2 1-L Plastic Bottles	Cool, ≤6°C	7 days
Turbidity[a]	35	NA	NA	NA

[a] Measured in the field.

[b] Includes additional duplicate samples collected at a rate of 10 percent for TSS, POC, and turbidity.

[c] Includes extra volume collected for POC at a rate of 10 percent for (MS/MSD) analysis.

[d] Includes an equipment blank from both the Kemmerer sampler and the pumping system for TSS, POC, and turbidity.

3.4 Sample Labeling

Each sample bottle will be coded with a unique sample number and labeled at the time of collection. The self-adhesive label will be completed in indelible ink and will contain the following information:

- Sample number;
- Sampling location;
- Sampling point description;
- Analysis to be performed;
- Sample bottle type;
- Date of sample collection; and
- Preservation used.

Once applied to the sample bottle, labels will be covered with clear tape to prevent tampering, abrasion, smearing, or loss during transit.

3.5 Chain of Custody

To maintain a record of sample collection, shipment, and receipt by the laboratory, a Chain of Custody Report (CCR) will be filled out listing the samples bottles contained in each ice chest transferred to the laboratory. These forms will be completed and used to document sample custody transfer from the field to the laboratory. At the time of sample transfer, a copy of the CCR will be retained by ERG and the remainder of the copies will be transmitted with the samples to the analytical laboratories. The analytical laboratory will send a copy of the CCR to ERG to acknowledge receipt and the condition of the samples. To verify the coolers containing the samples have not been opened during shipment to the laboratory, a custody seal will be placed on each cooler at the time of shipment.

4. QUALITY ASSURANCE FOR ANALYTICAL LABORATORIES

ERG will contract with a commercial laboratory to analyze samples for TSS and POC. Contacts for the laboratory performing these analyses are provided below in Section 5.4.4. Quality assurance/quality control (QA/QC) procedures applicable to this sampling program are outlined in the QAPP (USEPA, 2014). The QA/QC program includes the components discussed in the following subsections.

4.1 Documentation of Sample Custody

While samples are being collected, samples and sampling equipment will be maintained in the physical possession or view of at least one member of the sampling crew, or kept inside a locked cooler. To maintain a record of sample custody, the sampling crew will complete a CCR form for each cooler that is transferred to the laboratory. Custody seals will be used to ensure secure sample transfer between personnel and sample receipt by the laboratory. These CCR forms will be used to document sample custody transfer from the field to the laboratory and will contain the following information:

- Sample number for each sample in shipment;
- Collection date and time for each sample in shipment;
- Preservation for each sample in shipment; and
- Sample description (environmental matrix).

4.2 Field Duplicate

The sampling crew will simultaneously collect field duplicate samples by collecting twice the volume as a normal sample from the same location to evaluate total measurement precision and cover all the sources of data variability, including sample collection, handling, preparation, and analysis. Field duplicates will be collected at a frequency of one per batch of 10 samples (10 percent).

4.3 Equipment Blank

Equipment blanks will be collected and analyzed for any sampling equipment, other than sample bottles, that come into direct contact with samples. Anticipated sampling equipment for which equipment black will be prepared include: 1) the Kemmerer sampler, and 2) the pumping system including the pump, hoses, and collection pail. Equipment blanks will be analyzed for the same parameters that are analyzed on the samples collected using the sampling equipment. The sampling crew will collect equipment blanks by rinsing sampling equipment with tap water to verify the non-contaminated condition of sampling equipment. Tap water is not expected to contain measurable TSS, POC, or turbidity and therefore is adequate for use in preparing equipment blanks. Equipment blanks will be collected at a frequency of one per type of sample collection equipment used.

4.4 Matrix Spikes/Matrix Spike Duplicates

Additional sample volumes will be collected for POC when MS/MSD testing is required. The same volume collected for a POC sample will be sent to the laboratory as the MS/MSD for every 10 samples (10 percent) submitted for analysis.

5. SAMPLING ACTIVITIES

This section of the sampling plan summarizes the sampling team organization, pre-visit Preparation, field sampling activities, and logistics such as, port contacts, and analytical laboratory contacts and addresses.

5.1 Sampling Team Organization

The sampling crew will consist of a two to three person team, depending on location and anticipated sampling effort. The crew chief will be responsible for all sample collection, preservation, and shipping activities while on-site. The sampling crew will compile and collate the analytical results.

5.2 Pre-Visit Preparation

Prior to the sampling event, the crew chief will distribute the SAP, QAPP, and health and safety plans to each team member and ensure they are completely familiar with the sampling, quality, and health and safety requirements. The crew chief will also provide site personnel copies of the SAP and any site-specific supplemental information prior to the start of sampling.

The crew chief will also coordinate the procurement and shipment of all necessary sampling and health and safety equipment.

5.3 Field Sampling Activities

The crew chief, in conjunction with the EPA Representative (if available) will meet with site personnel to determine whether samples can be collected at each of the planned sampling locations. Upon making the decision to collect samples, the crew chief will update the descriptions of the proposed sampling locations, if necessary, in consultation with EPA. If necessary, additional equipment will be obtained. The revised description will include:

- A sampling location description and collection procedure for each sampling location;
- A list of the sample fractions to be collected:
- A list of potential physical hazards (such as pH, temperature, and potentially hazardous equipment);
- A list of any potential chemical hazards associated with each sampling location; and
- A list of proposed health and safety procedures.

Prior to sampling, the crew chief will also notify ERG's Health and Safety Coordinator of any revised sampling activities along with recommended revisions to the proposed health and safety procedures. Together, they will review the proposed health and safety procedures,

incorporate any site-specific changes indicated by the Health and Safety Coordinator, and obtain approval for sampling from the Health and Safety Coordinator before proceeding with sampling activities.

Sample fractions collected will be labeled, sealed, packaged, and placed in coolers with ice for shipment to the laboratory. The CCR will be completed and placed in plastic sleeves inside the coolers, and a custody seal placed over each cooler. The coolers will then be transferred to the designated laboratory. At the conclusion of the sampling event, the sampling equipment will be prepared for return shipping.

The crew chief will contact the laboratories prior to transporting the samples to communicate the number of samples collected. The crew chief will also contact the laboratories after shipping samples to communicate shipping information and verify sample receipt.

5.4 Logistics

This subsection summarizes the sampling team personnel, port contacts, analytical laboratories, EPA contact and address, and ERG project management contact and address.

5.4.1 Sampling Team

Mark Briggs (Crew Chief)
ERG
3400 Jack Morris Drive
West Branch, MI 48661
Office: (989) 345-7595
Cell: (989) 701-5850
mark.briggs@erg.com

Kathleen Wu
ERG
14555 Avion Parkway, Suite 200
Chantilly, VA 20151
Office: (703) 633-1625
Cell: (703) 581-7390
kathleen.wu@erg.com

5.4.2 Port Contacts

To be determined prior to sampling.

5.4.3 EPA Contacts

Dr. Ryan Albert
Mail Code: 4203M
1200 Pennsylvania Ave., NW
Washington DC 20460
(202) 564-0763

albert.ryan@epa.gov

Kathryn Kelley
Mail Code: 4203M
1200 Pennsylvania Ave., NW
Washington DC 20460
(202) 564-7004
kelley.kathryn@epa.gov

5.4.4 Analytical Laboratory Contacts

TriMatrix Laboratories
5560 Corporate Exchange Court SE
Grand Rapids, MI 49521
(616) 975-4500
Contact: Phil Komar
komarp@trimatrixlabs.com

5.4.5 ERG Contacts

Debra Falatko (Work Assignment Manager)
ERG
14555 Avion Parkway, Suite 200
Chantilly, VA 20151
(703) 633-1607
debra.falatko@erg.com

5.4.6 Freight Forwarders

Federal Express (FedEx)
General Information (800) 238-5355

Location of specific shipping options to be determined.

6. SAMPLE HANDLING AND SHIPMENT

If logistics between the sampled port and the laboratory are reasonable, ERG will drive the samples to the laboratory rather than shipping via FedEx or using a courier service. If samples are driven to the laboratory, they will be placed in ice chests on wet ice and the ice chests will remain in the locked vehicle until arrival at the laboratory. Each ice chest will include a Chain of Custody Report with information on the samples held within. At the laboratory, ERG will transfer custody of the samples to laboratory personnel.

If the sampling port logistics do not allow ERG to drive the samples to the laboratory or to use a courier service to the laboratory, then samples will be packaged for shipment via FedEx. The following subsections outline the sample packing procedures that will be used if samples are shipped to the laboratory via FedEx.

6.1 Sample Packing

All samples will be packed according to the following guidelines:

1. Tighten the lid on each filled sample bottle, being careful not to over-tighten the lid. Clean the sample bottle with a cloth rag or paper towel.

2. Package sample bottles into individual sealable plastic freezer bags.

3. Place two garbage bags inside each other in a cooler.

4. Place packaged sample bottles and a temperature blank in garbage bags in the cooler with proper end up and close bag with twist-tie.

5. Arrange sealed plastic freezer bags filled with ice (or chemical ice) on top of the sample bottles. Put at least 4 × ½ gallons of ice (4 × 2.5 lbs of ice) in each large cooler and 2 × ½ gallons of ice (2 × 2.5 lbs of ice) in each small cooler. More ice should be used when ambient temperatures are very high. The ice should be placed inside the second garbage bag. Close the second garbage bag with a twist-tie. Any additional free space should be filled with packing material so that the sample bottles will not shift during shipment.

6. Seal the Chain of Custody Report form in a plastic sleeve and tape securely to the inside of the cooler lid.

7. Place a "Return to ..." label on the inside of the cooler lid.

8. Close cooler.

9. Make several wraps with strapping tape around the cooler perpendicular to the seal to ensure that the lid will remain closed if the latch is accidentally released or damaged.

10. Tape the cooler drain plug so it will not open.

11. Place a completed address label on the lid of the cooler including name, address, and telephone number of the receiving laboratory and the return address and telephone number of the shipper.

12. Place a custody seal on the cooler in a manner that will allow the laboratory to verify the cooler has not been opened during shipment. Place clear tape over the custody seal to ensure the custody seal will remain on the cooler during transport to the laboratory.

6.2 Sample Shipping

All sample packages will be labeled with self adhesive labels as described in Section 3.4. All samples will be tracked using CCR forms. Custody will be maintained by the crew chief from sample collection through shipment.

All samples will be packaged and shipped in accordance with Department of Transportation (DOT) or International Air Transport Association (IATA) regulations. The general IATA packaging requirements for air shipment are as follows:

- Inner packaging must be so packed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the outer packaging during normal conditions of transport. Cushioning material must not react dangerously with the contents of the inner packaging. Any leakage of the contents must not substantially impair the protective properties of the cushioning material. Unless otherwise provided in this paragraph or in the Packing Instructions, liquids in Classes, 3, 4, 5, 6, or 8 of Packing Groups I or II in glass or earthenware inner packaging, must be packaged using material capable of absorbing the liquid. Absorbent material must not react dangerously with the liquid. (IATA Dangerous Goods Regulations, 5.0.16).

- "When filling receptacles for liquids, sufficient volume (outage) must be left to ensure that neither leakage nor permanent distortion of the receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to prevail during transport. Liquids must not completely fill a receptacle at a temperature of 55°C (130°F)." (IATA Dangerous Goods Regulations, 5.0.12).

EPA does not anticipate that samples collected from ports will be classified as IATA dangerous goods, and therefore shipping requirements for dangerous goods have not been included in this sampling plan. If dangerous goods shipping does occur during the course of this sampling program, then the sampling team crew chief will consult with a dangerous goods shipping contact located in ERG's office in Chantilly, Virginia, and appropriate hazardous shipping procedures will be followed.

7. RELATED BIBLIOGRAPHY

1. Johengen, T., Reid, Dl, and Fahnenstiel, G., and MacIsaac, H. (2005) Assessment of Transoceanic NOBOB Vessels and Low-Salinity Ballast Water as Vectors for Non-indigenous Species Introductions into the Great Lakes. NOAA-Great Lakes Environmental Research Laboratory, Ann Arbor, Michigan.

2. Sano, L.L., R.A. Moll, A.M. Krueger, and P.F. Landrum (2003) Assessing the potential efficacy of glutaraldehyde for biocide treatment of un-ballasted transoceanic vessels. Journal of Great Lakes Research 29: 545-557.

3. Sano, L.L., M. Mapili, A. Sano, E. Krueger, D.G. Garcia, K. Phillips, and P.F. Landrum (2004) Comparative efficacy of potential chemical disinfectants for treating unballasted vessels. Journal of Great Lakes Research 30: 201-216.

4. U.S. Coast Guard Acquisition Directorate. (2013) Research and Development Center, Ballast Water Treatment, U.S. Great Lakes Bulk Carrier Engineering and Cost Study, Volume 1, Table B4. Report CG-D-12-13, November.

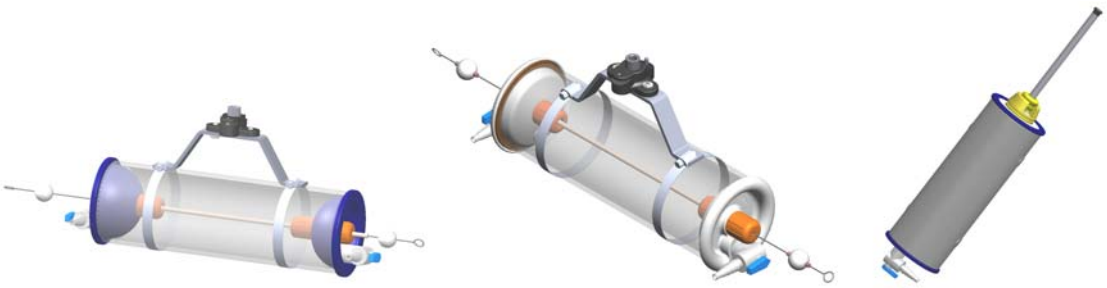
5. U.S. Environmental Protection Agency. (2013) U.S. Final Issuance of National Pollutant Discharge Elimination System (NPDES) Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Vessels.

6. U.S. Environmental Protection Agency. (2012) Addendum to the Quality Assurance Project Plan for Technical Support for the Vessel General Permitting Program–Vessel Sampling.

Appendix A:

EXCERPTS FROM A COMPREHENSIVE GUIDE TO WILDCO® WATER BOTTLE SAMPLERS

Wildlife Supply Company®



A Comprehensive Guide to Wildco® Water Bottle Samplers

Table of Contents:

INTRODUCTION TO WILDCO

Wildlife Supply Company was established in 1938 by the Trippensee brothers, Dr. Rueben and Herbert. Dr. Rueben was a professor at the University of Massachusetts for 30 years. His two published texts on wildlife management have long served as references in their field. The company remained in the Trippensee family for over 60 years.

The company changed hands in 2000, when it was purchased by the Bell family.

Wildco has always been a family business, whether the family is the Trippensees or the Bells. Because of this, the owners think long term. You can count on sturdy, reliable products that give you the ability to compare your samples to data of past decades.

INTRODUCTION TO WATER SAMPLE BOTTLES:

Wildco water sample bottles are designed for grabbing a sample of water at a known depth. This is why they are referred to as *in situ* water samplers or discrete depth water samplers.

These sampling devices are Messenger operated. They are lowered into a body of water in the open position. When the bottle reaches a desired depth, a weight, or Messenger, is slid down the line until it hits a trigger device on the bottle, known as a trip head. This causes the bottle to close.

Wildco Messenger

Alpha and Beta bottles are available with either transparent acrylic or opaque PVC bodies. They can be either vertical or horizontal with relation to the substrate. Kemmerer bottles are vertical and can have transparent acrylic, opaque PVC, stainless steel or PTFE bodies. Van Dorn style bottles can be horizontal or vertical. Both types of bottles serve the same function, but they have different trip heads and end seals.

All bottles are available in a kit, containing the bottle, line, a messenger, and carry case.

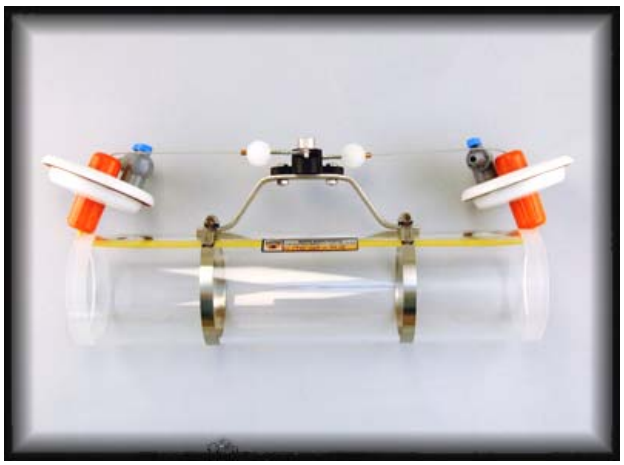
HOW TO CHOOSE THE RIGHT BOTTLE:

Van Dorn style sample bottles are well suited for general purpose sampling at any depth. Available with clear acrylic or opaque PVC bodies, they can be had in both **horizontal and vertical** configurations, with relation to the substrate. **Vertical** bottles allow a free flow of water through the bottle as it moves down the water column. **Horizontal** bottles tend to fill at the surface and should be tugged sideways at the desired depth to obtain a good sample. For both style of bottles, the end seals are off to the side of the bottle body when set open.

Two types of the Horizontal and Vertical Van Dorn style bottles are available:
Alpha bottles are best for general purpose sampling. The Alpha bottle is very sturdy, but is unsuitable for chemical sampling.

Horizontal Alpha Bottle

Beta style bottles are ideal for trace metals and chemical sampling.



Horizontal Beta Bottle

Kemmerer bottles come in a variety of configurations for specialized sampling. They are vertical only. They have fewer working parts than the Van Dorn style. The Kemmerer design assures flushing of the bottle as it descends through the water, and it closes with much less agitation and disturbance. Kemmerer bodies are available in acrylic, PVC, stainless steel, and PTFE. The end seals are in line with the bottle body when set open.

Kemmerer Bottle

Representative example situations:
Below are some common sampling situations and suggestions for appropriate samplers.

Plankton – The wide mouth of the Alpha and Beta bottles allows little restriction of flow through the bottle as it moves down the water column. Therefore, they are preferred for sampling standing crops, primary productivity and other quantitative measures, because they allow free water flow throughout the bottle. Because they collect whole water samples, all size classes of plankton are obtained. They are sometimes used for sampling nanoplankton and picoplankton, which can pass through most nets due to their extremely small size. The larger bottles, 6.2 or 8.2 liter, are good for this purpose.

For larger types of plankton, Wildco makes a variety of high quality plankton nets as well as the Schindler-Patalas Plankton Trap, which combines a large sampling box with a net for filtering out the plankton.

Trace Organics – Most water sampling bottles are made with plastics, and are generally unsuitable for trace organic sampling. Wildco® makes two Kemmerer bottles which are suitable: 1295-B32 is all Teflon, while 1200-G32 has a stainless steel body with Teflon seals. Since there is a possibility of contaminants in the bottle, **Wildco® recommends running a blank to get a baseline before doing organic sampling.**

Trace Metals, Metallic Ion Avoidance – Beta bottles, all plastic Kemmerer bottles with silicone seals, and the all PTFE Kemmerer bottle are recommended. The blue polyurethane end seals on the Alpha bottles and some Kemmerer bottles may leach mercury into the water, at concentrations of 20-450 ng/L. They may also leach

phosphorus and other chemicals in small amounts. Since there is a possibility of contaminants in the bottle, Wildco® recommends to run a blank to get a baseline before doing trace metal sampling.

Large Volume – If a larger volume of water is needed in one haul, several options are available. Alpha and Beta bottles come in 6.2 and 8.2 liter sizes, the 1260-E32 and1560 series Kemmerer bottles hold 6.2 liters and the 1580 series Kemmerer bottles hold 8.2L. For plankton, the 12 liter or 30 liter Schindler Patalas trap can be used.

Wells – The Kemmerer Well sampler is long and thin and fits easily into a 2-inch pipe. It can sample at any depth. 1280-A12 has polyurethane seals, and 1280-B22 has silicone seals. A 45-B40 messenger shock absorber may be needed, as it will help to protect the trip mechanism if there is a long air drop before the messenger reaches the bottle.

Narrow Opening – In this case defined as a hole in ice, drum sampling, or confined space sampling. The Kemmerer well sampler is ideal for this, fitting into a two inch pipe. The Teflon Kemmerer has a 2-7/8" outside diameter, and the 0.4 and 1.2 liter versions of the stainless steel Kemmerer have 2-5/8" outside diameters. A 45-B40 messenger shock absorber may be needed, as it will help to protect the trip mechanism if there is a long air drop before the messenger reaches the bottle.

Thermocline/Stratified Lakes – horizontal Alpha and Beta bottles are mostly used for discrete point sampling at a given depth, which makes them ideal for sampling the water column in a stratified lake. Lakes often develop a layer of warm water on top of cold water, due to the fact that warm water is less dense than cold. In large bodies of water, the layer between these regions can be very distinct. This area, called the thermocline, can be very narrow, with the temperature changing rapidly with depth. The lake environment is very different above and below the thermocline. A horizontal bottle can get fairly accurate samples above, below and right at the area where the water mixes.

Series – This is sampling at multiple depths. To sample with multiple bottles on one line, Wildco makes the Series Sampling Bottle. Up to five of these Beta style bottles can be placed on the same line, each with a messenger above its trip. After a messenger is dropped on the top bottle, all the bottles will close in rapid succession.

Severe Environment – Sampling environments such as industrial solvents, strong acids and bases, corrosive chemicals, and temperatures up to 440 degrees. Wildco® makes two Kemmerer bottles suitable for this purpose: 1295-B32 is all Teflon, and 1200-G32 has a stainless steel body with Teflon seals.

Need a sterile bottle? Autoclaving is the best way to sterilize a sampler. Wildco® makes two bottles which can be autoclaved: 1295-B32 is all Teflon, and 1200-G32 has a stainless steel body with Teflon seals.

Shallow Water – Horizontal Alpha and Beta bottles are mostly used for discrete point sampling at a given depth, and are the best for very shallow water. For long air drops, consider using a 45-B40 messenger shock absorber to help protect the trip head.

Just Above the Substrate – Horizontal Alpha and Beta bottles are often used for this purpose. The tube itself lies parallel to the lake bed, allowing for close up sampling.

Composite Samples – Samples can be taken with the same bottle at different depths and the contents combined, or samples can be pooled from the same depth.

Water Temperature at the Time of Sampling - A thermometer can be mounted on the inside of most clear acrylic Van Dorn or Kemmerer Bottles. This is done at the factory before shipping. The bottle should be left at the desired depth long enough for the thermometer to stabilize. When the sample is retrieved, the reading should be taken immediately for better accuracy.

Rough Conditions - The 2.2 Liter PVC Alpha Bottle (1120-H42) is very sturdy and the least likely to break. The PVC Beta Bottles are slightly less sturdy than the Alpha due to their silicone gasket. Kemmerer bottles tend to be more delicate. Care should be taken to avoid problems such as hitting a rock or the side of a boat with any bottle. The trigger mechanisms on the bottles are, by design, very sensitive and may trip early if they hit the surface of the water too hard. Acrylic bottles afford a view of the contents, but may shatter if dropped on one end.

Opaque vs. Transparent - Clear acrylic bottles allow a full view of the contents during your fieldwork, but chemical changes and effects on plankton may occur when exposed to sunlight. Opaque bottles prevent sunlight from affecting the sample. The opaque bottles are made from PVC, which tends to be cheaper and more crack resistant than acrylic.

TIPS FOR TRACE METAL SAMPLING

1. All samplers contaminate or distort in some way.
    - Plastics may leach metals from ultraviolet inhibitors, metal-organic plasticizers, and (rarely) metal catalysts.
    - PTFE has a rough porous surface that traps ions and fine charged particles. Errors may occur in your first sample.
    - Metal and glass may dissolve into the sample, usually at the nanogram/ liter level.
    - Sample may react with the sampler, causing errors.

2. Are you using the right sampler? Is the sampler clean? Have you run a test blank?

3. Selecting a particular sampler may depend upon the material(s) sought or environment being sampled.

4. Alconox is suggested to remove oil and most soils. Rinse. A 3% acid solution (HCl or HNO_3) will remove detergent. Rinse with distilled water. Air dry.

5. Run a test blank by filling the sampler with distilled water, holding for at least as long as the sample will be held in the sampler, and running test analysis.

NOTES ABOUT CONTAMINATION:

Blue end seals may leach small amounts of mercury and phosphorus, and thus are not recommended for chemical sampling. Make sure you have the right bottle, one with silicone seals.
Avoid cross contamination by thoroughly cleaning your equipment after each use.

TEST BEFORE YOU SAMPLE:

We recommend that any new sampler be thoroughly cleaned prior to any sampling.
If you are performing metal or chemical sampling, run a blank before using the bottle. Fill the instrument with distilled, contaminant free water, and test to determine what contaminants may be present in the sample.

We also recommend that this procedure be repeated throughout the sampling season.

PREPARING WATER SAMPLERS FOR USE

1. General cleaning
   a. For most sampling, soak in mild detergent and warm water (to 150° F/ 65° C). Rinse with tap, then distilled water.
   b. Soak in mild laboratory detergent such as Alconox and warm water. Rinse with distilled water, rinse again with 3% HCl or HNO_3, then with triple distilled water. Repeat. Store when completely dry in clean, sealed plastic bag.

2. Trace level decontamination for plastic samplers
   a. Clean as above, then soak up to 8 hours in warm 1N HCl solution (3 N maximum), then rinse in distilled water. **Do not use alcohol, ketones or chloroform on acrylic**.

3. Removing grease and oils
   a. Wash with mild detergent to remove grease and oil. **Do not use solvents on acrylic.** Use **alcohol only** on Lexan, PVC and CPVC.

4. Sterilizing samplers
   a. Autoclaving: Clean and rinse with distilled water before autoclaving to prevent baking contaminants.
   b. Metal, glass, Teflon™, polycarbonate may be autoclaved. **Do not** autoclave polyurethane, PVC, CPVC, acrylic, CAB.
   c. Gas sterilization: The above materials can be gas sterilized using formaldehyde gas or ethylene oxide.
   d. Chemical sterilization: In general all the above can be sterilized with commonly used disinfectants.

5. Trace metal or organic measurements
   a. Fill sampler with distilled water for same length of time you would fill with sample. Analyze the distilled water.

6. Rust stains on stainless steel
   a. *All stainless steel devices should be rinsed at once with fresh water* after removal from salt water.
   b. To remove rust, soak in concentrated HNO_3 for 3-4 hours.

7. Storage of samplers
   a. To avoid mildew, corrosion, and odors, samplers should not be stored in foam-lined cases unless very dry.

PERSONAL SAFETY:

The trigger mechanisms on bottles of this type are very sensitive by design. To prevent injury, keep your hands clear of the main tube when the bottle is in the open position. The end seals close with surprising force. **Do not operate out of water!**

BOTTLE SAFETY AND CARE:

Wildco recommends an 11 ounce messenger (such as 45-B10), unless there is a very long air drop and the bottle is close to the surface of the water, in which case a lighter messenger may be used. Under these conditions, a messenger shock absorber (45-B40) may also be used to help protect the trip mechanism. Do not use a messenger heavier than 11 ounces, as this may damage the trip mechanism.
Perform a preliminary inspection prior to using the bottle. Make sure the line and cable are tightly connected.

Guard the sampler from blows to the cylinder ends. This may knock them out of round, which could cause leakage during sampling. Dropping or impacting the sampler can crack the main tube. A blow to an acrylic body can cause it to crack or shatter.
Always lower the bottle slowly, without dropping it.
To avoid damage during use, the sampler should always be transported in a carry case.

MAINTENANCE AND CLEANING:

Storing bottles with the valves closed may cause them to "set" tightly in the end of the bottle, resulting in damage when pried open. Store the bottle so the end seals do not touch the cylinder.
After sampling, rinse the sampler in fresh, clean water. Allow the sampler and case to completely dry.
Do not store the sampler when wet, damp, or dirty. This can cause mold, mildew, metal corrosion, or plastic surface deterioration.
The foam interior of the case may deteriorate or be damaged if the product is not dried after use.
When fully dry, store the sampler in its case, or in a dark, cool shelf or cabinet.

RECOMMENDED ACCESSORIES:

3001-B15 Thermometer.
3001-A10 Thermometer mount.
62-C15 3/16" Polyester line, 100ft.
61-B14 1/8" diameter steel Aircraft Cable, 100ft.
45-B10 Split Messenger, 11 ounce.
45-B40 Messenger Shock Absorber.
66-A50 Hand Winding Reel.
Plastic Carry Case.

Appendix B:
RAW LABORATORY DATA FOR TSS AND POC

CLIENT	PROJECT	PROJECTNUM	LabName	SAMPLENAME	LABSAMPID	MATRIX
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	001	1405452-01	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	001	1405452-01	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	004	1405452-02	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	004	1405452-02	Water
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Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	007	1405452-03	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	010	1405452-04	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	010	1405452-04	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	013	1405452-05	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	013	1405452-05	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	002	1405452-06	Water
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Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	008	1405452-08	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	008	1405452-08	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	011	1405452-09	Water
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Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	003	1405452-11	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	006	1405452-12	Water
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Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	022	1405452-18	Water

CLIENT	PROJECT	PROJECTNUM	LabName	SAMPLENAME	LABSAMPID	MATRIX
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Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	017	1405452-21	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	017	1405452-21	Water
Eastern Research Group	Burns Harbor	0317.01.053	TriMatrix Laboratories, Inc.	020	1405452-22	Water
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Water	05/28/2014 08:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 08:45:00	06/06/2014 13:00:00	06/10/2014 18:01:00	1405629	POC LG206/207 (Modified)
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Water	05/28/2014 08:45:00	06/06/2014 13:00:00	06/10/2014 18:03:00	1405629	POC LG206/207 (Modified)
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Water	05/28/2014 09:15:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:15:00	06/06/2014 13:00:00	06/10/2014 18:06:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:15:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:15:00	06/06/2014 13:00:00	06/10/2014 18:54:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:15:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:15:00	06/06/2014 13:00:00	06/10/2014 18:55:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:15:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:15:00	06/06/2014 13:00:00	06/10/2014 18:57:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:45:00	06/06/2014 13:00:00	06/10/2014 18:58:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:45:00	06/06/2014 13:00:00	06/10/2014 19:03:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:45:00	06/06/2014 13:00:00	06/10/2014 19:04:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:45:00	06/06/2014 13:00:00	06/10/2014 19:06:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 09:45:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 09:45:00	06/06/2014 13:00:00	06/10/2014 19:10:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 19:11:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 19:14:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 19:22:00	1405629	POC LG206/207 (Modified)

RPTMATRIX	SAMPDATE	PREPDATE	ANADATE	BATCH	METHODCODE
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 19:25:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 19:26:00	1405629	POC LG206/207 (Modified)
Water	05/28/2014 12:30:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:30:00	06/06/2014 13:00:00	06/10/2014 19:46:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:30:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:30:00	06/06/2014 13:00:00	06/10/2014 19:48:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:30:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:30:00	06/06/2014 13:00:00	06/10/2014 20:08:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:30:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:30:00	06/06/2014 13:00:00	06/10/2014 20:11:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:30:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:30:00	06/06/2014 13:00:00	06/10/2014 20:13:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:00:00	06/06/2014 13:00:00	06/10/2014 20:15:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:00:00	06/06/2014 13:00:00	06/10/2014 20:17:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:00:00	06/06/2014 13:00:00	06/10/2014 20:27:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:00:00	06/06/2014 13:00:00	06/10/2014 20:30:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 12:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 12:00:00	06/06/2014 13:00:00	06/10/2014 20:34:00	1405628	POC LG206/207 (Modified)
Water	05/28/2014 13:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/28/2014 13:00:00	06/06/2014 13:00:00	06/10/2014 20:36:00	1405628	POC LG206/207 (Modified)
Water	05/27/2014 16:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/27/2014 16:00:00	06/06/2014 13:00:00	06/10/2014 20:38:00	1405628	POC LG206/207 (Modified)
Water	05/27/2014 16:00:00	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291	Solids, TSS 2540 D
Water	05/27/2014 16:00:00	06/06/2014 13:00:00	06/10/2014 20:41:00	1405628	POC LG206/207 (Modified)

METHODNAME	PREPNAME	ANALYTE	CASNUMBER	SURROGATE	TIC
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE

METHODNAME	PREPNAME	ANALYTE	CASNUMBER	SURROGATE	TIC
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE
SM 2540 D-2011	General Inorganic Prep	Residue, Suspended		FALSE	FALSE
USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0	FALSE	FALSE

Result	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	SPIKELEVEL	RECOVERY	UPPERCL	LOWERCL	ANALYST
5.4	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.1	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.6	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.4	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.0	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.8	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.2	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.8	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.2	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
<1.0	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.4	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
1.5	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.1	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.8	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.7	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB

Result	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	SPIKELEVEL	RECOVERY	UPPERCL	LOWERCL	ANALYST
21.7	1.3	1.3	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
69.4	2.0	2.0	mg/L	TRUE	NA	1					WAH
3.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
7.8	1.0	1.0	mg/L	TRUE	NA	1					WAH
1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
13.1	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
65.6	2.0	2.0	mg/L	TRUE	NA	1					WAH
1.9	1.1	5.0	mg/L	TRUE	NA	1					HLB
40.6	2.0	2.0	mg/L	TRUE	NA	1					WAH
2.3	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
4.0	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
2.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
8.7	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
65.2	2.0	2.0	mg/L	TRUE	NA	1					WAH
2.4	1.1	5.0	mg/L	TRUE	NA	1					HLB
1.3	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
<1.0	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB
6.0	1.0	1.0	mg/L	TRUE	NA	1					WAH
<1.1	1.1	5.0	mg/L	TRUE	NA	1					HLB

PSOLIDS	LNOTE	ANOTE	LATITUDE	LONGITUDE	sComment	SNOTE1	SNOTE2	SNOTE3	SNOTE4	SNOTE5
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
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		J			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
		MD02			TSS/PPOC - MS/MSD					
		U			TSS/PPOC - MS/MSD					

PSOLIDS	LNOTE	ANOTE	LATITUDE	LONGITUDE	sComment	SNOTE1	SNOTE2	SNOTE3	SNOTE4	SNOTE5
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		J			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		J			TSS/PPOC					
		MD01			TSS/PPOC - MS/MSD					
		U			TSS/PPOC - MS/MSD					
					TSS/PPOC					
		J			TSS/PPOC					
					TSS/PPOC					
		J			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					
		MD02			TSS/PPOC - MS/MSD					
		U			TSS/PPOC - MS/MSD					
					TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		J			TSS/PPOC					
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		U			TSS/PPOC					
		U			TSS/PPOC					
		U			TSS/PPOC					
					TSS/PPOC					
		U			TSS/PPOC					

SNOTE6	SNOTE7	SNOTE8	SNOTE9	SNOTE10	ANALYTEORDER
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SNOTE6	SNOTE7	SNOTE8	SNOTE9	SNOTE10	ANALYTEORDER
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LABNAME	LABSAMPID	QCTYPE	MATRIX	PREPDATE	ANADATE	BATCH
TriMatrix Laboratories, Inc.	1405289-BLK1	Blank	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289
TriMatrix Laboratories, Inc.	1405289-BS1	LCS	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289
TriMatrix Laboratories, Inc.	1405289-DUP1	Duplicate	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405289
TriMatrix Laboratories, Inc.	1405291-BLK1	Blank	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291
TriMatrix Laboratories, Inc.	1405291-BS1	LCS	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291
TriMatrix Laboratories, Inc.	1405291-DUP1	Duplicate	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291
TriMatrix Laboratories, Inc.	1405291-DUP2	Duplicate	Water	06/03/2014 14:00:00	06/03/2014 14:00:00	1405291
TriMatrix Laboratories, Inc.	1405628-BLK1	Blank	Water	06/06/2014 13:00:00	06/10/2014 19:41:00	1405628
TriMatrix Laboratories, Inc.	1405628-BS1	LCS	Water	06/06/2014 13:00:00	06/10/2014 19:44:00	1405628
TriMatrix Laboratories, Inc.	1405628-BSD1	LCS Dup	Water	06/06/2014 13:00:00	06/10/2014 20:42:00	1405628
TriMatrix Laboratories, Inc.	1405628-DUP1	Duplicate	Water	06/06/2014 13:00:00	06/10/2014 20:10:00	1405628
TriMatrix Laboratories, Inc.	1405628-DUP2	Duplicate	Water	06/06/2014 13:00:00	06/10/2014 20:32:00	1405628
TriMatrix Laboratories, Inc.	1405629-BLK1	Blank	Water	06/06/2014 13:00:00	06/10/2014 17:03:00	1405629
TriMatrix Laboratories, Inc.	1405629-BS1	LCS	Water	06/06/2014 13:00:00	06/10/2014 17:05:36	1405629
TriMatrix Laboratories, Inc.	1405629-BSD1	LCS Dup	Water	06/06/2014 13:00:00	06/10/2014 19:31:00	1405629
TriMatrix Laboratories, Inc.	1405629-DUP1	Duplicate	Water	06/06/2014 13:00:00	06/10/2014 19:23:00	1405629
TriMatrix Laboratories, Inc.	4F11027-CAL1	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:13:40	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL2	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:16:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL3	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:23:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL4	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:28:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL5	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:31:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL6	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:34:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CAL7	Cal Standard	Water	06/10/2014 16:05:59	06/10/2014 16:37:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB1	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 16:59:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB2	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 18:10:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB3	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 19:20:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB4	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 19:36:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB5	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 20:21:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCB6	Calibration Blank	Water	06/10/2014 16:05:59	06/10/2014 20:47:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV1	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 16:55:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV2	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 18:09:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV3	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 19:17:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV4	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 19:33:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV5	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 20:20:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CCV6	Calibration Check	Water	06/10/2014 16:05:59	06/10/2014 20:46:00	4F11027
TriMatrix Laboratories, Inc.	4F11027-CRL1	Instrument RL Check	Water	06/10/2014 16:05:59	06/10/2014 17:02:00	4F11027

METHODCODE	METHODNAME	PREPNAME	ANALYTE	CASNUMBER
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
Solids, TSS 2540 D	SM 2540 D-2011	General Inorganic Prep	Residue, Suspended	
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	Method Specific Preparation	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0
POC LG206/207 (Modified)	USEPA LG206/207 (Modified)	1405628	Particulate-phase Organic Carbon	7440-44-0

SURROGATE	TIC	RESULT	DL	RL	UNITS	RPToMDL	BASIS	DILUTION	SOURCEID	SOURCERES	SPIKELEVEL
FALSE	FALSE	<1.0	1.0	1.0	mg/L	TRUE	NA	1			
FALSE	FALSE	199	7.5	7.5	mg/L	TRUE	NA	1			200
FALSE	FALSE	1.4	0.8	0.8	mg/L	TRUE	NA	1	1405452-18	1.7	
FALSE	FALSE	<1.0	1.0	1.0	mg/L	TRUE	NA	1			
FALSE	FALSE	199	7.5	7.5	mg/L	TRUE	NA	1			200
FALSE	FALSE	7.1	0.8	0.8	mg/L	TRUE	NA	1	1405452-23	13.1	
FALSE	FALSE	1.6	0.8	0.8	mg/L	TRUE	NA	1	1405452-28	2.3	
FALSE	FALSE	<1.1	1.1	5.0	mg/L	TRUE	NA	1			
FALSE	FALSE	22			mg/L	TRUE	NA	1			20.7
FALSE	FALSE	23			mg/L	TRUE	NA	1			20.7
FALSE	FALSE	<1.1	1.1	5.0	mg/L	TRUE	NA	1	1405452-23	ND	
FALSE	FALSE	<1.1	1.1	5.0	mg/L	TRUE	NA	1	1405452-28	ND	
FALSE	FALSE	<1.1	1.1	5.0	mg/L	TRUE	NA	1			
FALSE	FALSE	24			mg/L	TRUE	NA	1			21.0
FALSE	FALSE	22			mg/L	TRUE	NA	1			21.0
FALSE	FALSE	<1.1	1.1	5.0	mg/L	TRUE	NA	1	1405452-18	ND	
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			1.37
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			6.71
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			12.3
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			24.0
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			37.0
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			48.2
FALSE	FALSE	0.00			mg/L	TRUE	NA	1			62.1
FALSE	FALSE	0.041			mg/L	TRUE	NA	1			
FALSE	FALSE	0.026			mg/L	TRUE	NA	1			
FALSE	FALSE	0.019			mg/L	TRUE	NA	1			
FALSE	FALSE	0.015			mg/L	TRUE	NA	1			
FALSE	FALSE	0.018			mg/L	TRUE	NA	1			
FALSE	FALSE	0.017			mg/L	TRUE	NA	1			
FALSE	FALSE	33.3			mg/L	TRUE	NA	1			33.4
FALSE	FALSE	29.1			mg/L	TRUE	NA	1			29.1
FALSE	FALSE	29.6			mg/L	TRUE	NA	1			28.9
FALSE	FALSE	25.6			mg/L	TRUE	NA	1			25.4
FALSE	FALSE	34.6			mg/L	TRUE	NA	1			33.6
FALSE	FALSE	29.6			mg/L	TRUE	NA	1			28.7
FALSE	FALSE	3.02			mg/L	TRUE	NA	1			3.14

RECOVERY	RPD	UPPERCL	LOWERCL	RPDCL	ANALYST	PSOLIDS	LNOTE	ANOTE	ANALYTEORDER
					WAH			U	1
100		104	88		WAH				1
	19			5	WAH				1
					WAH			U	1
100		104	88		WAH				1
	59			5	WAH				1
	36			5	WAH				1
					HLB			U	1
105		130	40		HLB				1
112	7	130	40	20	HLB				1
				20	HLB			U	1
				20	HLB			U	1
					HLB			U	1
115		130	40		HLB				1
104	10	130	40	20	HLB				1
				20	HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB			U	1
					HLB				1
					HLB				1
					HLB				1
					HLB				1
					HLB				1
					HLB				1
100		120	80		HLB				1
100		120	80		HLB				1
103		120	80		HLB				1
101		120	80		HLB				1
103		120	80		HLB				1
103		120	80		HLB				1
96		200	0		HLB				1

QUALIFIER	DESCRIPTION
J	Estimated value
MD01	The laboratory duplicate RPD for this sample exceeded the control limit.
MD02	The laboratory duplicate RPD for this sample exceeded the control limit. Since the initial and/or the duplicate sample result was less than 5 times the reporting limit, the initial reported sample result is not qualified.
U	Analyte included in the analysis, but not detected

Appendix C:
LABORATORY DATA PACKAGE

DATA VALIDATION PACKAGE

Prepared for:

Eastern Research Group
14555 Avion Parkway, Suite 200
Chantilly, VA 20151

Project:

Burns Harbor

Prime Contract: EP-C-12-021
ERG Project Number: 0317.01.053

Sample Delivery Group (SDG):

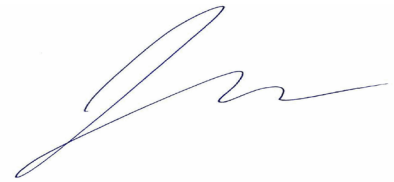
1405452

Prepared by:

TriMatrix Laboratories, Inc.
5560 Corporate Exchange Court SE
Grand Rapids, MI 49512-5503

Report Date:

June 12, 2014



James D. McFadden, Project Chemist
mcfaddenj@trimatrixlabs.com

6/12/2014

Approval Date

TABLE OF CONTENTS

Eastern Research Group
Burns Harbor

SDG CASE NARRATIVE

Eastern Research Group
Burns Harbor

SDG Executive Summary

This case narrative applies to samples received on May 29, 2014. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between Eastern Research Group and TriMatrix Laboratories, Inc.

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations, narrations, and reporting conventions are included in Attachment 1 - *Project Technical Narrative(s)*.

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

This report relates only to the sample(s) as received. Estimates of analytical uncertainties for the test results contained within the report are available upon request. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC), and one or more of the following certification programs:

ACLASS DoD-ELAP/ISO17025 (#ADE-1542); Arkansas DEP (#13-049-0); Florida DEP (#E87622-24); Georgia EPD (#E87622-24); Illinois DEP (#003329); Kansas DPH (#E-10302); Kentucky DEP (#0021); Louisiana DEP (#103068); Michigan DPH (#0034); Minnesota DPH (#367345); New York ELAP (#46503); North Carolina DNRE (#659); Texas CEQ (#T104704495-14-4); Virginia DCLS (#2592); Wisconsin DNR (#999472650); USDA Soil Import Permit (#P330-09-00163).

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SDG CASE NARRATIVE

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 1405452

TriMatrix Laboratories received the cooler(s) for this work order on May 29, 2014, at 10:55am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and Client Drop-Off shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
001	1405452-01	Water	5/28/2014
004	1405452-02	Water	5/28/2014
007	1405452-03	Water	5/28/2014
010	1405452-04	Water	5/28/2014
013	1405452-05	Water	5/28/2014
002	1405452-06	Water	5/28/2014
005	1405452-07	Water	5/28/2014
008	1405452-08	Water	5/28/2014
011	1405452-09	Water	5/28/2014
014	1405452-10	Water	5/28/2014
003	1405452-11	Water	5/28/2014
006	1405452-12	Water	5/28/2014
009	1405452-13	Water	5/28/2014
012	1405452-14	Water	5/28/2014
015	1405452-15	Water	5/28/2014
016	1405452-16	Water	5/28/2014
019	1405452-17	Water	5/28/2014
022	1405452-18	Water	5/28/2014
025	1405452-19	Water	5/28/2014
028	1405452-20	Water	5/28/2014
017	1405452-21	Water	5/28/2014
020	1405452-22	Water	5/28/2014
023	1405452-23	Water	5/28/2014

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SDG CASE NARRATIVE

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
026	1405452-24	Water	5/28/2014
029	1405452-25	Water	5/28/2014
018	1405452-26	Water	5/28/2014
021	1405452-27	Water	5/28/2014
024	1405452-28	Water	5/28/2014
027	1405452-29	Water	5/28/2014
030	1405452-30	Water	5/28/2014
034	1405452-31	Water	5/28/2014
035	1405452-32	Water	5/27/2014
036	1405452-33	Water	5/27/2014

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative(s)

Sample Result Reporting Convention

Sample results are reported as RL "U" (e.g. 0.001 U) if the target analyte was not detected above the MDL.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis.

Percent Solids and Metals Data Reporting

Unless otherwise noted, all soil samples requiring metals analysis are dried at 50° to 60° C to a constant weight prior to acid digestion. In order to report results on a dry weight basis, correction for percent solids is not applicable.

Data Qualifier Designation

If applicable, sample results are qualified with:

a "J" flag if the analyte was detected, but the concentration is greater than the MDL and less than the RL;

a "B" flag if the analyte was also detected at or above the RL in the associated method blank, and the sample concentration was less than five times the method blank result;

a "E" flag if the analyte exceeded the instrument calibration range;

an asterisk (*) if a report-generated statement of qualification applies; qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical run.

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SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative(s)

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Narrative: Reporting limit for this analysis was set below the method recommended level of 2.5 mg/L.

Analysis: SM 2540 D-2011

Sample/Analyte:			
	1405452-01	001	Residue, Suspended
	1405452-02	004	Residue, Suspended
	1405452-03	007	Residue, Suspended
	1405452-04	010	Residue, Suspended
	1405452-05	013	Residue, Suspended
	1405452-06	002	Residue, Suspended
	1405452-07	005	Residue, Suspended
	1405452-08	008	Residue, Suspended
	1405452-09	011	Residue, Suspended
	1405452-10	014	Residue, Suspended
	1405452-11	003	Residue, Suspended
	1405452-12	006	Residue, Suspended
	1405452-13	009	Residue, Suspended
	1405452-14	012	Residue, Suspended
	1405452-15	015	Residue, Suspended
	1405452-16	016	Residue, Suspended
	1405452-17	019	Residue, Suspended
	1405452-18	022	Residue, Suspended
	1405452-19	025	Residue, Suspended
	1405452-20	028	Residue, Suspended
	1405452-21	017	Residue, Suspended
	1405452-22	020	Residue, Suspended
	1405452-23	023	Residue, Suspended
	1405452-24	026	Residue, Suspended
	1405452-25	029	Residue, Suspended
	1405452-26	018	Residue, Suspended
	1405452-27	021	Residue, Suspended
	1405452-28	024	Residue, Suspended
	1405452-29	027	Residue, Suspended
	1405452-30	030	Residue, Suspended
	1405452-31	034	Residue, Suspended
	1405452-32	035	Residue, Suspended
	1405452-33	036	Residue, Suspended

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Qualification: The laboratory duplicate RPD for this sample exceeded the control limit.

Analysis: SM 2540 D-2011

Sample/Analyte:		
	1405452-23 023	Residue, Suspended

Qualification: The laboratory duplicate RPD for this sample exceeded the control limit. Since the initial and/or the duplicate sample result was less than 5 times the reporting limit, the initial reported sample result is not qualified.

Analysis: SM 2540 D-2011

Sample/Analyte:		
	1405452-18 022	Residue, Suspended
	1405452-28 024	Residue, Suspended

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SECTION - A

FIELD CHAIN-OF-CUSTODY (COC) RECORDS / RECEIVING DOCUMENTS

Tm 2503

Cooler #1

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

Pg. 1 of 7

For Lab Use Only
Cart: 13, 3, 4
VOA Rack/Tray: -
Receipt Log No.: 277
Project Chemist: Jim McFadden
Work Order No.: H05452

Client Name: Mark Briggs - ERG
Address: 14555 Avion Parkway
City, State Zip: Chantilly VA 20151
Phone: 989 345 7595 Fax
Email: Mark.briggs@erg.com

Project Name: Burns Harbor
Client Project No. / P.O. No.
Invoice To: ☑ Client ☐ Other (comments)
Contact/Report To: Kathleen Wil

Analyses Requested

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type: A TSS	A POC-vol1	A POC-vol2	Total	Sample Comments
				Number of Containers Submitted											
01		01	1	001	1	5/28/14	0845		X	Liq	1	1	1	3	
|		02	2	004	1	5/28/14	0845		X	Liq	1	1	1	3	
|		03	3	007	1	5/28/14	0845		X	Liq	1	1	1	3	
|		04	4	010	1	5/28/14	0845		X	Liq	1	1	1	3	
|		05	5	013	1	5/28/14	0845		X	Liq	1	1	1	3	
			6												
			7												
			8												
			9												
			10												

Sampled By (print)
Sampler's Signature
Company

How Shipped? Hand X Carrier
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
							5/29	1052
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**4. Received For Lab By**	**Date**	**Time**
							5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

000011

Tm 3102

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

For Lab Use Only
Cart
VOA Rack/Tray
Receipt Log No.
Project Chemist: Jim McFadden
Work Order No.: H05452

Client Name: Mark Briggs - ERG
Address: 14555 Avion Parkway
City, State Zip: Chantilly VA 20151
Phone: 989-345755 Fax
Email: mark.briggs@erg.com

Project Name: Burns Harbor
Client Project No. / P.O. No.
Invoice To: ☑ Client ☐ Other (comments)
Contact/Report To: Kathleen Wu

Analyses Requested

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	TSS	POC vol 1	POC vol 2	Total	Sample Comments
				Container Type (corresponds to Container Packing List)							A	A	A		
				Number of Containers Submitted							1	1	1		
01		06	1	002	2	5/28/14	9:15 am		✓	liq	1	1	1	3	
1		07	2	005	2	5/28/14	9:15 am		✓	liq	1	1	1	3	
1		08	3	008	2	5/28/14	9:15 am		✓	liq	1	1	1	3	
1		09	4	011	2	5/28/14	9:15 am		✓	liq	1	1	1	3	
1		10	5	014	2	5/28/14	9:15 am		✓	liq	1	1	1	3	
			6												
			7												
			8												
			9												
			10												

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print)
Sampler's Signature
Company

How Shipped? Hand ✓ Carrier
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
							5/29	10:5?
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

000012

Tm 2775

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

Pg. 3 of 7

For Lab Use Only
Cart
VOA Rack/Tray
Receipt Log No.
Project Chemist: Jim McFadden
Work Order No.: H05452

Client Name: Mark Briggs - EPC
Address: 14555 Avion Parkway
City, State Zip: Chantilly, VA 20151
Phone: Fax
Email

Project Name: Burns Harbor
Client Project No. / P.O. No.
Invoice To: ☑ Client ☐ Other (comments)
Contact/Report To: Kathleen Wu

Analyses Requested

Container Type (corresponds to Container Packing List)

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	A TSS	A POC-W1	A POC-W2	Total	Sample Comments
				Number of Containers Submitted											
01		11	1	003	3	5/28/14	0945		X	Liq	1	1	1	3	
		12	2	006	3	5/28/14	0945		X	Liq	1	1	1	3	
		13	3	009	3	5/28/14	0945		X	Liq	1	1	1	3	
		14	4	012	3	5/28/14	0945		X	Liq	1	1	1	3	
		15	5	015	3	5/28/14	0945		X	Liq	1	1	1	3	
			6												
			7												
			8												
			9												
			10												

Sampled By (print)
Sampler's Signature
Company

How Shipped? Hand Carrier
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
							5/29	10:30
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

000013

Tm 3396

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

Pg. 4 of 7

For Lab Use Only
Cart
VOA Rack/Tray
Receipt Log No.
Project Chemist: Jim McFadden
Work Order No. H05752

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

Client Name: Mark Brigg - ERG
Address: 14555 Avion Parkway
City, State Zip: Chantilly VA 20151
Phone: 989 345 7595 Fax
Email: mark.brigg@erg.com

Project Name: Burn Harbor
Client Project No. / P.O. No.
Invoice To: ☑ Client ☐ Other (comments)
Contact/Report To: Kathleen Wu

Analyses Requested

Container Type (corresponds to Container Packing List)

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	TSS	Poc vol 1	Poc vol 2	ex vol TSS	Ex Vol Poc vol1	Exvol Poc vol 2	Total	Sample Comments
				Number of Containers Submitted							A	A	A	A	A	A		
01		16	1	016	4	5/28/14	13:00		✓	liq	1	1	1				3	
1		17	2	019	4	5/28/14	13:00		✓	liq	1	1	1				3	
02		18	3	022	4	5/28/14	13:00		✓	liq	1	1	1	1	1	1	6	Bottle Label 031
01		19	4	025	4	5/28/14	13:00		✓	liq	1	1	1				3	
1		20	5	028	4	5/28/14	13:00		✓	liq	1	1	1				3	
			6															
			7															
			8															
			9															
			10															

Sampled By (print)
Sampler's Signature
Company

How Shipped? Hand ✓ Carrier
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
							5/29	10:5?
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

0000014

Tm 2747

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

Pg. 5 of 7

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

For Lab Use Only

Cart:

VOA Rack/Tray:

Receipt Log No.:

Project Chemist: Jim McFadden

Work Order No.: 1405452

Client Name: Mark Briggs - ERG

Address: 14555 Avion Parkway

City, State Zip: Chantilly VA 20151

Phone: 989 345 7395 Fax:

Email: mark.briggs@erg.com

Project Name: Burns Harbor

Client Project No. / P.O. No.:

Invoice To: ☑ Client ☐ Other (comments)

Contact/Report To: Kathleen Wall

Analyses Requested

Container Type	TSS	POC-01	POC-02	POC-ExVol	POC ExVol	TSS ExVol				
Preservative	A	A	A	A	A	A				

PRESERVATIVES
- A NONE pH~7
- B HNO_3 pH<2
- C H_2SO_4 pH<2
- D 1+1 HCl pH<2
- E NaOH pH>12
- F ZnAc/NaOH pH>9
- G MeOH
- H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	TSS	POC-01	POC-02	POC-ExVol	POC ExVol	TSS ExVol					Total	Sample Comments
01		21	1	017	5	5/28	12:30		X	Liq	1	1	1								3	
1		22	2	020	5	5/28	12:30		X	Liq	1	1	1								3	
02		23	3	023	5	5/27	12:30		X	Liq	1	1	1	1	1	1					6	#032
01		24	4	026	5	5/27	12:30		X	Liq	1	1	1								3	
1		25	5	029	5	5/27	12:30		X	Liq	1	1	1								3	
			6																			
			7																			
			8																			
			9																			
			10																			

Sampled By (print):

Sampler's Signature:

Company:

How Shipped? Hand ✓ Carrier

Tracking No.:

Comments:

	Date	Time
1. Relinquished By		
1. Received By		
2. Relinquished By		
2. Received By		
3. Relinquished By [signature]	5/29	10:55
3. Received For Lab By [signature]	5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

Tm 3400

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

For Lab Use Only
Cart
VOA Rack/Tray
Receipt Log No.
Project Chemist: Jim McFadden
Work Order No.: 405452

Client Name: Mark Briggs - ERG
Address: 14555 Avion Parkway
City, State Zip: Chantilly VA 20151
Phone: 989345 7595 Fax
Email: Mark.Briggs@ERG.com

Project Name
Client Project No. / P.O. No.
Invoice To: ☑ Client ☐ Other (comments)
Contact/Report To

Analyses Requested

Container Type (corresponds to Container Packing List)	A	A	A	A	A	A					
	TSS	Poc vol 1	Poc vol 2	Excel TSS	Excel Pocvol1	Excel Pocvol2					

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted							Total	Sample Comments
01		26	1	018	6	5/28/14	12:00		✓	liq	1	1	1						
1		27	2	021	6	5/28/14	12:00		✓	liq	1	1	1						
02		28	3	024	6	5/28/14	12:00		✓	liq	1	1	1	1	1	1			# Bottle 033
01		29	4	027	6	5/28/14	12:00		✓	liq	1	1	1						
1		30	5	030	6	5/28/14	12:00		✓	liq	1	1	1						
			6																
			7																
			8																
			9																
			10																

Sampled By (print)
Sampler's Signature
Company

How Shipped? Hand ✓ Carrier
Tracking No.

Comments

1. Relinquished By	Date	Time
1. Received By	Date	Time
2. Relinquished By	Date	Time
2. Received By	Date	Time
3. Relinquished By	5/29	10:57
4. Received For Lab By	5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

000016

Tm 2867

TRIMATRIX LABORATORIES

Chain of Custody Record

COC No. 140341262

For Lab Use Only

5560 Corporate Exchange Court SE, Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463 www.trimatrixlabs.com

Pg. 2 of 2

Analyses Requested

Cart

VOA Rack/Tray

Receipt Log No.

Project Chemist: Jim McFadden

Work Order No. H05452

Client Name: Mark Briggs - E&G

Address: 14555 Avion Parkway

City, State Zip: Chantilly, VA 2051

Phone: Fax:

Email

Project Name: Burns Harbor

Client Project No. / P.O. No.

Invoice To: ☑ Client ☐ Other (comments)

Contact/Report To

Analyses (Container Type row: A / A / A): TSS | POC-vol 1 | POC-vol 2

Container Type (corresponds to Container Packing List)

PRESERVATIVES
- A NONE pH~7
- B HNO_3 pH<2
- C H_2SO_4 pH<2
- D 1+1 HCl pH<2
- E NaOH pH>12
- F ZnAc/NaOH pH>9
- G MeOH
- H Other (note below)

Schedule	Matrix Code	Sample Number		Field Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	TSS	POC-vol 1	POC-vol 2								Total	Sample Comments
01		31	1	034	7	5/28/14	1:00		X	Lg	1	1	1								3	
|		32	2	035	7	5/27/14	4:00		X	Lg	1	1	1								3	
|		33	3	036	7	5/27/14	4:00		X	Lg	1	1	1								3	
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

Sampled By (print)

Sampler's Signature

Company

How Shipped? Hand ___ Carrier ___

Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
						[signature]	5/29	1055
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[signature]	5.29.14	1055

ORIGINAL - LABORATORY COPY - SAMPLER

SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: ERG
Receipt Record Page/Line #: 27.7
Work Order #: 1405452
New / Add To
Project Chemist | Sample #s

Recorded by (initials/date): WC 5.29.14
☑ Cooler ☐ Box ☐ Other
Qty Received: 7
Thermometer Used: ☑ IR Gun (#202) ☐ Digital Thermometer (#54) ☐ Other (#_____)
☐ See Additional Cooler Information Form

Cooler #	Time	Custody Seals	Coolant Location	Coolant/Temperature Taken Via	Alternate Temperature Taken Via
Tm2503	1101	#1 ☑ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☑ Temperature Blank (TB) ☐ 1 Container
Tm3102	1106	#2 ☑ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☑ Temperature Blank (TB) ☐ 1 Container
Tm2775	1110	#3 ☑ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☑ Temperature Blank (TB) ☐ 1 Container
Tm3396	1118	#4 ☑ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☑ Temperature Blank (TB) ☐ 1 Container

Cooler #	Recorded °C	Correction Factor °C	Actual °C
Tm2503	Temp Blank: –		3.0
	TB location: Representative / Not Representative		
	1 3.7	–	3.7
	2 3.1	–	3.1
	3 3.5	–	3.5
		Average °C	3.4
	☑ Cooler ID on COC? ☐ VOC Trip Blank received?		
Tm3102	Temp Blank: –		2.4
	TB location: Representative / Not Representative		
	1 2.7	–	2.7
	2 3.5	–	3.5
	3 2.9	–	2.9
		Average °C	3.0
	☑ Cooler ID on COC? ☐ VOC Trip Blank received?		
Tm2775	Temp Blank: –		1.9
	TB location: Representative / Not Representative		
	1 2.0	–	2.0
	2 2.8	–	2.8
	3 2.0	–	2.0
		Average °C	2.3
	☑ Cooler ID on COC? ☐ VOC Trip Blank received?		
Tm3396	Temp Blank: –		2.2
	TB location: Representative / Not Representative		
	1 2.4	–	2.4
	2 2.7	–	2.7
	3 2.5	–	2.5
		Average °C	2.5
	☑ Cooler ID on COC? ☐ VOC Trip Blank received?		

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes	No	
☑	☐	Chain of Custody record(s)? If No, Initiated By _____
☑		Received for Lab Signed/Date/Time?
☐	☐	Shipping document?
☐	☐	Other _____

COC Information

☑ TriMatrix COC ☐ Other _____

COC ID Numbers:

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☐	☐	☐	Was thermal preservation required?
☐		☐	If "No", Project Chemist Approval Intials: _____
☐		☐	If "Yes" Completed Non Con Cooler - Cont Inventory Form?
☐	☐	☐	Completed Sample Preservation Verification Form?
☐	☐	☐	Samples chemically preserved correctly?
☐		☐	If "No", added orange tag?
		☐	Received pre-preserved VOC soils? ☐ MeOH ☐ Na_2SO_4

Check COC for Accuracy

Yes	No	
☑	☐	Analysis Requested?
☑	☐	Sample ID matches COC?
☑	☐	Sample Date and Time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☑ Green-tagged containers
☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☐ RECEIVED, COCs TO LAB(S)

Sample Condition Summary

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate or non-TriMatrix containers received?
☑	☐	☑	VOC vials / TOX containers have headspace?
☑	☐	☑	Extra sample locations / containers not listed on COC?

Notes

☐ Trip Blank received ☐ Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
5.29.14 1055	5.29.14 1145	(Yes) / No

000018

TRIMATRIX LABORATORIES

SAMPLE RECEIVING / LOG-IN CHECKLIST
ADDITIONAL COOLER INFORMATION

Recorded by (initials/date): WC 5·29·14
Client: ERG
Work Order #: 1405452
Receipt Log #: 27.7
Sample #s:
Project Chemist:

Cooler #: Tm 2747
Time: 1125

Custody Seals: #5
☑ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
[✓ Dispersed] / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☑ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☑ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:		-	2.9

TB location: [✓ Representative] / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1	3.4	-	3.4
2	3.0	-	3.0
3	3.6	-	3.6
Average °C			3.3

☑ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #: Tm 3400
Time: 1130

Custody Seals: #6
☑ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
[✓ Dispersed] / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☑ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☑ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:		-	3.3

TB location: [✓ Representative] / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1	3.8	-	3.8
2	3.5	-	3.5
3	3.6	-	3.6
Average °C			3.6

☑ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #: Tm 2867
Time: 1135

Custody Seals: #7
☑ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
[✓ Dispersed] / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☑ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☑ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:		-	2.7

TB location: [✓ Representative] / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1	2.9	-	2.9
2	2.7	-	2.7
3	3.3	-	3.3
Average °C			3.0

☑ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #:
Time:

Custody Seals:
☐ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☐ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☐ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			

TB location: Representative / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1			
2			
3			
Average °C			

☐ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #:
Time:

Custody Seals:
☐ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☐ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☐ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			

TB location: Representative / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1			
2			
3			
Average °C			

☐ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #:
Time:

Custody Seals:
☐ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☐ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☐ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			

TB location: Representative / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1			
2			
3			
Average °C			

☐ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #:
Time:

Custody Seals:
☐ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☐ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☐ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			

TB location: Representative / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1			
2			
3			
Average °C			

☐ Cooler ID on COC?
☐ VOC Trip Blank received?

Cooler #:
Time:

Custody Seals:
☐ None
☐ Present / Intact
☐ Present / Not Intact

Coolant Location:
Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
☐ Loose Ice / Avg 2-3 containers
☐ Bagged Ice / Avg 2-3 containers
☐ Blue Ice / Avg 2-3 containers
☐ None / Avg 2-3 containers

Alternate Temperature Taken Via:
☐ Temperature Blank (TB)
☐ 1 Container

	Recorded °C	Correction Factor °C	Actual °C
Temp Blank:			

TB location: Representative / Not Representative

	Recorded °C	Correction Factor °C	Actual °C
1			
2			
3			
Average °C			

☐ Cooler ID on COC?
☐ VOC Trip Blank received?

Comments

TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

Client		Work Order #
ERG		1405452
Receipt Log #	Completed By (initials/date)	Project Chemist
27.7	WC 5.29.14	

COC ID # 140341262

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

COC ID # 140341262

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot # HC389101

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

Client	Work Order #
ERG	1405452
Receipt Log #	**Completed By (initials/date)**	**Project Chemist**
27.7	WC 5.29.14	

COC ID # 1403412b2

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Ph Strip Lot # HC389101

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

COC ID # 1403412b2

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

Client	Work Order #
ERG	1405452
Receipt Log #	**Completed By (initials/date)**	**Project Chemist**
27.7	WC 5.29.14	

COC ID # 1403412b2

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Ph Strip Lot # HC389101

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

COC ID # 1403412b2

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5					✓			
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

TRIMATRIX LABORATORIES

SAMPLE PRESERVATION VERIFICATION FORM

Client	Work Order #
ERG	405452
Receipt Log # 27.7	Completed By (initials/date) WC 5.29.14
	Project Chemist

COC ID # 403412G2

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Ph Strip Lot # HC389101

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1					✓			
COC Line #2					✓			
COC Line #3					✓			
COC Line #4					✓			
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form. If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.

COC ID #

Adjusted by: _____
Date: _____

DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5 / 23	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		6-8	<2	<2	
COC Line #1								
COC Line #2								
COC Line #3								
COC Line #4								
COC Line #5								
COC Line #6								
COC Line #7								
COC Line #8								
COC Line #9								
COC Line #10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5	NaOH
500	2.5
1000	5.0
Container Type 4	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

SECTION - B

INTERNAL (COC) RECORDS

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: Solids TSS 2540 D

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-01 001	C		6-3-14 10:00	6-3-14 2:30	Yes	-
1405452-02 004						-
1405452-03 007						-
1405452-04 010						-
1405452-05 013						-
1405452-06 002						-
1405452-07 005						-
1405452-08 008						-
1405452-09 011						-
1405452-10 014						-
1405452-11 003						-
1405452-12 006						-
1405452-13 009						-
1405452-14 012	C		6-3-14 10:00	6-3-14 2:30	Yes	-

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: Solids TSS 2540 D

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-15 015	C	[signature]	6-3-14 10:00	6-3-14 2:30	Yes	-
1405452-16 016					Yes	-
1405452-17 019					Yes	-
1405452-18 022	C+D				Yes	-
1405452-19 025					NO	-
1405452-20 028					NO	-
1405452-21 017					Yes	-
1405452-22 020					Yes	-
1405452-23 023	C+D				Yes	-
1405452-24 026					NO	-
1405452-25 029					NO	-
1405452-26 018					Yes	-
1405452-27 021					Yes	-
1405452-28 024	C+D	[signature]	6-3-14 10:00	6-3-14 2:30	Yes	-

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: Solids TSS 2540 D

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-29 027	C		6-3-14 10:00	6-3-14 2:30	Yes	-
1405452-30 030	C				NO	-
1405452-31 034	C				Yes	-
1405452-32 035	C				Yes	-
1405452-33 036	C		6-3-14 10:00	6-3-14 2:30	Yes	-

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: PDC LG206/207 (Modified)

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-01 001	A	Heather L. Brady	6-6-14 8:05AM	—	yes	
1405452-02 004	A			—	yes	
1405452-03 007	A			—	yes	
1405452-04 010	A			—	yes	
1405452-05 013	A			—	yes	
1405452-06 002	A			—	yes	
1405452-07 005	A			—	yes	
1405452-08 008	A			—	yes	
1405452-09 011	A			—	yes	
1405452-10 014	A			—	yes	
1405452-11 003	A			—	yes	
1405452-12 006	A			—	yes	
1405452-13 009	A			—	yes	
1405452-14 012	A	Heather L. Brady	6-6-14 8:05AM	—	yes	

wko_TriMatrix_custody.rpt

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: POC L6206/207 (Modified)

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-15 015	A	Heather L. Brady	6-6-14 8:05AM	—	yes	
1405452-16 016	A			—	yes	
1405452-17 019	A			—	yes	
1405452-18 022	A,B			—	yes	
1405452-19 025	A			—	yes	
1405452-20 028	A			—	yes	
1405452-21 017	A	NLB	NLB	—	yes	
1405452-22 020	A			—	yes	
1405452-23 023	A,B			—	yes	
1405452-24 026	A			—	yes	
1405452-25 029	A			—	yes	
1405452-26 018	A			—	yes	
1405452-27 021	A			—	yes	
1405452-28 024	A,B	Heather L. Brady	6-6-14 8:05AM	—	yes	

Internal Chain of Custody

SDGID: 1405452 **Work Order #: 1405452**

Client: **Eastern Research Group**
Project: **Burns Harbor**

Project Manager: **James D. McFadden**
Date Received: **May-29-14 10:55**

Department: **Inorganic - Wet Chemistry** Analysis: POC L6206/207 (Modified)

Lab Number / Sample Name	*Container*	*Removed by (Signature)*	*Date & Time Removed*	*Date & Time Returned*	*Consumed?*	*Extract Container*
1405452-29 027	A	Heather L Brady	6-6-14 8:05AM	—	yes	
1405452-30 030	A	"	"	—	yes	
1405452-31 034	A	"	"	—	yes	
1405452-32 035	A	"	"	—	yes	
1405452-33 036	A	Heather L Brady	6-6-14 8:05AM	—	yes	

SECTION - C

INORGANIC – WET CHEMISTRY
SM 2540 D-2011

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

001

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-01
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	5.4	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

004

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-02
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.1	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

007

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-03
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.6	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

010

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-04
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

013

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-05
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.4	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

002

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-06
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.0	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

005

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-07
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.8	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

008

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-08
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.2	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

011

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-09
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.8	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

014

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-10
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

003

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-11
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.2	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

006

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-12
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

009

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-13
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.0	mg/L	1.0	1.0	U	06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

012

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-14
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.4	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

015

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-15
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

016

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-16
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.1	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

019

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-17
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.8	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

022

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-18
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.7	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

025

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-19
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 750 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	21.7	mg/L	1.3	1.3		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

028

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-20
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 500 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	69.4	mg/L	2.0	2.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

017

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-21
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

020

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-22
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	7.8	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

023

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-23
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	13.1	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

026

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-24
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 500 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	65.6	mg/L	2.0	2.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

029

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-25
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 500 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	40.6	mg/L	2.0	2.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

018

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-26
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

021

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-27
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	4.0	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

024

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-28
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	2.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET
SM 2540 D-2011

027

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-29
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	8.7	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

030

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-30
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 500 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	65.2	mg/L	2.0	2.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

034

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-31
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.3	mg/L	1.0	1.0		06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

035

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/27/14 16:00
Solids: 0.00
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-32
Prepared: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	1.0	mg/L	1.0	1.0	U	06/03/14 14:00

INORGANIC ANALYSIS DATA SHEET

SM 2540 D-2011

036

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405452-33
Sampled: 05/27/14 16:00
Prepared: 06/03/14 14:00
Solids: 0.00
Preparation: General Inorganic Prep
QC Batch: 1405291
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
	Residue, Suspended	1	6.0	mg/L	1.0	1.0		06/03/14 14:00

ANALYSIS BATCH (SEQUENCE) SUMMARY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Sequence: 4F03011

SDG: 1405452
Project: Burns Harbor
Calibration: UNASSIGNED
Instrument: 210

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	1405289-BLK1		06/03/14 14:00
LCS	1405289-BS1		06/03/14 14:00
001	1405452-01		06/03/14 14:00
004	1405452-02		06/03/14 14:00
007	1405452-03		06/03/14 14:00
010	1405452-04		06/03/14 14:00
013	1405452-05		06/03/14 14:00
002	1405452-06		06/03/14 14:00
005	1405452-07		06/03/14 14:00
008	1405452-08		06/03/14 14:00
011	1405452-09		06/03/14 14:00
014	1405452-10		06/03/14 14:00
003	1405452-11		06/03/14 14:00
006	1405452-12		06/03/14 14:00
009	1405452-13		06/03/14 14:00
012	1405452-14		06/03/14 14:00
015	1405452-15		06/03/14 14:00
016	1405452-16		06/03/14 14:00
019	1405452-17		06/03/14 14:00
022	1405452-18		06/03/14 14:00
022	1405289-DUP1		06/03/14 14:00
025	1405452-19		06/03/14 14:00
028	1405452-20		06/03/14 14:00

ANALYSIS BATCH (SEQUENCE) SUMMARY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Sequence: 4F03012

SDG: 1405452
Project: Burns Harbor
Calibration: UNASSIGNED
Instrument: 210

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	1405291-BLK1		06/03/14 14:00
LCS	1405291-BS1		06/03/14 14:00
017	1405452-21		06/03/14 14:00
020	1405452-22		06/03/14 14:00
023	1405452-23		06/03/14 14:00
023	1405291-DUP1		06/03/14 14:00
026	1405452-24		06/03/14 14:00
029	1405452-25		06/03/14 14:00
018	1405452-26		06/03/14 14:00
021	1405452-27		06/03/14 14:00
024	1405452-28		06/03/14 14:00
024	1405291-DUP2		06/03/14 14:00
027	1405452-29		06/03/14 14:00
030	1405452-30		06/03/14 14:00
034	1405452-31		06/03/14 14:00
035	1405452-32		06/03/14 14:00
036	1405452-33		06/03/14 14:00

QC BATCH SUMMARY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
QC Batch: 1405289
QC Batch Matrix: Water
Preparation: General Inorganic Prep

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	1405289-BLK1	06/03/14 14:00	
LCS	1405289-BS1	06/03/14 14:00	
022	1405289-DUP1	06/03/14 14:00	
001	1405452-01	06/03/14 14:00	
004	1405452-02	06/03/14 14:00	
007	1405452-03	06/03/14 14:00	
010	1405452-04	06/03/14 14:00	
013	1405452-05	06/03/14 14:00	
002	1405452-06	06/03/14 14:00	
005	1405452-07	06/03/14 14:00	
008	1405452-08	06/03/14 14:00	
011	1405452-09	06/03/14 14:00	
014	1405452-10	06/03/14 14:00	
003	1405452-11	06/03/14 14:00	
006	1405452-12	06/03/14 14:00	
009	1405452-13	06/03/14 14:00	
012	1405452-14	06/03/14 14:00	
015	1405452-15	06/03/14 14:00	
016	1405452-16	06/03/14 14:00	
019	1405452-17	06/03/14 14:00	
022	1405452-18	06/03/14 14:00	
025	1405452-19	06/03/14 14:00	
028	1405452-20	06/03/14 14:00	

QC BATCH SUMMARY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
QC Batch: 1405291
QC Batch Matrix: Water
Preparation: General Inorganic Prep

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	1405291-BLK1	06/03/14 14:00	
LCS	1405291-BS1	06/03/14 14:00	
023	1405291-DUP1	06/03/14 14:00	
024	1405291-DUP2	06/03/14 14:00	
017	1405452-21	06/03/14 14:00	
020	1405452-22	06/03/14 14:00	
023	1405452-23	06/03/14 14:00	
026	1405452-24	06/03/14 14:00	
029	1405452-25	06/03/14 14:00	
018	1405452-26	06/03/14 14:00	
021	1405452-27	06/03/14 14:00	
024	1405452-28	06/03/14 14:00	
027	1405452-29	06/03/14 14:00	
030	1405452-30	06/03/14 14:00	
034	1405452-31	06/03/14 14:00	
035	1405452-32	06/03/14 14:00	
036	1405452-33	06/03/14 14:00	

METHOD BLANK DATA SHEET
SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405289-BLK1
File ID:
Prepared: 06/03/14 14:00
Analyzed: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 750 mL / 1000 mL
QC Batch: 1405289
Sequence: 4F03011
Calibration: UNASSIGNE
Instrument: 210

CAS No.	Analyte	Concentration	Unit	MDL	MRL	Q
	Residue, Suspended	1.0	mg/L	1.0	1.0	U

METHOD BLANK DATA SHEET
SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405291-BLK1
File ID:
Prepared: 06/03/14 14:00
Analyzed: 06/03/14 14:00
Preparation: General Inorganic Prep
Initial/Final: 750 mL / 1000 mL
QC Batch: 1405291
Sequence: 4F03012
Calibration: UNASSIGNE
Instrument: 210

CAS No.	Analyte	Concentration	Unit	MDL	MRL	Q
	Residue, Suspended	1.0	mg/L	1.0	1.0	U

DUPLICATES
SM 2540 D-2011

022

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-18
% Solids:
QC Batch: 1405289

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405289-DUP1
Source Sample Name: 022
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Residue, Suspended	5	1.7		1.4		19	*	SM 2540 D-2011	mg/L

* Values outside of QC limits

DUPLICATES
SM 2540 D-2011

023

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-23
% Solids:
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405291-DUP1
Source Sample Name: 023
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Residue, Suspended	5	13.1		7.1		59	*	SM 2540 D-2011	mg/L

* Values outside of QC limits

DUPLICATES
SM 2540 D-2011

024

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-28
% Solids:
QC Batch: 1405291

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405291-DUP2
Source Sample Name: 024
Preparation: General Inorganic Prep
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Residue, Suspended	5	2.3		1.6		36	*	SM 2540 D-2011	mg/L

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.

Client: Eastern Research Group

Matrix: Water

QC Batch: 1405289

SDG: 1405452

Project: Burns Harbor

Laboratory ID: 1405289-BS1

Preparation: General Inorganic Prep

Initial/Final: 100 mL / 1000 mL

Sequence: 4F03011

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Residue, Suspended	200	199	100	88 - 104	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

SM 2540 D-2011

Laboratory: TriMatrix Laboratories, Inc.

Client: Eastern Research Group

Matrix: Water

QC Batch: 1405291

SDG: 1405452

Project: Burns Harbor

Laboratory ID: 1405291-BS1

Preparation: General Inorganic Prep

Initial/Final: 100 mL / 1000 mL

Sequence: 4F03012

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Residue, Suspended	200	199	100	88 - 104	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Inorganic - Wet Chemistry, Water, Jun-03-14

Instrument = 210, Calibration = UNASSIGNED

Sequence Analyses:
Solids, TSS 2540 D

Lab Number	*Analysis*	*Contain*	*STD ID*	*ISTD ID*	*Client / QC Type*	*Extraction Comments*
1405289-BLK1	QC				BLANK	
1405289-BS1	QC				LCS	
1405452-01	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-02	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-03	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-04	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-05	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-06	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-07	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-08	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-09	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-10	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-11	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-12	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-13	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-14	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-15	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-16	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-17	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-18	Solids, TSS 2540 D	C			Eastern Research Group	
1405289-DUP1	QC				DUPLICATE	
1405452-19	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-20	Solids, TSS 2540 D	C			Eastern Research Group	

Comments:

Analyst Initials:

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1405289** Page 1 of 2

Printed: 6/13/2014 10:36:33AM

Inorganic - Wet Chemistry, Water, General Inorganic Prep

(No Surrogate)

Batch Comments: (none)

NLB 6-13-14

Standard	Description	Solvent	LotNum
4051228	Residue Low	n/a	n/a

Work Order	Analysis	Work Order	Analysis	Work Order	Analysis
1405452	Solids, TSS 2540 D				

Balance ID: 210 **pH Meter:** none

Lab Number	Contain	Prepared	By	Initial (mL)	Final (mL)	uL Surrogate	Source ID	Spike ID	uL Spike	Client / QC Type	Extraction Comments
1405289-BLK1		Jun-03-14 14:00	WAH	750	1000					BLANK	
1405289-DUP1		Jun-03-14 14:00	WAH	1000	1000		1405452-18			DUPLICATE	
1405289-BS1		Jun-03-14 14:00	WAH	100	1000			4051228	100000	LCS	
1405452-01	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-02	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-03	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-04	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-05	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-06	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-07	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-08	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-09	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-10	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-11	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-12	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-13	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-14	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-15	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-16	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-17	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	

Comments:

Analyst Initials:

000077

Inorganic - Wet Chemistry, Water, General Inorganic Prep

(No Surrogate)

Batch Comments: (none)

Balance ID: 210 **pH Meter:** none

Lab Number	*Contain*	*Prepared*	*By*	*Initial (mL)*	*Final (mL)*	*uL Surrogate*	*Source ID*	*Spike ID*	*uL Spike*	*Client / QC Type*	*Extraction Comments*
1405452-18	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-19	C	Jun-03-14 14:00	WAH	750	1000					Eastern Research Group	
1405452-20	C	Jun-03-14 14:00	WAH	500	1000					Eastern Research Group	

Comments:

Analyst Initials:

Rerun Macro

TRIMATRIX LABORATORIES

TOTAL SUSPENDED SOLIDS

BATCH OVERVIEW	
Sequence:	4103011
Balance Number:	210
Analysis Date:	06/03/14
Analyst:	WAH
Parameter:	Residue, Suspended
Matrix:	Water
Method Reference:	Solids, TSS 2540 D
Units:	mg/L
Minimum MRL:	2.5

ANALYSIS STEPS

Step	Start Date	Start Time	Start Temp (°C)	End Date	End Time	End Temp (°C)
Step #1	06/03/14	2:60	104	6-4	8:15	104
Step #2	6-4	9:30	104	6-4	10:30	104
Step #3						

Step #1 To dryness @ 103-105° C (overnight, to dryness) **in Oven #54 or #56**

Step #2 Second drying @ 103-105° C (1hr) **in Oven #54 or #56**

Step #3 Recheck of Step #2 after further cooling in desiccator (if necessary)

Oven # Used: 54

QUALITY CONTROL

Difference Between Weighings: Less than 0.0005 g

Blank Concentration: Less than 3.3mg/L (at 750 mL)

MS/MSD Precision: <20%

LCS Accuracy: See benchsheet

QC BATCH AND APPROVAL

Batch Number: 1405289

Filter Paper Lot: 77690

Supervisor Approval:

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405289-BLK1		BLK1					p5425	0.1207				750				0.0000
1405289-BS1		BS1					p5426	0.1240				100				0.0000
1405452-01	Eastern Research Group	REG					p5427	0.1179				1000				0.0000
1405452-02	Eastern Research Group	REG					p5428	0.1187				1000				0.0000
1405452-03	Eastern Research Group	REG					p5429	0.1220				1000				0.0000
1405452-04	Eastern Research Group	REG					p5430	0.1226				1000				0.0000
1405452-05	Eastern Research Group	REG					p5431	0.1185				1000				0.0000
1405452-06	Eastern Research Group	REG					p5432	0.1213				1000				0.0000
1405452-07	Eastern Research Group	REG					p5433	0.1171				1000				0.0000
1405452-08	Eastern Research Group	REG					p5434	0.1203				1000				0.0000
1405452-09	Eastern Research Group	REG					p5435	0.1209				1000				0.0000
1405452-10	Eastern Research Group	REG					p5436	0.1199				1000				0.0000
1405452-11	Eastern Research Group	REG					p5437	0.1207				1000				0.0000
1405452-12	Eastern Research Group	REG					p5438	0.1203				1000				0.0000
1405452-13	Eastern Research Group	REG					p5439	0.1184				1000				0.0000
1405452-14	Eastern Research Group	REG					p5440	0.1189				1000				0.0000
1405452-15	Eastern Research Group	REG					p5441	0.1209				1000				0.0000
1405452-16	Eastern Research Group	REG					p5442	0.1203				1000				0.0000

670000

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405452-17	Eastern Research Group	REG					p5443	0.1229				1000				0.0000
1405452-18	Eastern Research Group	REG					p5444	0.1204				1000				0.0000
1405289-DUP1		DUP1					p5445	0.1181				1000				0.0000
1405452-19	Eastern Research Group	REG					p5446	0.1171				250				0.0000
1405452-20	Eastern Research Group	REG					p5447	0.1215				500				0.0000
																0.0000
																0.0000
																0.0000
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																0.0000
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000080

Rerun Macro

TRIMATRIX LABORATORIES

TOTAL SUSPENDED SOLIDS

BATCH OVERVIEW	
Sequence:	4103011
Balance Number:	210
Analysis Date:	06/03/14
Analyst:	WAH
Parameter:	Residue, Suspended
Matrix:	Water
Method Reference:	Solids, TSS 2540 D
Units:	mg/L
Minimum MRL:	2.5

ANALYSIS STEPS

Step	Start Date	Start Time	Start Temp (°C)	End Date	End Time	End Temp (°C)
Step #1	06/03/14	2:00 PM	104.0	06/04/14	8:15 AM	104.0
Step #2	06/04/14	9:30 AM	104.0	06/04/14	10:30 AM	104.0
Step #3						

Step #1: To dryness @ 103-105° C (overnight, to dryness) **in Oven #54 or #56**

Step #2: Second drying @ 103-105° C (1hr) **in Oven #54 or #56**

Step #3: Recheck of Step #2 after further cooling in desiccator (if necessary)

Oven # Used: 54

QUALITY CONTROL

Difference Between Weighings: Less than 0.0005 g

Blank Concentration: Less than 3.3mg/L (at 750 mL)

MS/MSD Precision: <20%

LCS Accuracy: See benchsheet

QC BATCH AND APPROVAL

Batch Number: 1405289

Filter Paper Lot: 77690

Supervisor Approval:

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405289-BLK1		BLK1	<3.3			3.3	p5425	0.1207	0.1207	0.1205	0.0002	750	1.3			-0.2000
1405289-BS1		BS1	199			25	p5426	0.1240	0.1441	0.1439	0.0002	100	10.0			19.9000
1405452-01	Eastern Research Group	REG	5			3	p5427	0.1179	0.1235	0.1233	0.0002	1000	1.0			5.4000
1405452-02	Eastern Research Group	REG	<2.5			3	p5428	0.1187	0.1209	0.1208	0.0001	1000	1.0			2.1000
1405452-03	Eastern Research Group	REG	3			3	p5429	0.1220	0.1246	0.1246	0.0000	1000	1.0			2.6000
1405452-04	Eastern Research Group	REG	<2.5			3	p5430	0.1226	0.1251	0.1249	0.0002	1000	1.0			2.3000
1405452-05	Eastern Research Group	REG	<2.5			3	p5431	0.1185	0.1210	0.1209	0.0001	1000	1.0			2.4000
1405452-06	Eastern Research Group	REG	<2.5			3	p5432	0.1213	0.1234	0.1233	0.0001	1000	1.0			2.0000
1405452-07	Eastern Research Group	REG	<2.5			3	p5433	0.1171	0.1189	0.1189	0.0000	1000	1.0			1.8000
1405452-08	Eastern Research Group	REG	<2.5			3	p5434	0.1203	0.1226	0.1225	0.0001	1000	1.0			2.2000
1405452-09	Eastern Research Group	REG	<2.5			3	p5435	0.1209	0.1228	0.1227	0.0001	1000	1.0			1.8000
1405452-10	Eastern Research Group	REG	<2.5			3	p5436	0.1199	0.1223	0.1222	0.0001	1000	1.0			2.3000
1405452-11	Eastern Research Group	REG	<2.5			3	p5437	0.1207	0.1220	0.1219	0.0001	1000	1.0			1.2000
1405452-12	Eastern Research Group	REG	<2.5			3	p5438	0.1203	0.1217	0.1216	0.0001	1000	1.0			1.3000
1405452-13	Eastern Research Group	REG	<2.5			3	p5439	0.1184	0.1192	0.1191	0.0001	1000	1.0			0.7000
1405452-14	Eastern Research Group	REG	<2.5			3	p5440	0.1189	0.1203	0.1203	0.0000	1000	1.0			1.4000
1405452-15	Eastern Research Group	REG	<2.5			3	p5441	0.1209	0.1233	0.1232	0.0001	1000	1.0			2.3000
1405452-16	Eastern Research Group	REG	<2.5			3	p5442	0.1203	0.1225	0.1224	0.0001	1000	1.0			2.1000

000081

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405452-17	Eastern Research Group	REG	<2.5			3	p5443	0.1229	0.1247	0.1247	0.0000	1000	1.0			1.8000
1405452-18	Eastern Research Group	REG	<2.5			3	p5444	0.1204	0.1223	0.1221	0.0002	1000	1.0			1.7000
1405289-DUP1		DUP1	<2.5			3	p5445	0.1181	0.1197	0.1195	0.0002	1000	1.0			1.4000
1405452-19	Eastern Research Group	REG	22			3	p5446	0.1171	0.1335	0.1334	0.0001	750	1.3			16.3000
1405452-20	Eastern Research Group	REG	69			5	p5447	0.1215	0.1562	0.1562	0.0000	500	2.0			34.7000
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000082

Inorganic - Wet Chemistry, Water, Jun-03-14

Instrument = 210, Calibration = UNASSIGNED

Sequence Analyses:
Solids, TSS 2540 D

Lab Number	*Analysis*	*Contain*	*STD ID*	*ISTD ID*	*Client / QC Type*	*Extraction Comments*
1405291-BLK1	QC				BLANK	
1405291-BS1	QC				LCS	
1405452-21	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-22	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-23	Solids, TSS 2540 D	C			Eastern Research Group	
1405291-DUP1	QC				DUPLICATE	
1405452-24	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-25	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-26	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-27	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-28	Solids, TSS 2540 D	C			Eastern Research Group	
1405291-DUP2	QC				DUPLICATE	
1405452-29	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-30	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-31	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-32	Solids, TSS 2540 D	C			Eastern Research Group	
1405452-33	Solids, TSS 2540 D	C			Eastern Research Group	
1405460-10	Solids, TSS 2540 D	C			Republic Services, Inc.	
1405460-16	Solids, TSS 2540 D	C			Republic Services, Inc.	
1405482-01	Solids, TSS 2540 D	C			U.S. Gypsum	

Comments:

Analyst Initials:

TriMatrix Laboratories, Inc.

PREPARATION BATCH 1405291

Printed: 6/13/2014 10:43:33AM

Inorganic - Wet Chemistry, Water, General Inorganic Prep

(No Surrogate)

Batch Comments: (none)

NLB 6-13-14

Standard	Description	Solvent	LotNum
4051228	Residue Low	n/a	n/a

Work Order	Analysis	Work Order	Analysis	Work Order	Analysis
1405452	Solids, TSS 2540 D	1405460	Solids, TSS 2540 D	1405482	Solids, TSS 2540 D

Balance ID: 210 **pH Meter:** none

Lab Number	Contain	Prepared	By	Initial (mL)	Final (mL)	uL Surrogate	Source ID	Spike ID	uL Spike	Client / QC Type	Extraction Comments
1405291-BLK1		Jun-03-14 14:00	WAH	750	1000					BLANK	
1405291-DUP1		Jun-03-14 14:00	WAH	1000	1000		1405452-23			DUPLICATE	
1405291-DUP2		Jun-03-14 14:00	WAH	1000	1000		1405452-28			DUPLICATE	
1405291-BS1		Jun-03-14 14:00	WAH	100	1000			4051228	100000	LCS	
1405452-21	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-22	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-23	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-24	C	Jun-03-14 14:00	WAH	500	1000					Eastern Research Group	
1405452-25	C	Jun-03-14 14:00	WAH	500	1000					Eastern Research Group	
1405452-26	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-27	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-28	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-29	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-30	C	Jun-03-14 14:00	WAH	500	1000					Eastern Research Group	
1405452-31	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-32	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405452-33	C	Jun-03-14 14:00	WAH	1000	1000					Eastern Research Group	
1405460-10	C	Jun-03-14 14:00	WAH	500	1000					Republic Services, Inc.	
1405460-16	C	Jun-03-14 14:00	WAH	750	1000					Republic Services, Inc.	
1405482-01	C	Jun-03-14 14:00	WAH	750	1000					U.S. Gypsum	

Comments:

Analyst Initials:

Rerun Macro

TRIMATRIX LABORATORIES

TOTAL SUSPENDED SOLIDS

BATCH OVERVIEW	
Sequence:	4103012
Balance Number:	210
Analysis Date:	06/03/14
Analyst:	WAH
Parameter:	Residue, Suspended
Matrix:	Water
Method Reference:	Solids, TSS 2540 D
Units:	mg/L
Minimum MRL:	2.5

ANALYSIS STEPS

Step	Start Date	Start Time	Start Temp (°C)	End Date	End Time	End Temp (°C)
Step #1	06/03/14	2:00	104	6-4	8:15	104
Step #2	6-4	9:30	104	6-4	10:30	104
Step #3						

Step #1 To dryness @ 103-105° C (overnight, to dryness) **in Oven #54 or #56**

Step #2 Second drying @ 103-105° C (1hr) **in Oven #54 or #56**

Step #3 Recheck of Step #2 after further cooling in desiccator (if necessary)

Oven # Used: 54

QUALITY CONTROL

Difference Between Weighings: Less than 0.0005 g

Blank Concentration: Less than 3.3mg/L (at 750 mL)

MS/MSD Precision: <20%

LCS Accuracy: See benchsheet

QC BATCH AND APPROVAL

Batch Number: 1405291

Filter Paper Lot: 600007-4094-R1

Supervisor Approval:

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405291-BLK1		BLK1					p5425	0.1207				750				0.0000
1405291-BS1		BS1					p5426	0.1240				100				0.0000
1405452-21	Eastern Research Group	REG					p5448	0.1217				1000				0.0000
1405452-22	Eastern Research Group	REG					p5449	0.1208				1000				0.0000
1405452-23	Eastern Research Group	REG					p5075	0.1209				1000				0.0000
1405291-DUP1		DUP1					p5076	0.1204				1000				0.0000
1405452-24	Eastern Research Group	REG					p5077	0.1226				500				0.0000
1405452-25	Eastern Research Group	REG					p5078	0.1214				500				0.0000
1405452-26	Eastern Research Group	REG					p5079	0.1211				1000				0.0000
1405452-27	Eastern Research Group	REG					p5080	0.1205				1000				0.0000
1405452-28	Eastern Research Group	REG					p5081	0.1214				1000				0.0000
1405291-DUP2		DUP2					p5082	0.1221				1000				0.0000
1405452-29	Eastern Research Group	REG					p5083	0.1207				1000				0.0000
1405452-30	Eastern Research Group	REG					p5084	0.1226				500				0.0000
1405452-31	Eastern Research Group	REG					p5085	0.1192				1000				0.0000
1405452-32	Eastern Research Group	REG					p5086	0.1186				1000				0.0000
1405452-33	Eastern Research Group	REG					p5087	0.1200				1000				0.0000
1405460-10	Republic Services, Inc.	REG					p5088	0.1208				500				0.0000

5800000

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405460-16	Republic Services, Inc.	REG					p5089	0.1212				950				0.0000
1405482-01	U.S. Gypsum	REG					p5090	0.1191				750				0.0000
																0.0000
																0.0000
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000086

Rerun Macro

TRIMATRIX LABORATORIES

TOTAL SUSPENDED SOLIDS

BATCH OVERVIEW	
Sequence:	4103012
Balance Number:	210
Analysis Date:	06/03/14
Analyst:	WAH
Parameter:	Residue, Suspended
Matrix:	Water
Method Reference:	Solids, TSS 2540 D
Units:	mg/L
Minimum MRL:	2.5

ANALYSIS STEPS

Step	Start Date	Start Time	Start Temp (°C)	End Date	End Time	End Temp (°C)
Step #1	06/03/14	2:00 PM	104.0	06/04/14	8:15 AM	104.0
Step #2	06/04/14	9:30 AM	104.0	06/04/14	10:30 AM	104.0
Step #3						

Step #1: To dryness @ 103-105° C (overnight, to dryness) **in Oven #54 or #56**

Step #2: Second drying @ 103-105° C (1hr) **in Oven #54 or #56**

Step #3: Recheck of Step #2 after further cooling in desiccator (if necessary)

Oven # Used: 54

QUALITY CONTROL

Difference Between Weighings: Less than 0.0005 g

Blank Concentration: Less than 3.3mg/L (at 750 mL)

MS/MSD Precision: <20%

LCS Accuracy: See benchsheet

QC BATCH AND APPROVAL

Batch Number: 1405291

Filter Paper Lot: 600007-4094-R1

Supervisor Approval:

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405291-BLK1		BLK1	<3.3			3.3	p5425	0.1207	0.1207	0.1205	0.0002	750	1.3			-0.2000
1405291-BS1		BS1	199			25	p5426	0.1240	0.1441	0.1439	0.0002	100	10.0			19.9000
1405452-21	Eastern Research Group	REG	<2.5			3	p5448	0.1217	0.1240	0.1240	0.0000	1000	1.0			2.3000
1405452-22	Eastern Research Group	REG	8			3	p5449	0.1208	0.1286	0.1286	0.0000	1000	1.0			7.8000
1405452-23	Eastern Research Group	REG	13			3	p5075	0.1209	0.1340	0.1340	0.0000	1000	1.0			13.1000
1405291-DUP1		DUP1	7			3	p5076	0.1204	0.1276	0.1275	0.0001	1000	1.0			7.1000
1405452-24	Eastern Research Group	REG	66			5	p5077	0.1226	0.1554	0.1554	0.0000	500	2.0			32.8000
1405452-25	Eastern Research Group	REG	41			5	p5078	0.1214	0.1417	0.1417	0.0000	500	2.0			20.3000
1405452-26	Eastern Research Group	REG	<2.5			3	p5079	0.1211	0.1224	0.1224	0.0000	1000	1.0			1.3000
1405452-27	Eastern Research Group	REG	4			3	p5080	0.1205	0.1244	0.1245	0.0001	1000	1.0			4.0000
1405452-28	Eastern Research Group	REG	<0.2			0	p5081	0.1214	0.1238	0.1237	0.0001	1000 10000	0.1			2.3000
1405291-DUP2		DUP2	<2.5			3	p5082	0.1221	0.1237	0.1237	0.0000	1000	1.0			1.6000
1405452-29	Eastern Research Group	REG	9			3	p5083	0.1207	0.1294	0.1294	0.0000	1000	1.0			8.7000
1405452-30	Eastern Research Group	REG	65			5	p5084	0.1226	0.1552	0.1552	0.0000	500	2.0			32.6000
1405452-31	Eastern Research Group	REG	<2.5			3	p5085	0.1192	0.1205	0.1205	0.0000	1000	1.0			1.3000
1405452-32	Eastern Research Group	REG	<2.5			3	p5086	0.1186	0.1194	0.1194	0.0000	1000	1.0			0.8000
1405452-33	Eastern Research Group	REG	6			3	p5087	0.1200	0.1259	0.1260	0.0001	1000	1.0			6.0000
1405460-10	Republic Services, Inc.	REG	67			5	p5088	0.1208	0.1544	0.1544	0.0000	500	2.0			33.6000

000087

Sample ID	Client	QC	TSS Result (mg/L)	TSS Adjusted Result (mg/L)	LCS or Spike Conc. (mg/L)	MRL	Dish ID	Initial Dish (g)	First Dish + Residue (g)	Final Dish + Residue (g)	Difference between weighings (g)	Sample Size (mL)	D.F.	RPD	REC (%)	Result for Element (mg)
1405460-16	Republic Services, Inc.	REG	23			3	p5089	0.1212	0.1385	0.1384	0.0001	750	1.3			17.2000
1405482-01	U.S. Gypsum	REG	<3.3			3	p5090	0.1191	0.1205	0.1205	0.0000	750	1.3			1.4000
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SECTION - C

INORGANIC – WET CHEMISTRY
USEPA LG206/207 (Modified)

TriMatrix Laboratories, Inc.

Eastern Research Group

Project: Burns Harbor

SDG: 1405452

USEPA LG206/207 (Modified)

SAMPLE ID SUMMARY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor

Client Sample Id:	Lab Sample Id:
001	1405452-01
004	1405452-02
007	1405452-03
010	1405452-04
013	1405452-05
002	1405452-06
005	1405452-07
008	1405452-08
011	1405452-09
014	1405452-10
003	1405452-11
006	1405452-12
009	1405452-13
012	1405452-14
015	1405452-15
016	1405452-16
019	1405452-17
022	1405452-18
025	1405452-19
028	1405452-20
017	1405452-21
020	1405452-22
023	1405452-23
026	1405452-24
029	1405452-25
018	1405452-26
021	1405452-27
024	1405452-28
027	1405452-29
030	1405452-30
034	1405452-31
035	1405452-32
036	1405452-33

INORGANIC ANALYSIS DATA SHEET

USEPA LG206/207 (Modified)

001

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-01
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 17:08

INORGANIC ANALYSIS DATA SHEET

USEPA LG206/207 (Modified)

004

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-02
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 17:10

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

007

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-03
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 17:12

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

010

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-04
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:01

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

013

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 08:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-05
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:03

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

002

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-06
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:05

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

005

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-07
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:06

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

008

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-08
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:54

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

011

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-09
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:55

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

014

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:15
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-10
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:57

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

003

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-11
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 18:58

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

006

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-12
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:03

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

009

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-13
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:04

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

012

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-14
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:06

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

015

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 09:45
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-15
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	1.5	mg/L	1.1	5.0	**J**	06/10/14 19:10

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

016

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-16
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:11

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

019

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-17
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:14

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

022

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-18
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:22

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

025

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-19
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:25

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

028

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405452-20
Sampled: 05/28/14 13:00
Prepared: 06/06/14 13:00
Solids: 0.00
Preparation: Method Specific Preparation
QC Batch: 1405629
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	3.1	mg/L	1.1	5.0	**J**	06/10/14 19:26

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

017

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-21
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 19:46

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

020

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-22
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	1.1	mg/L	1.1	5.0	**J**	06/10/14 19:48

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

023

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-23
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:08

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

026

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-24
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	1.9	mg/L	1.1	5.0	**J**	06/10/14 20:11

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

029

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:30
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-25
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	2.3	mg/L	1.1	5.0	**J**	06/10/14 20:13

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

018

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-26
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:15

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

021

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-27
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:17

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

024

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-28
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:27

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

027

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405452-29
Sampled: 05/28/14 12:00
Prepared: 06/06/14 13:00
Solids: 0.00
Preparation: Method Specific Preparation
QC Batch: 1405628
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:30

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

030

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 12:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-30
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	2.4	mg/L	1.1	5.0	**J**	06/10/14 20:34

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

034

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/28/14 13:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-31
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:36

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

035

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405452-32
Sampled: 05/27/14 16:00
Prepared: 06/06/14 13:00
Solids: 0.00
Preparation: Method Specific Preparation
QC Batch: 1405628
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:38

INORGANIC ANALYSIS DATA SHEET
USEPA LG206/207 (Modified)

036

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Sampled: 05/27/14 16:00
Solids: 0.00
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405452-33
Prepared: 06/06/14 13:00
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

CAS No.	Analyte	Dil. Factor	Conc.	Units	MDL	MRL	Q	Analyzed
7440-44-0	Particulate-phase Organic Carbon	1	5.0	mg/L	1.1	5.0	U	06/10/14 20:41

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Sequence: 4F11027

SDG: 1405452
Project: Burns Harbor
Calibration: 4F11008
Instrument: 334

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	4F11027-CAL1		06/10/14 16:13
Cal Standard	4F11027-CAL2		06/10/14 16:16
Cal Standard	4F11027-CAL3		06/10/14 16:23
Cal Standard	4F11027-CAL4		06/10/14 16:28
Cal Standard	4F11027-CAL5		06/10/14 16:31
Cal Standard	4F11027-CAL6		06/10/14 16:34
Cal Standard	4F11027-CAL7		06/10/14 16:37
Calibration Check	4F11027-CCV1		06/10/14 16:55
Calibration Blank	4F11027-CCB1		06/10/14 16:59
Instrument RL Check	4F11027-CRL1		06/10/14 17:02
Blank	1405629-BLK1		06/10/14 17:03
LCS	1405629-BS1		06/10/14 17:05
001	1405452-01		06/10/14 17:08
004	1405452-02		06/10/14 17:10
007	1405452-03		06/10/14 17:12
010	1405452-04		06/10/14 18:01
013	1405452-05		06/10/14 18:03
002	1405452-06		06/10/14 18:05
005	1405452-07		06/10/14 18:06
Calibration Check	4F11027-CCV2		06/10/14 18:09
Calibration Blank	4F11027-CCB2		06/10/14 18:10
008	1405452-08		06/10/14 18:54
011	1405452-09		06/10/14 18:55
014	1405452-10		06/10/14 18:57
003	1405452-11		06/10/14 18:58
006	1405452-12		06/10/14 19:03
009	1405452-13		06/10/14 19:04
012	1405452-14		06/10/14 19:06
015	1405452-15		06/10/14 19:10
016	1405452-16		06/10/14 19:11
019	1405452-17		06/10/14 19:14
Calibration Check	4F11027-CCV3		06/10/14 19:17

ANALYSIS BATCH (SEQUENCE) SUMMARY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Sequence: 4F11027

SDG: 1405452
Project: Burns Harbor
Calibration: 4F11008
Instrument: 334

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Blank	4F11027-CCB3		06/10/14 19:20
022	1405452-18		06/10/14 19:22
022	1405629-DUP1		06/10/14 19:23
025	1405452-19		06/10/14 19:25
028	1405452-20		06/10/14 19:26
LCS Dup	1405629-BSD1		06/10/14 19:31
Calibration Check	4F11027-CCV4		06/10/14 19:33
Calibration Blank	4F11027-CCB4		06/10/14 19:36
Blank	1405628-BLK1		06/10/14 19:41
LCS	1405628-BS1		06/10/14 19:44
017	1405452-21		06/10/14 19:46
020	1405452-22		06/10/14 19:48
023	1405452-23		06/10/14 20:08
023	1405628-DUP1		06/10/14 20:10
026	1405452-24		06/10/14 20:11
029	1405452-25		06/10/14 20:13
018	1405452-26		06/10/14 20:15
021	1405452-27		06/10/14 20:17
Calibration Check	4F11027-CCV5		06/10/14 20:20
Calibration Blank	4F11027-CCB5		06/10/14 20:21
024	1405452-28		06/10/14 20:27
027	1405452-29		06/10/14 20:30
024	1405628-DUP2		06/10/14 20:32
030	1405452-30		06/10/14 20:34
034	1405452-31		06/10/14 20:36
035	1405452-32		06/10/14 20:38
036	1405452-33		06/10/14 20:41
LCS Dup	1405628-BSD1		06/10/14 20:42
Calibration Check	4F11027-CCV6		06/10/14 20:46
Calibration Blank	4F11027-CCB6		06/10/14 20:47

INITIAL AND CONTINUING CALIBRATION CHECK

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Sequence: 4F11027
Calibration: 4F11008
Control Limt: +/- 20.00%
Instrument ID: 334

Lab Sample ID	Analyte	True	Found	%R	Units	Analyzed
4F11027-CCV1	Particulate-phase Organic Carb	33.4	33.3	100	mg/L	06/10/14 16:55
4F11027-CCV2	Particulate-phase Organic Carb	29.1	29.1	100	mg/L	06/10/14 18:09
4F11027-CCV3	Particulate-phase Organic Carb	28.9	29.6	103	mg/L	06/10/14 19:17
4F11027-CCV4	Particulate-phase Organic Carb	25.4	25.6	101	mg/L	06/10/14 19:33
4F11027-CCV5	Particulate-phase Organic Carb	33.6	34.6	103	mg/L	06/10/14 20:20
4F11027-CCV6	Particulate-phase Organic Carb	28.7	29.6	103	mg/L	06/10/14 20:46

* Values outside of QC limits

CRDL STANDARD

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Sequence: 4F11027
Calibration: 4F11008
Instrument ID: 334

Lab Sample ID	Analyte	True	Found	%R	Units	QC Limts
4F11027-CRL1	Particulate-phase Organic Carbc	3.14	3.02	96	mg/L	0 - 200

* Values outside of QC limits

BLANKS
USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Sequence: 4F11027
Calibration: 4F11008
Instrument ID: 334

Lab Sample ID	Analyte	Found	Unit	MDL	MRL	C	Analyzed
4F11027-CCB1	Particulate-phase Organic Carb	0.041	mg/L	1.1	5.0	U	06/10/14 16:59
4F11027-CCB2	Particulate-phase Organic Carb	0.026	mg/L	1.1	5.0	U	06/10/14 18:10
4F11027-CCB3	Particulate-phase Organic Carb	0.019	mg/L	1.1	5.0	U	06/10/14 19:20
4F11027-CCB4	Particulate-phase Organic Carb	0.015	mg/L	1.1	5.0	U	06/10/14 19:36
4F11027-CCB5	Particulate-phase Organic Carb	0.018	mg/L	1.1	5.0	U	06/10/14 20:21
4F11027-CCB6	Particulate-phase Organic Carb	0.017	mg/L	1.1	5.0	U	06/10/14 20:47

* Values outside of QC limits

QC BATCH SUMMARY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
QC Batch: 1405628
QC Batch Matrix: Water
Preparation: Method Specific Preparation

Sample Name	Lab Sample ID	Date Prepared	Observations
017	1405452-21	06/06/14 13:00	
020	1405452-22	06/06/14 13:00	
023	1405452-23	06/06/14 13:00	
026	1405452-24	06/06/14 13:00	
029	1405452-25	06/06/14 13:00	
018	1405452-26	06/06/14 13:00	
021	1405452-27	06/06/14 13:00	
024	1405452-28	06/06/14 13:00	
027	1405452-29	06/06/14 13:00	
030	1405452-30	06/06/14 13:00	
034	1405452-31	06/06/14 13:00	
035	1405452-32	06/06/14 13:00	
036	1405452-33	06/06/14 13:00	
Blank	1405628-BLK1	06/06/14 13:00	
LCS	1405628-BS1	06/06/14 13:00	
LCS Dup	1405628-BSD1	06/06/14 13:00	
023	1405628-DUP1	06/06/14 13:00	
024	1405628-DUP2	06/06/14 13:00	

QC BATCH SUMMARY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
QC Batch: 1405629
QC Batch Matrix: Water
Preparation: Method Specific Preparation

Sample Name	Lab Sample ID	Date Prepared	Observations
001	1405452-01	06/06/14 13:00	
004	1405452-02	06/06/14 13:00	
007	1405452-03	06/06/14 13:00	
010	1405452-04	06/06/14 13:00	
013	1405452-05	06/06/14 13:00	
002	1405452-06	06/06/14 13:00	
005	1405452-07	06/06/14 13:00	
008	1405452-08	06/06/14 13:00	
011	1405452-09	06/06/14 13:00	
014	1405452-10	06/06/14 13:00	
003	1405452-11	06/06/14 13:00	
006	1405452-12	06/06/14 13:00	
009	1405452-13	06/06/14 13:00	
012	1405452-14	06/06/14 13:00	
015	1405452-15	06/06/14 13:00	
016	1405452-16	06/06/14 13:00	
019	1405452-17	06/06/14 13:00	
022	1405452-18	06/06/14 13:00	
025	1405452-19	06/06/14 13:00	
028	1405452-20	06/06/14 13:00	
Blank	1405629-BLK1	06/06/14 13:00	
LCS	1405629-BS1	06/06/14 13:00	
LCS Dup	1405629-BSD1	06/06/14 13:00	
022	1405629-DUP1	06/06/14 13:00	

METHOD BLANK DATA SHEET
USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405628-BLK1
File ID:
Prepared: 06/06/14 13:00
Analyzed: 06/10/14 19:41
Preparation: Method Specific Preparat
Initial/Final: 1000 mL / 1000 mL
QC Batch: 1405628
Sequence: 4F11027
Calibration: 4F11008
Instrument: 334

CAS No.	Analyte	Concentration	Unit	MDL	MRL	Q
7440-44-0	Particulate-phase Organic Carbon	5.0	mg/L	1.1	5.0	U

METHOD BLANK DATA SHEET
USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405629-BLK1
File ID:
Prepared: 06/06/14 13:00
Analyzed: 06/10/14 17:03
Preparation: Method Specific Preparat
Initial/Final: 1000 mL / 1000 mL
QC Batch: 1405629
Sequence: 4F11027
Calibration: 4F11008
Instrument: 334

CAS No.	Analyte	Concentration	Unit	MDL	MRL	Q
7440-44-0	Particulate-phase Organic Carbon	5.0	mg/L	1.1	5.0	U

DUPLICATES
USEPA LG206/207 (Modified)

023

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-23
% Solids:
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405628-DUP1
Source Sample Name: 023
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Particulate-phase Organic Carbo	20	5.0	U	5.0	U	0		LG206/207 (Mo	mg/L

* Values outside of QC limits

DUPLICATES
USEPA LG206/207 (Modified)

024

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-28
% Solids:
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405628-DUP2
Source Sample Name: 024
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Particulate-phase Organic Carbo	20	5.0	U	5.0	U	0		LG206/207 (Mo	mg/L

* Values outside of QC limits

DUPLICATES
USEPA LG206/207 (Modified)

022

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
Lab Source ID: 1405452-18
% Solids:
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405629-DUP1
Source Sample Name: 022
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL

Analyte	Control Limit	Sample Conc.	C	Dup. Conc.	C	RPD %	Q	Method	Units
Particulate-phase Organic Carbo	20	5.0	U	5.0	U	0		LG206/207 (Mo	mg/L

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
QC Batch: 1405628

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405628-BS1
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL
Sequence: 4F11027

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Particulate-phase Organic Carbon	20.7	22	105	40 - 130	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405628-BSD1
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL
QC Batch: 1405628
Sequence: 4F11027

Analyte	Spike Added mg/L	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Particulate-phase Organic Carbon	20.7	23	112	7	20	40 - 130	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
Client: Eastern Research Group
Matrix: Water
QC Batch: 1405629

SDG: 1405452
Project: Burns Harbor
Laboratory ID: 1405629-BS1
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL
Sequence: 4F11027

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Particulate-phase Organic Carbon	21.0	24	115	40 - 130	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY

USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Matrix: Water
Laboratory ID: 1405629-BSD1
Preparation: Method Specific Preparation
Initial/Final: 1000 mL / 1000 mL
QC Batch: 1405629
Sequence: 4F11027

Analyte	Spike Added mg/L	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Particulate-phase Organic Carbon	21.0	22	104	10	20	40 - 130	mg/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

HOLDING TIME SUMMARY
USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Analyte: Particulate-phase Organic Carbon

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
001	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
004	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
007	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
010	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
013	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
002	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
005	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
008	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
011	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
014	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
003	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
006	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
009	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
012	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
015	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
016	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
019	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
022	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
025	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
028	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
017	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
020	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	

HOLDING TIME SUMMARY
USEPA LG206/207 (Modified)

Laboratory: TriMatrix Laboratories, Inc.
SDG: 1405452
Client: Eastern Research Group
Project: Burns Harbor
Analyte: Particulate-phase Organic Carbon

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
023	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
026	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
029	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
018	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
021	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
024	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
027	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
030	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
034	05/28/14	05/29/14		06/06/14	9	NA	06/10/14	13	14	
035	05/27/14	05/29/14		06/06/14	10	NA	06/10/14	14	14	
036	05/27/14	05/29/14		06/06/14	10	NA	06/10/14	14	14	

Inorganic - Wet Chemistry, Water, Jun-10-14

Instrument = 334, Calibration = 4F11008

Sequence Analyses:
POC LG206/207 (Modified)

Lab Number	*Analysis*	*Contain*	*STD ID*	*ISTD ID*	*Client / QC Type*	*Extraction Comments*
4F11027-CAL1	QC		4060527		CAL STANDARD	
4F11027-CAL2	QC		4060529		CAL STANDARD	
4F11027-CAL3	QC		4060530		CAL STANDARD	
4F11027-CAL4	QC		4060564		CAL STANDARD	
4F11027-CAL5	QC		4060567		CAL STANDARD	
4F11027-CAL6	QC		4060568		CAL STANDARD	
4F11027-CAL7	QC		4060569		CAL STANDARD	
4F11027-CCV1	QC		4060570		CALIBRATION CHECK	
4F11027-CCB1	QC				CALIBRATION BLANK	
4F11027-CRL1	QC		4060577		INSTRUMENT RL CHECK	
1405629-BLK1	QC				BLANK	
1405629-BS1	QC				LCS	
1405452-01	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-02	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-03	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-04	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-05	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-06	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-07	POC LG206/207 (Modified)	A			Eastern Research Group	
4F11027-CCV2	QC		4060571		CALIBRATION CHECK	
4F11027-CCB2	QC				CALIBRATION BLANK	
1405452-08	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-09	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-10	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-11	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-12	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-13	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-14	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-15	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-16	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-17	POC LG206/207 (Modified)	A			Eastern Research Group	
4F11027-CCV3	QC		4060572		CALIBRATION CHECK	
4F11027-CCB3	QC				CALIBRATION BLANK	
1405452-18	POC LG206/207 (Modified)	A			Eastern Research Group	
1405629-DUP1	QC				DUPLICATE	
1405452-19	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-20	POC LG206/207 (Modified)	A			Eastern Research Group	

Comments:

Analyst Initials:

Inorganic - Wet Chemistry, Water, Jun-10-14

Instrument = 334, Calibration = 4F11008

1405629-BSD1	QC				LCS DUP	
4F11027-CCV4	QC		4060573		CALIBRATION CHECK	
4F11027-CCB4	QC				CALIBRATION BLANK	
1405628-BLK1	QC				BLANK	
1405628-BS1	QC				LCS	
1405452-21	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-22	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-23	POC LG206/207 (Modified)	A			Eastern Research Group	
1405628-DUP1	QC				DUPLICATE	
1405452-24	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-25	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-26	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-27	POC LG206/207 (Modified)	A			Eastern Research Group	
4F11027-CCV5	QC		4060575		CALIBRATION CHECK	
4F11027-CCB5	QC				CALIBRATION BLANK	
1405452-28	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-29	POC LG206/207 (Modified)	A			Eastern Research Group	
1405628-DUP2	QC				DUPLICATE	
1405452-30	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-31	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-32	POC LG206/207 (Modified)	A			Eastern Research Group	
1405452-33	POC LG206/207 (Modified)	A			Eastern Research Group	
1405628-BSD1	QC				LCS DUP	
4F11027-CCV6	QC		4060576		CALIBRATION CHECK	
4F11027-CCB6	QC				CALIBRATION BLANK	

Comments:	Analyst Initials:

TriMatrix Laboratories, Inc.

PREPARATION BATCH **1405629** Page 1 of 2

Printed: 6/11/2014 1:45:39PM

Inorganic - Wet Chemistry, Water, Method Specific Preparation

(No Surrogate)

Batch Comments: (none)

Jby 6-11-14 Due 6-11-14

Standard	Description	Solvent	LotNum
4060190	0.2N HCl for POC	Di H2O	136071
4060579	carbon BS KHP BSD1	Solvent Lot #NA	2110724

Work Order	Analysis	Work Order	Analysis	Work Order	Analysis
1405452	POC LG206/207 (Modified)				

Balance ID: 210 **pH Meter:** none

Lab Number	Contain	Prepared	By	Initial (mL)	Final (mL)	uL Surrogate	Source ID	Spike ID	uL Spike	Client / QC Type	Extraction Comments
1405629-BLK1		Jun-06-14 13:00	HLB	1000	1000					BLANK	
1405629-DUP1		Jun-06-14 13:00	HLB	1000	1000		1405452-18			DUPLICATE	
1405629-BS1		Jun-06-14 13:00	HLB	1000	1000			4060579	1	LCS	
1405629-BSD1		Jun-06-14 13:00	HLB	1000	1000			4060579	1	LCS DUP	
1405452-01	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-02	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-03	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-04	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-05	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-06	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-07	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-08	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-09	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-10	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-11	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-12	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-13	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-14	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-15	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	

Comments:

Analyst Initials:

Inorganic - Wet Chemistry, Water, Method Specific Preparation

(No Surrogate)

Batch Comments: (none)

Balance ID: 210 **pH Meter:** none

Lab Number	*Contain*	*Prepared*	*By*	*Initial (mL)*	*Final (mL)*	*uL Surrogate*	*Source ID*	*Spike ID*	*uL Spike*	*Client / QC Type*	*Extraction Comments*
1405452-16	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-17	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-18	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-19	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-20	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	

Comments:

Analyst Initials:

Inorganic - Wet Chemistry, Water, Method Specific Preparation

(No Surrogate)

Batch Comments: (none)

Standard	Description	Solvent	LotNum
4060190	0.2N HCl for POC	Di H2O	136071
4060580	carbon BS KHP BS2	Solvent Lot #NA	2110724

Work Order	Analysis	Work Order	Analysis	Work Order	Analysis
1405452	POC LG206/207 (Modified)				

Balance ID: 210 **pH Meter:** none

Lab Number	Contain	Prepared	By	Initial (mL)	Final (mL)	uL Surrogate	Source ID	Spike ID	uL Spike	Client / QC Type	Extraction Comments
1405628-BLK1		Jun-06-14 13:00	HLB	1000	1000					BLANK	
1405628-DUP1		Jun-06-14 13:00	HLB	1000	1000		1405452-23			DUPLICATE	
1405628-DUP2		Jun-06-14 13:00	HLB	1000	1000		1405452-28			DUPLICATE	
1405628-BS1		Jun-06-14 13:00	HLB	1000	1000			4060580	1	LCS	
1405628-BSD1		Jun-06-14 13:00	HLB	1000	1000			4060580	1	LCS DUP	
1405452-21	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-22	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-23	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-24	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-25	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-26	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-27	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-28	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-29	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-30	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-31	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-32	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	
1405452-33	A	Jun-06-14 13:00	HLB	1000	1000					Eastern Research Group	

Comments:

Analyst Initials:

TRIMATRIX LABORATORIES

Analyst: HLB

Balance: 210

Loyd Kahn TOC SOIL STANDARD WEIGHT

Start Date: 6/10/2014

Curve Date : 6/10/2014

	ROW #1	grams	ROW#2		grams	ROW#3		grams
1			STD1	0.01	0.0114			
2	crdl	2.0955	STD2	0.05	0.0559			
3	CCV1	0.2786	STD3	0.1	0.1022	bs1	0.0509	
4	CCV2	0.2422	STD4	0.2	0.1999	bsd1	0.0446	
5	CCV3	0.2409	STD5	0.3	0.3084	bs2	0.0439	
6	CCV4	0.212	STD6	0.4	0.4096	bsd2	0.0475	
7	CCV5	0.2797	STD7	0.5	0.5172			
8	CCV6	0.2394						
9								
10								
11								
12								
13								
14								
15								
16								

TRIMATRIX LABORATORIES

Analyst: HLB

Balance: 210

0.2 N HCL 4060190

Batch#:

Start Date: 6/6/14

FILTER LOT 9561527

TRAY A

	ROW#1	MLS	ROW#2	MLS	ROW#3	MLS	
1	BLK	1	1405452-14	990	1406452-25	955	1
2	BS	0.0509	1405452-15	962	1406452-26	938	2
3	CRDL	2.0955	1405452-16	958	1406452-27	898	3
4	1405452-01	975	1405452-17	960	1406452-28	938	4
5	1405452-02	966	1405452-18	945	1406452-28DUP	904	5
6	1405452-03	985	1405452-18 dup	968	1406452-29	982	6
7	1405452-04	958	1405452-19	958	1406452-30	750	7
8	1405452-05	950	1405452-20	962	1406452-31	962	8
9	1405452-06	960	BSD	0.0446	1406452-32	898	9
10	1405452-07	990	BLK	1	1406452-33	940	10
11	1405452-08	990	BS	0.0439	BSD	0.0475	11
12	1405452-09	962	1405452-21	938			12
13	1405452-10	960	1405452-22	988			13
14	1405452-11	984	1405452-23	952			14
15	1405452-12	983	1405452-23DUP	972			15
16	1405452-13	974	1405452-24	750			16

grams CaCO3		mg C
0.0114	std 1	1.368077453
0.0559	std 2	6.708379793
0.1022	std 3	12.26469436
0.1999	std 4	23.98935815
0.3084	std 5	37.01009532
0.4096	std 6	49.15478289
0.5172	std 7	62.06751394
0.2786	CCV1	33.43389285
0.2422	CCV2	29.06564554
0.2409	CCV3	28.90963671
0.212	CCV4	25.44144036
0.2797	CCV5	33.56590033
0.2394	CCV6	28.72962652
		0
		0
		0
grams Synthetic C		mgC
CRDL	2.0955	3.143427964
		0

grams KHP		mg C
0.0509	BS1	23.94892989
0.0446	BSD1	20.98472049
0.0439	BS2	20.65536389
0.0475	BSD2	22.34919783
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0
		0

SC632

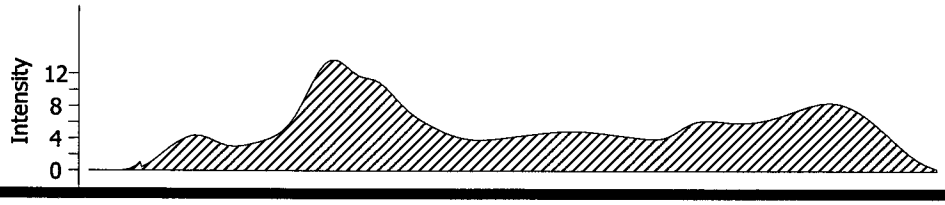
Blank

Name	Comments	Mass	Analysis Date
Blank	CONDITIONING	1.0000	6/10/2014 4:05:29 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.0058096	3372.6

Carbon High %	Carbon High Area
-0.0056215	505.89

Carbon mg 0.058096



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Name	Comments	Mass	Analysis Date
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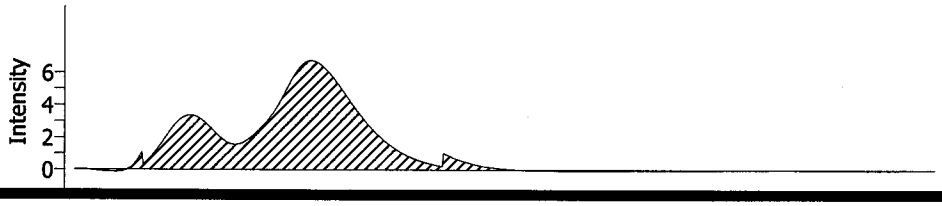
Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.0017528	652.24

Carbon High %	Carbon High Area
-0.011265	143.20

Carbon mg 0.017528



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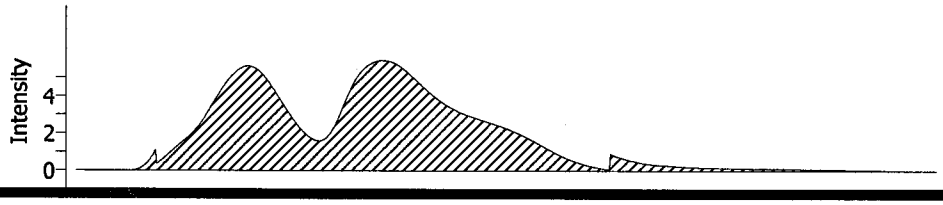
Name	Comments	Mass	Analysis Date
Blank	CONDITIONING	1.0000	6/10/2014 4:08:10 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.0023433	1048.2

Carbon High %	Carbon High Area
-0.010408	198.27

Carbon mg 0.023433



SC632

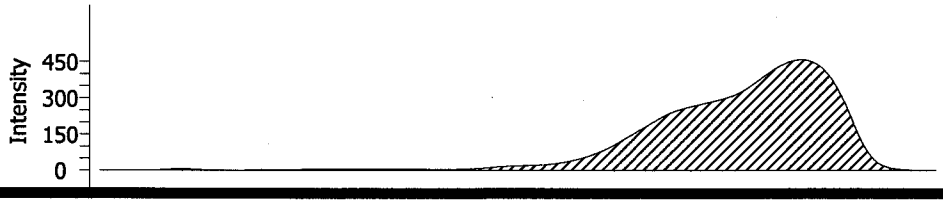
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD1	0.0114	6/10/2014 4:13:40 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	13.112	99709

Carbon High %	Carbon High Area
12.287	9869.0

Carbon mg
1.4948 ✓



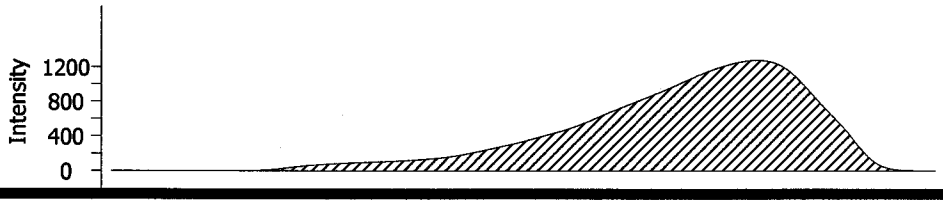
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD2	0.0559	6/10/2014 4:16:03 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	11.538	431975

Carbon High %	Carbon High Area
11.670	42792

Carbon mg
6.4499 ✓



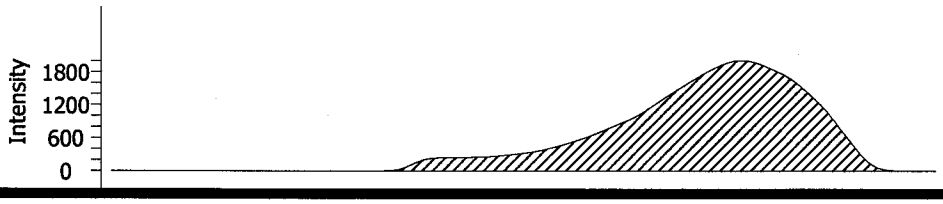
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD3	0.1022	6/10/2014 4:23:03 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	11.634	796769

Carbon High %	Carbon High Area
11.970	79489

Carbon mg
11.890 ✓



SC632

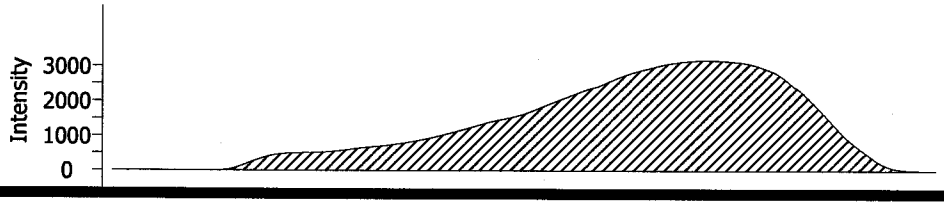
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD4	0.1999	6/10/2014 4:28:35 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	11.739	1573012

Carbon High %	Carbon High Area
12.065	155860

Carbon mg
23.466 ✓



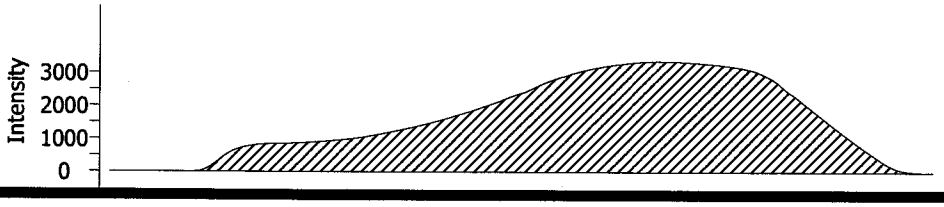
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD5	0.3084	6/10/2014 4:31:48 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	11.631	2404754

Carbon High %	Carbon High Area
12.015	238997

Carbon mg
35.870 ✓



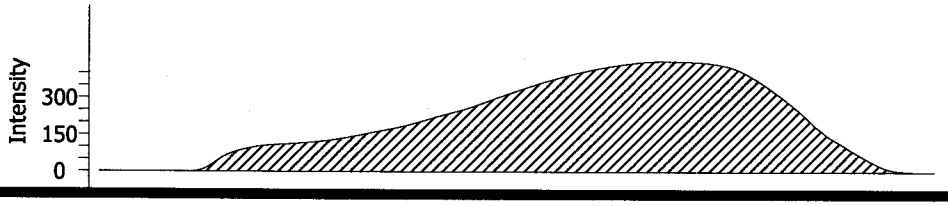
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD6	0.4096	6/10/2014 4:34:38 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	11.836	3250394

Carbon High %	Carbon High Area
11.969	315929

Carbon mg
49.024 ✓



SC632

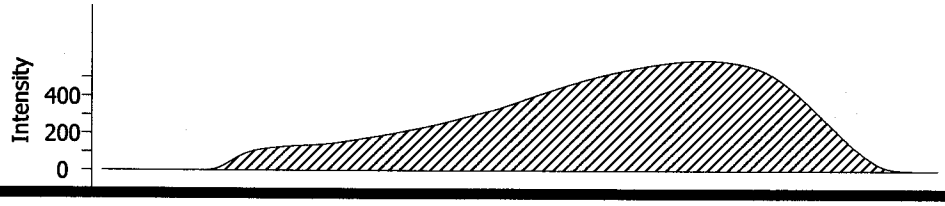
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	STD7	0.5172	6/10/2014 4:37:25 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1351	12.510	4337944

Carbon High %	Carbon High Area
12.025	400558

Carbon mg
62.192 ✓



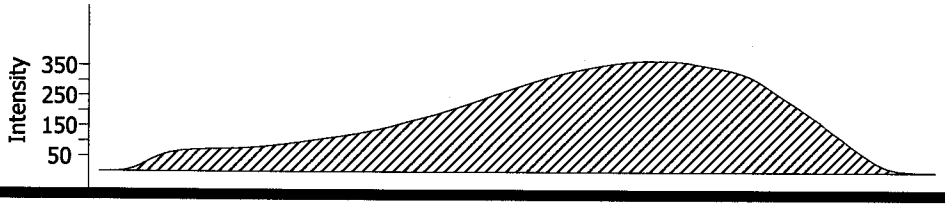
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV1	0.2786	6/10/2014 4:55:58 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	11.730	2190865

Carbon High %	Carbon High Area
11.968	215143

Carbon mg
33.342 ✓



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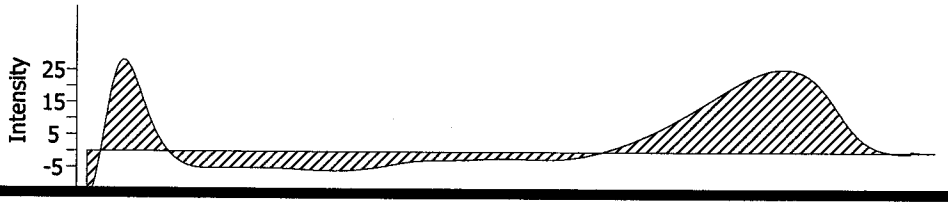
Name	Comments	Mass	Analysis Date
Blank	CCB1	1.0000	6/10/2014 4:59:27 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	0.0041039	2228.8

Carbon High %	Carbon High Area
-0.0044077	583.90

Carbon mg
0.041039 ✓



SC632

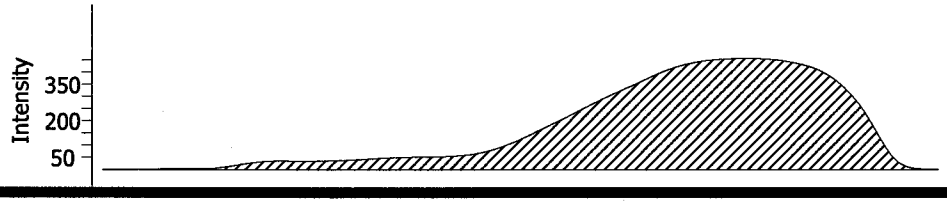
502-632 1007

Name	Comments	Mass	Analysis Date
502-632 1007	CRDL	2.0955	6/10/2014 5:02:00 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1345	0.14399	201810

Carbon High %	Carbon High Area
0.14107	19865

Carbon mg
3.0174 ✓



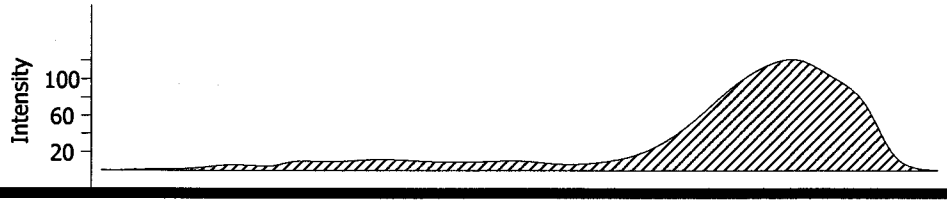
Blank

Name	Comments	Mass	Analysis Date
Blank	BLK1	1.0000	6/10/2014 5:03:56 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1349	0.039737	26123

Carbon High %	Carbon High Area
0.028660	2709.1

Carbon mg
0.39737 ✓



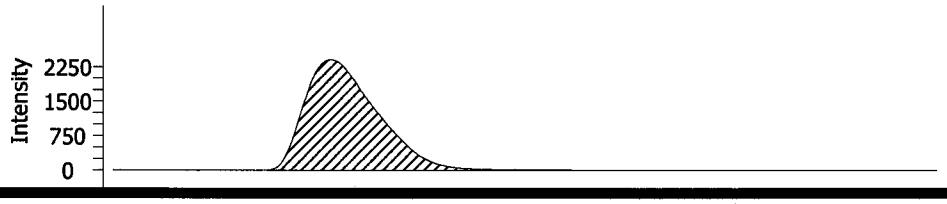
BS

Name	Comments	Mass	Analysis Date
BS	BS1	0.0509	6/10/2014 5:05:18 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	82.609	2819036

Carbon High %	Carbon High Area
47.376	155843

Carbon mg
24.114 ✓



SC632

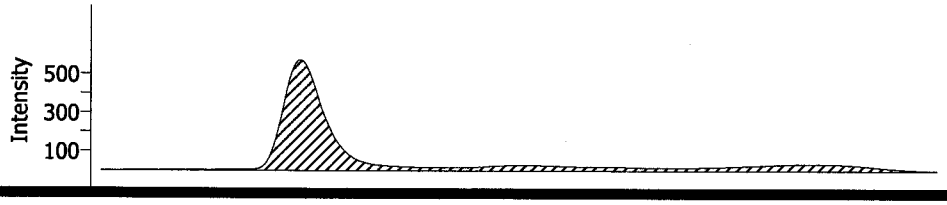
1405452-01

Name	Comments	Mass	Analysis Date
1405452-01	SAMPLE	975.0000	6/10/2014 5:08:28 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1351	0.000055411	35704

Carbon High %	Carbon High Area
0.000043725	3607.0

Carbon mg
0.54026 ✓



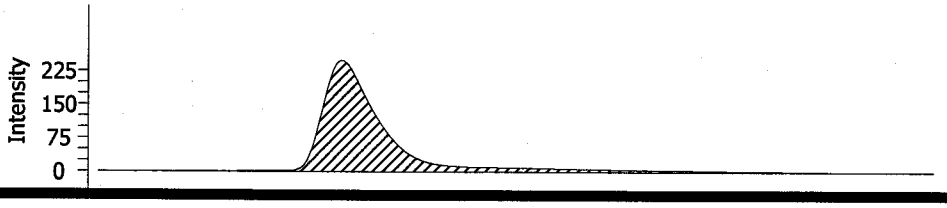
1405452-02

Name	Comments	Mass	Analysis Date
1405452-02	SAMPLE	966.0000	6/10/2014 5:10:29 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1349	0.000021529	13422

Carbon High %	Carbon High Area
0.0000085206	1396.1

Carbon mg
0.20797 ✓



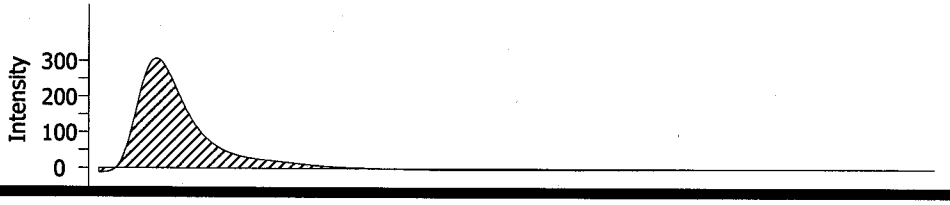
1405452-03

Name	Comments	Mass	Analysis Date
1405452-03	SAMPLE	985.0000	6/10/2014 5:12:35 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000022185	14130

Carbon High %	Carbon High Area
0.000013109	1697.0

Carbon mg
0.21852 ✓



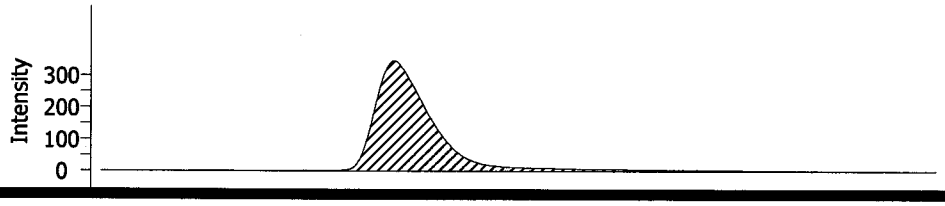
1405452-04

Name	Comments	Mass	Analysis Date
1405452-04	SAMPLE	958.0000	6/10/2014 6:01:16 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	0.000028345	17686

Carbon High %	Carbon High Area
0.000014348	1750.6

Carbon mg
0.27155 ✓



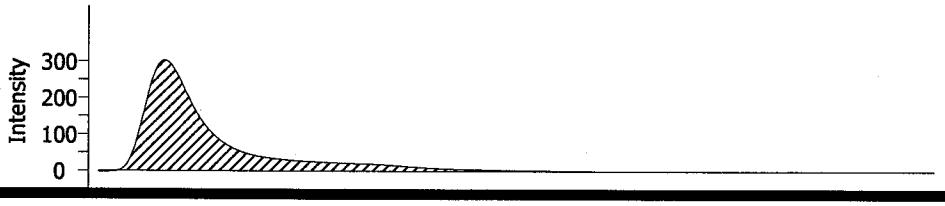
1405452-05

Name	Comments	Mass	Analysis Date
1405452-05	SAMPLE	950.0000	6/10/2014 6:03:13 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1343	0.000029139	18039

Carbon High %	Carbon High Area
0.000016216	1857.2

Carbon mg
0.27682 ✓



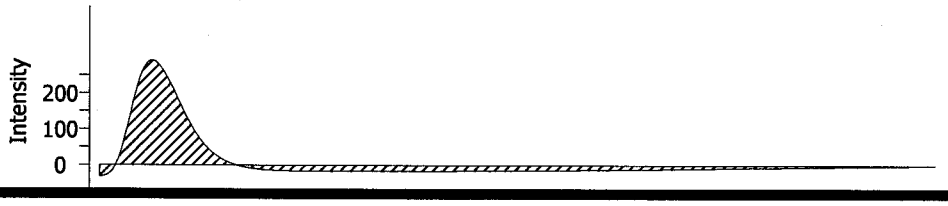
1405452-06

Name	Comments	Mass	Analysis Date
1405452-06	SAMPLE	960.0000	6/10/2014 6:05:19 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.000010840	6455.3

Carbon High %	Carbon High Area
0.0000075828	1335.0

Carbon mg
0.10407 ✓



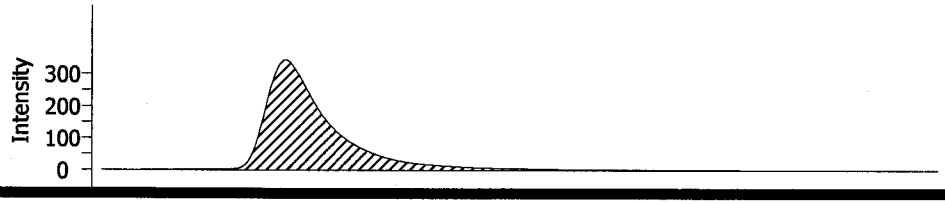
1405452-07

Name	Comments	Mass	Analysis Date
1405452-07	SAMPLE	990.0000	6/10/2014 6:06:40 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.000029927	19344

Carbon High %	Carbon High Area
0.000016858	1939.7

Carbon mg
0.29628✓



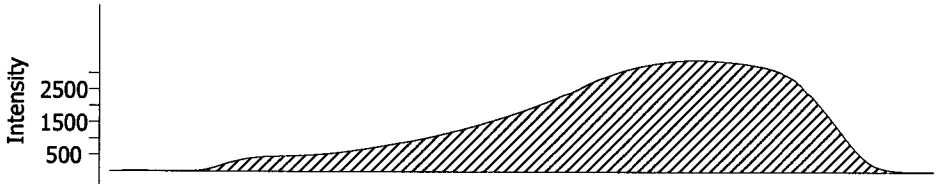
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV2	0.2422	6/10/2014 6:09:18 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	11.995	1947603

Carbon High %	Carbon High Area
12.088	189026

Carbon mg
29.052✓



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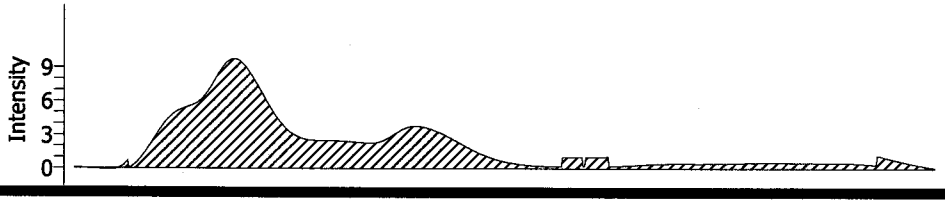
Name	Comments	Mass	Analysis Date
Blank	CCB2	1.0000	6/10/2014 6:10:36 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	0.0025868	1211.5

Carbon High %	Carbon High Area
-0.010964	162.56

Carbon mg
0.025868✓



SC632

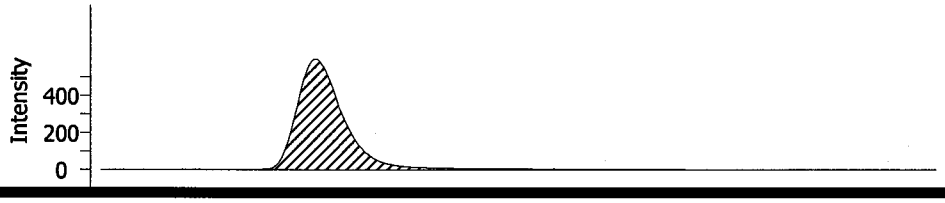
1405452-08

Name	Comments	Mass	Analysis Date
1405452-08	SAMPLE	990.0000	6/10/2014 6:54:11 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	0.000038226	24853

Carbon High %	Carbon High Area
0.000025240	2473.0

Carbon mg
0.37844 ✓



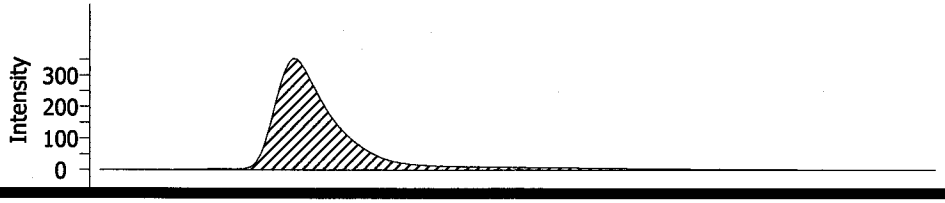
1405452-09

Name	Comments	Mass	Analysis Date
1405452-09	SAMPLE	962.0000	6/10/2014 6:55:29 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1344	0.000031006	19478

Carbon High %	Carbon High Area
0.000017369	1941.0

Carbon mg
0.29828 ✓



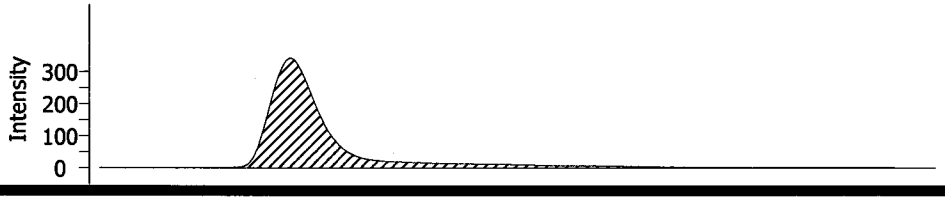
1405452-10

Name	Comments	Mass	Analysis Date
1405452-10	SAMPLE	960.0000	6/10/2014 6:57:01 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1344	0.000029326	18355

Carbon High %	Carbon High Area
0.000017103	1922.4

Carbon mg
0.28153 ✓



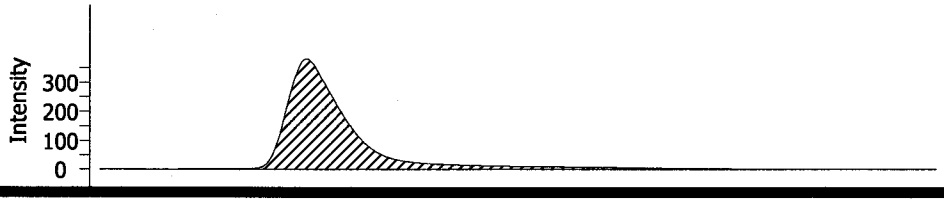
1405452-11

Name	Comments	Mass	Analysis Date
1405452-11	SAMPLE	984.0000	6/10/2014 6:58:44 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1345	0.000032431	20875

Carbon High %	Carbon High Area
0.000019281	2086.5

Carbon mg
0.31912 ✓



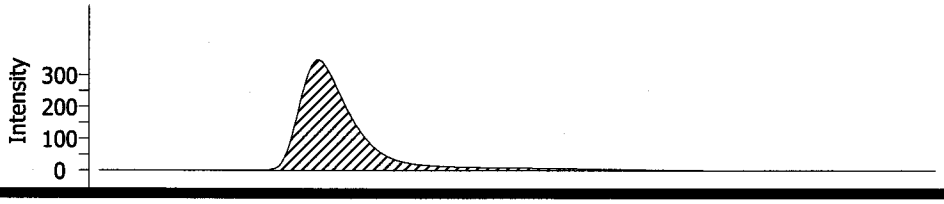
1405452-12

Name	Comments	Mass	Analysis Date
1405452-12	SAMPLE	983.0000	6/10/2014 7:03:02 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.000027120	17353

Carbon High %	Carbon High Area
0.000013942	1748.0

Carbon mg
0.26659 ✓



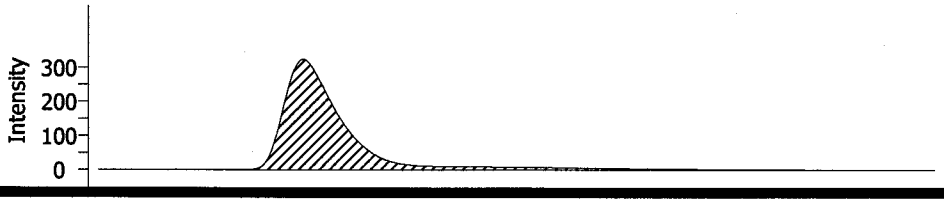
1405452-13

Name	Comments	Mass	Analysis Date
1405452-13	SAMPLE	974.0000	6/10/2014 7:04:23 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.000027029	17130

Carbon High %	Carbon High Area
0.000013479	1710.9

Carbon mg
0.26326 ✓



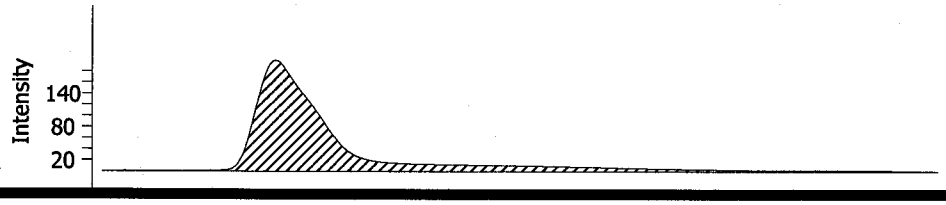
1405452-14

Name	Comments	Mass	Analysis Date
1405452-14	SAMPLE	990.0000	6/10/2014 7:06:28 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	0.000020541	13113

Carbon High %	Carbon High Area
0.0000077431	1359.8

Carbon mg
0.20336 ✓



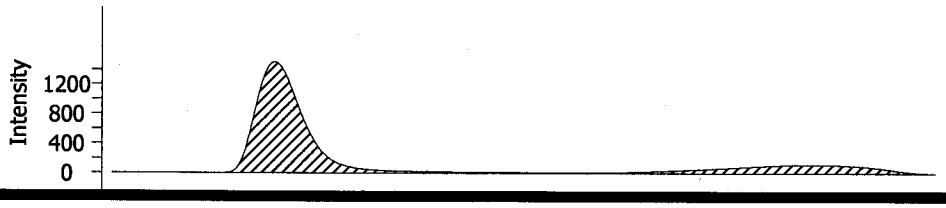
1405452-15

Name	Comments	Mass	Analysis Date
1405452-15	SAMPLE	962.0000	6/10/2014 7:10:12 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.00015784	101296

Carbon High %	Carbon High Area
0.00014657	9929.1

Carbon mg
1.5184 ✓



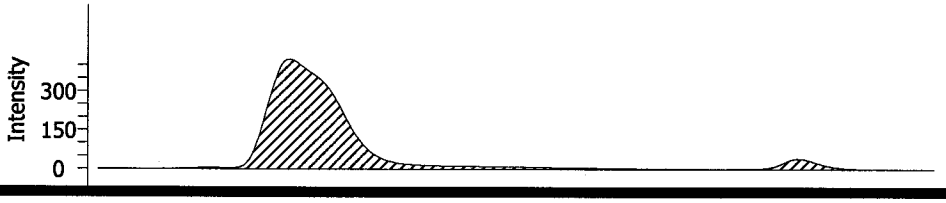
1405452-16

Name	Comments	Mass	Analysis Date
1405452-16	SAMPLE	958.0000	6/10/2014 7:11:31 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000045897	28961

Carbon High %	Carbon High Area
0.000032955	2896.1

Carbon mg
0.43969 ✓



SC632

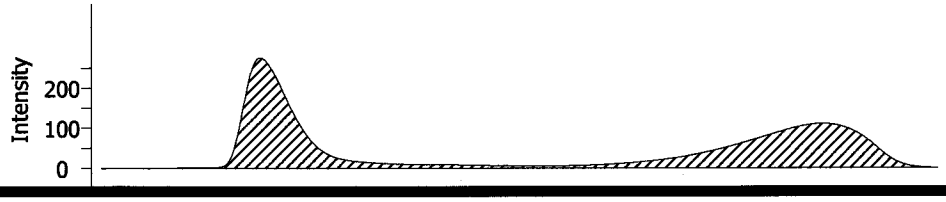
1405452-17

Name	Comments	Mass	Analysis Date
1405452-17	SAMPLE	960.0000	6/10/2014 7:14:35 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1351	0.000054798	34752

Carbon High %	Carbon High Area
0.000041516	3428.6

Carbon mg
0.52606 ✓



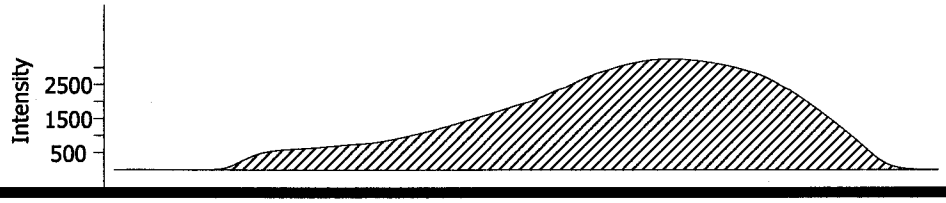
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV3	0.2409	6/10/2014 7:17:36 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1349	12.301	1986563

Carbon High %	Carbon High Area
12.366	192314

Carbon mg
29.633 ✓



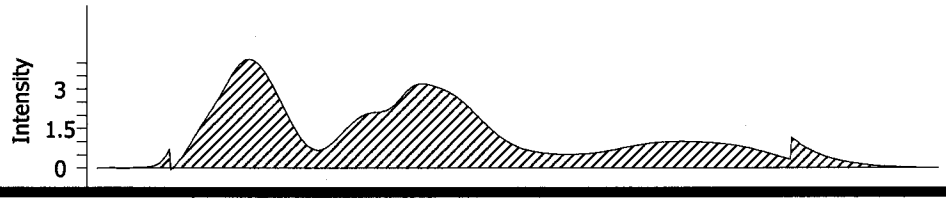
Blank

Name	Comments	Mass	Analysis Date
Blank	CCB3	1.0000	6/10/2014 7:20:09 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	0.0018820	738.89

Carbon High %	Carbon High Area
-0.011734	113.06

Carbon mg
0.018820 ✓



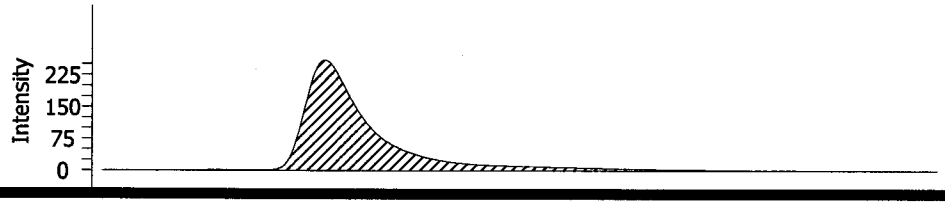
1405452-18

Name	Comments	Mass	Analysis Date
1405452-18	SAMPLE	945.0000	6/10/2014 7:22:14 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	0.000025250	15477

Carbon High %	Carbon High Area
0.000011193	1546.9

Carbon mg
0.23861 ✓



1405452-18

Name	Comments	Mass	Analysis Date
1405452-18	DUP	968.0000	6/10/2014 7:23:48 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	0.0000072930	4210.8

Carbon High %	Carbon High Area
0.0000036105	1091.8

Carbon mg
0.070596 ✓

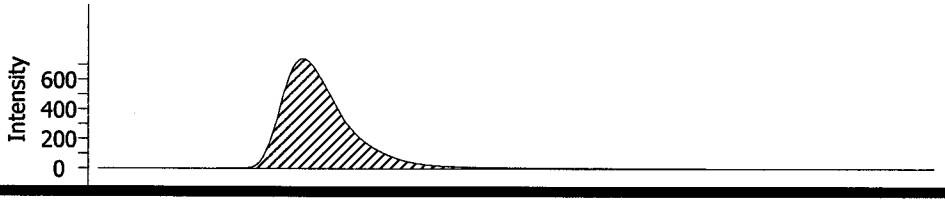
1405452-19

Name	Comments	Mass	Analysis Date
1405452-19	SAMPLE	958.0000	6/10/2014 7:25:30 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	0.000064865	41146

Carbon High %	Carbon High Area
0.000052182	4079.9

Carbon mg
0.62141 ✓



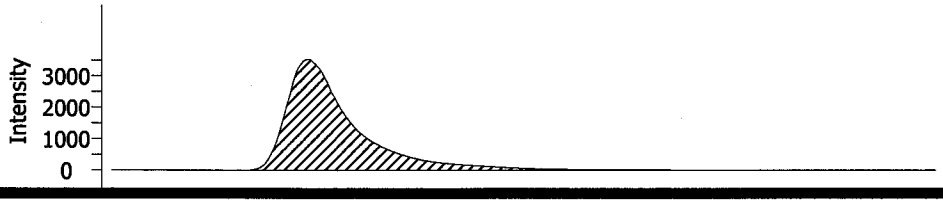
1405452-20

Name	Comments	Mass	Analysis Date
1405452-20	SAMPLE	962.0000	6/10/2014 7:26:55 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	0.00032484	209019

Carbon High %	Carbon High Area
0.00031021	20046

Carbon mg
3.1249



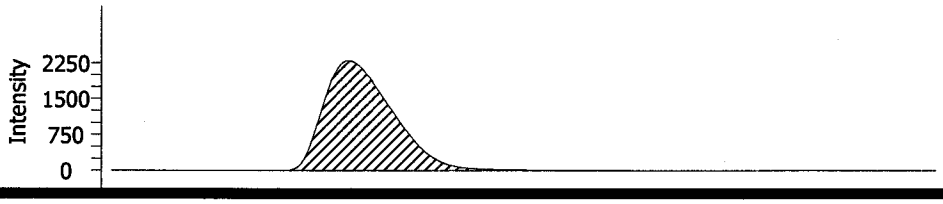
BSD

Name	Comments	Mass	Analysis Date
BSD	BSD1	0.0446	6/10/2014 7:31:13 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1354	105.48	3154010

Carbon High %	Carbon High Area
48.860	140916

Carbon mg
21.792



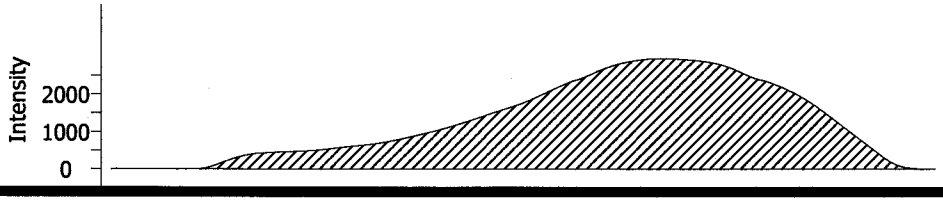
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV4	0.2120	6/10/2014 7:33:57 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	12.071	1715488

Carbon High %	Carbon High Area
12.377	169495

Carbon mg
25.591



SC632

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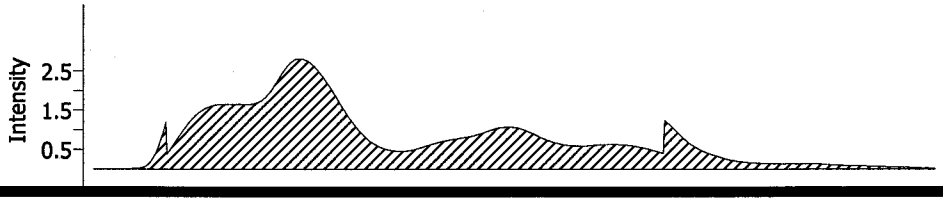
Name	Comments	Mass	Analysis Date
Blank	CCB4	1.0000	6/10/2014 7:36:34 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	0.0014775	467.66

Carbon High %	Carbon High Area
-0.012611	56.673

Carbon mg
0.014775



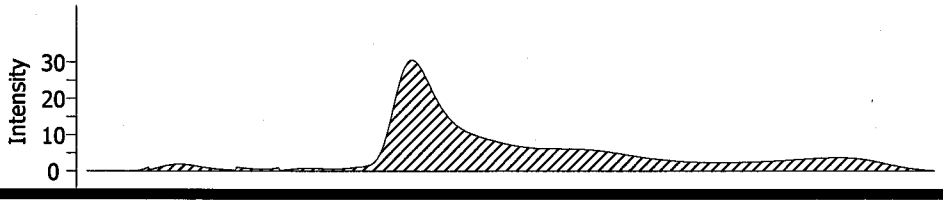
Blank

Name	Comments	Mass	Analysis Date
Blank	BLK2	1.0000	6/10/2014 7:41:15 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	0.0054372	3122.9

Carbon High %	Carbon High Area
-0.0071619	406.90

Carbon mg
0.054372



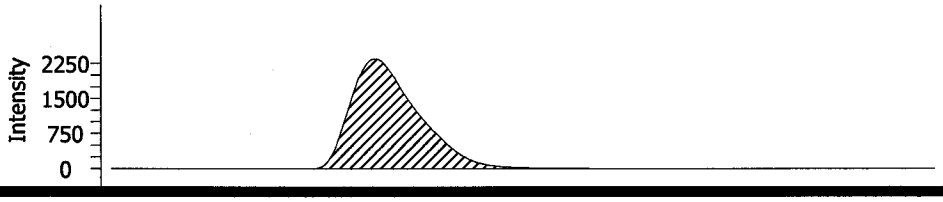
BS

Name	Comments	Mass	Analysis Date
BS	BS2	0.0439	6/10/2014 7:44:59 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	106.56	3136236

Carbon High %	Carbon High Area
49.473	140446

Carbon mg
21.719



SC632

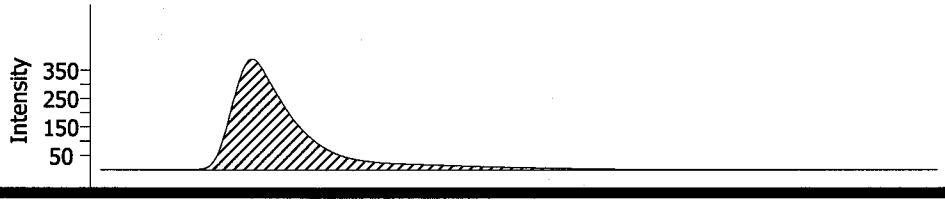
1405452-21

Name	Comments	Mass	Analysis Date
1405452-21	SAMPLE	938.0000	6/10/2014 7:46:45 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000036596	22495

Carbon High %	Carbon High Area
0.000023187	2264.9

Carbon mg
0.34327



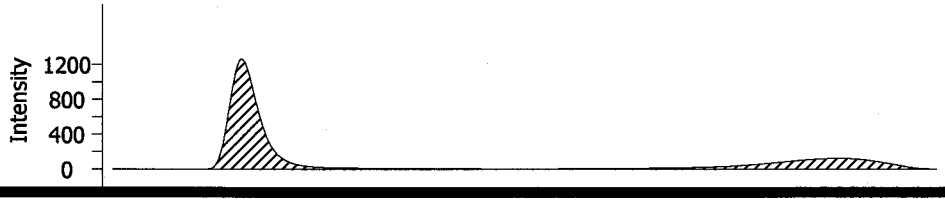
1405452-22

Name	Comments	Mass	Analysis Date
1405452-22	SAMPLE	988.0000	6/10/2014 7:48:42 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.00011167	73462

Carbon High %	Carbon High Area
0.00010175	7328.1

Carbon mg
1.1033



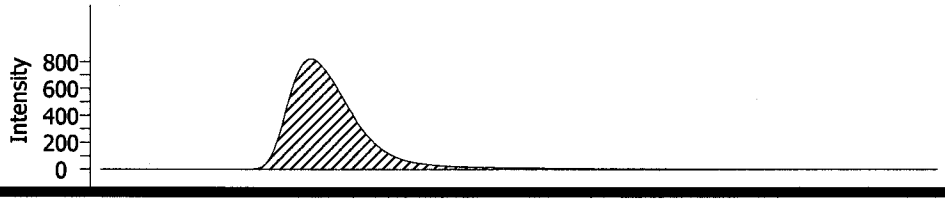
1405452-23

Name	Comments	Mass	Analysis Date
1405452-23	SAMPLE	952.0000	6/10/2014 8:08:37 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1351	0.000075948	47959

Carbon High %	Carbon High Area
0.000065273	4860.7

Carbon mg
0.72302



1405452-23

Name	Comments	Mass	Analysis Date
1405452-23	DUP	972.0000	6/10/2014 8:10:20 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1344	0.000077415	49934

Carbon High %	Carbon High Area
0.000067030	5054.4

Carbon mg
0.75248 ✓

1405452-24

Name	Comments	Mass	Analysis Date
1405452-24	SAMPLE	750.0000	6/10/2014 8:11:56 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1345	0.00024932	124866

Carbon High %	Carbon High Area
0.00023492	12190

Carbon mg
1.8699 ✓

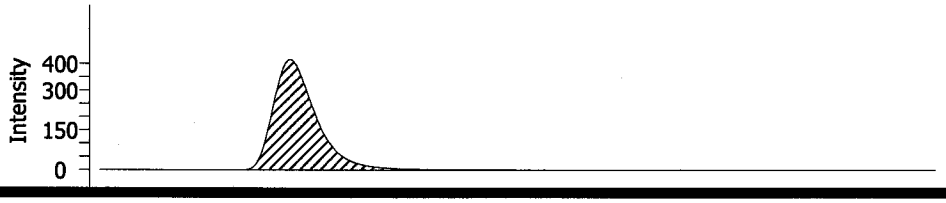
1405452-25

Name	Comments	Mass	Analysis Date
1405452-25	SAMPLE	955.0000	6/10/2014 8:13:46 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.00027142	173288

Carbon High %	Carbon High Area
0.00024208	15725

Carbon mg
2.3119 ✓



SC632

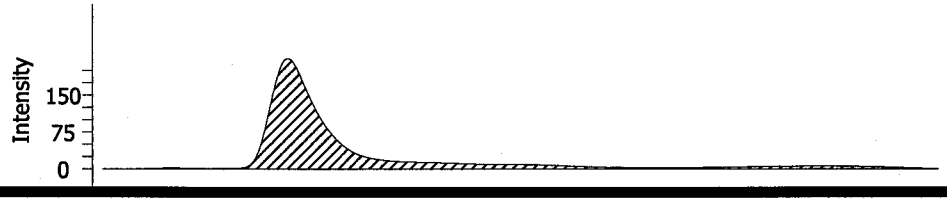
1405452-26

Name	Comments	Mass	Analysis Date
1405452-26	SAMPLE	938.0000	6/10/2014 8:15:21 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000023449	14226

Carbon High %	Carbon High Area
0.0000098981	1463.8

Carbon mg
0.21996✓



1405452-27

Name	Comments	Mass	Analysis Date
1405452-27	SAMPLE	898.0000	6/10/2014 8:17:10 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1346	0.000063186	37525

Carbon High %	Carbon High Area
0.000049262	3710.2

Carbon mg
0.56741✓

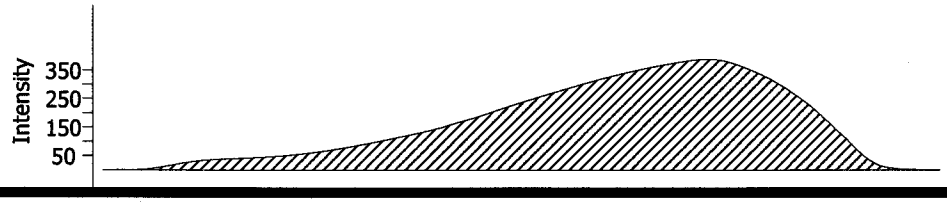
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV5	0.2797	6/10/2014 8:20:37 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1350	12.282	2303009

Carbon High %	Carbon High Area
12.356	222972

Carbon mg
34.560✓



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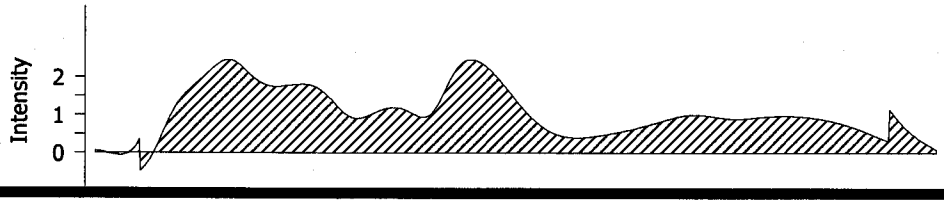
Name	Comments	Mass	Analysis Date
Blank	CCB5	1.0000	6/10/2014 8:21:59 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.0017765	668.16

Carbon High %	Carbon High Area
-0.011678	116.63

Carbon mg
0.017765



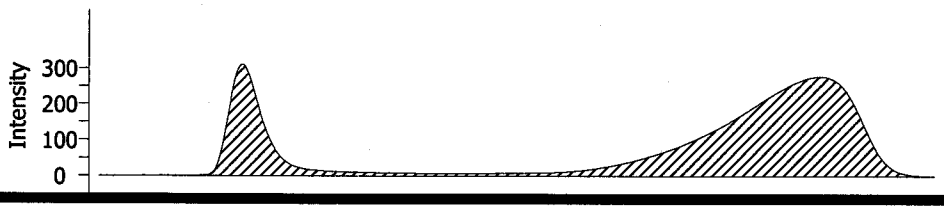
1405452-28

Name	Comments	Mass	Analysis Date
1405452-28	SAMPLE	938.0000	6/10/2014 8:27:09 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1353	0.000098984	61736

Carbon High %	Carbon High Area
0.000086136	6059.7

Carbon mg
0.92847



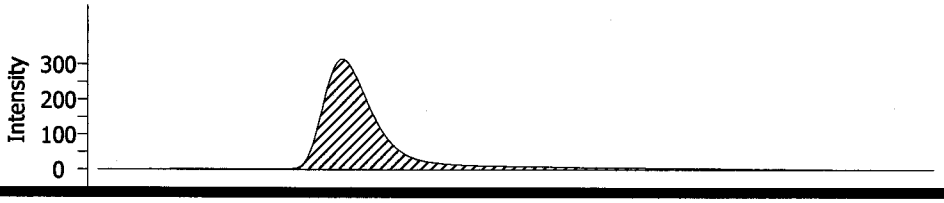
1405452-29

Name	Comments	Mass	Analysis Date
1405452-29	SAMPLE	982.0000	6/10/2014 8:30:22 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.000025272	16118

Carbon High %	Carbon High Area
0.000012015	1625.4

Carbon mg
0.24817



SC632

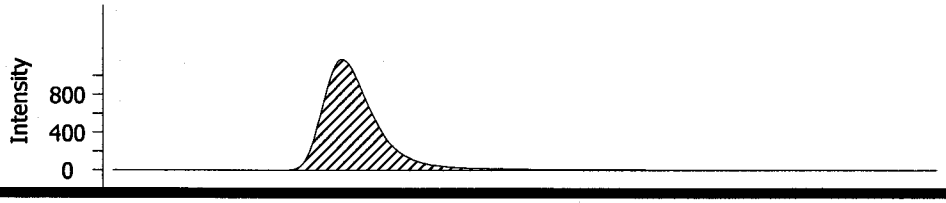
1405452-28

Name	Comments	Mass	Analysis Date
1405452-28	DUP	904.0000	6/10/2014 8:32:00 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000093800	56337

Carbon High %	Carbon High Area
0.000081778	5618.2

Carbon mg
0.84795



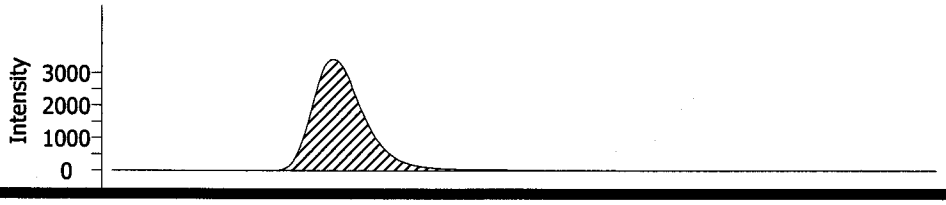
1405452-30

Name	Comments	Mass	Analysis Date
1405452-30	SAMPLE	750.0000	6/10/2014 8:34:16 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1349	0.00031864	159728

Carbon High %	Carbon High Area
0.00029976	15316

Carbon mg
2.3898



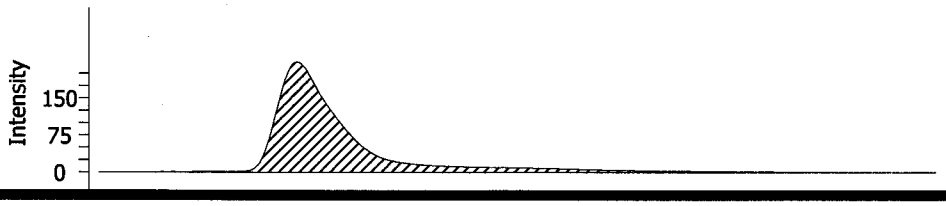
1405452-31

Name	Comments	Mass	Analysis Date
1405452-31	SAMPLE	962.0000	6/10/2014 8:36:53 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1351	0.000021404	13284

Carbon High %	Carbon High Area
0.0000078651	1353.4

Carbon mg
0.20590



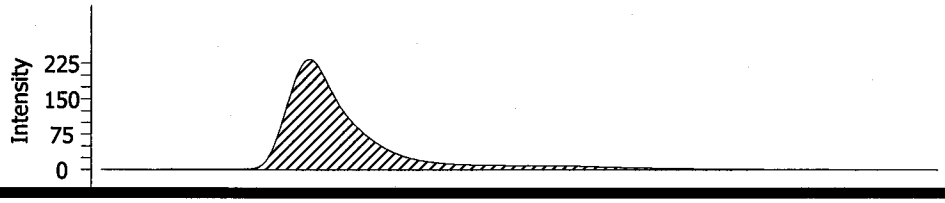
1405452-32

Name	Comments	Mass	Analysis Date
1405452-32	SAMPLE	898.0000	6/10/2014 8:38:32 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1347	0.000024854	14443

Carbon High %	Carbon High Area
0.000010292	1461.1

Carbon mg
0.22319 ✓



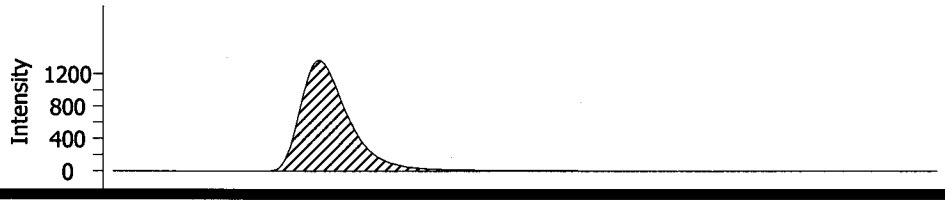
1405452-33

Name	Comments	Mass	Analysis Date
1405452-33	SAMPLE	940.0000	6/10/2014 8:41:23 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.000095774	59845

Carbon High %	Carbon High Area
0.000084085	5946.8

Carbon mg
0.90027 ✓



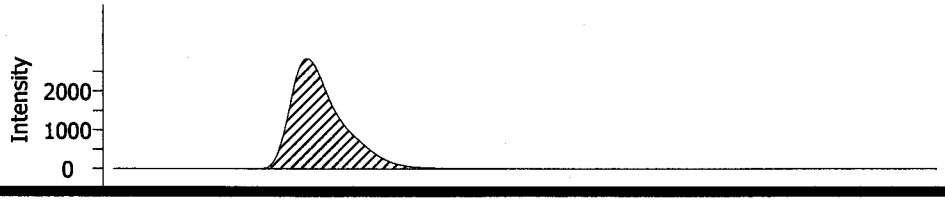
BSD

Name	Comments	Mass	Analysis Date
BSD	BSD2	0.0475	6/10/2014 8:42:57 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1348	116.79	3719444

Carbon High %	Carbon High Area
48.840	149960

Carbon mg
23.199 ✓



SC632

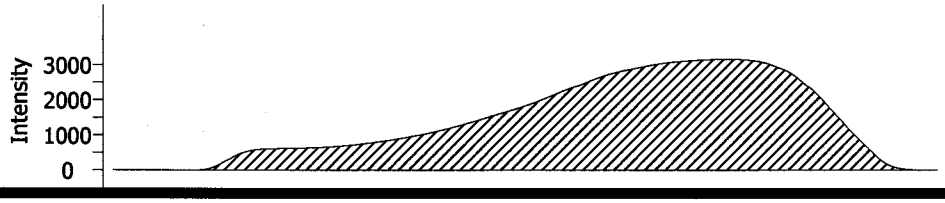
CaCO3-1040

Name	Comments	Mass	Analysis Date
CaCO3-1040	CCV6	0.2394	6/10/2014 8:46:01 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1349	12.348	1981687

Carbon High %	Carbon High Area
12.432	192138

Carbon mg
29.561



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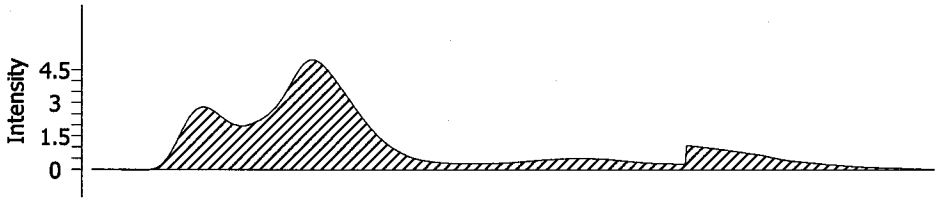
Name	Comments	Mass	Analysis Date
Blank	CCB6	1.0000	6/10/2014 8:47:20 PM

Method	Furnace Temperature	Carbon Low %	Carbon Low Area
TOC	1352	0.0017240	632.95

Carbon High %	Carbon High Area
-0.012248	80.033

Carbon mg
0.017240



Eastern Research Group
Burns Harbor

END OF REPORT

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