

Black Warrior RIVERKEEPER®  
712 37<sup>th</sup> Street South  
Birmingham, AL 35222  
Phone: (205) 458-0095  
Fax: (205) 458-0094  
[cscibner@blackwarriorriver.org](mailto:cscibner@blackwarriorriver.org)  
[www.BlackWarriorRiver.org](http://www.BlackWarriorRiver.org)



October 29, 2020

Russell Kelly, Chief  
Permits and Services Division  
Alabama Department of Environmental Management  
P. O. Box 301463  
Montgomery, AL 36130-1463

Re: **Comments on Draft Coal Combustion Residuals (CCR) Closure Permit No. 32-03 for Alabama Power Company's Plant Greene County Ash Pond**

Dear Mr. Kelly:

Black Warrior Riverkeeper, the Southern Environmental Law Center and the Alabama Rivers Alliance ("Conservation Groups") respectfully submit the following comments concerning the draft Coal Combustion Residual ("CCR") Facility Permit for Alabama Power Company's ("Alabama Power" or "Company") Greene County Electric Generating Plant, Permit Number 32-03 ("Draft Permit").

Black Warrior Riverkeeper is a nonprofit membership corporation with over 6,000 members that is dedicated to the protection and restoration of the Black Warrior River and its tributaries. Riverkeeper's members rely on good quality water in the Black Warrior River for fishing, swimming, hunting, and boating. The Southern Environmental Law Center is a nonprofit, regional environmental organization dedicated to protecting natural resources, preserving special places, and promoting vibrant communities throughout the Southeast. Alabama Rivers Alliance is a statewide network of groups working to protect and restore all of Alabama's water resources through building partnerships, empowering citizens, and advocating for sound water policy and its enforcement.

The proposed permit would authorize the permanent closure of the Plant Greene County Ash Pond, a CCR surface impoundment located on the banks of the Black Warrior River in Greene County, Alabama. These comments are in addition to and supplement summary comments made by Conservation Groups at ADEM's public hearing on this matter on October 22, 2020. We appreciate the opportunity to submit these comments.

## ***I. Introduction***

On October 27, 2020, the Conservation Groups filed detailed comments opposing the inadequate draft closure plan that Alabama Power submitted for Plant Miller. Although the size of the ash ponds and the topography and geology surrounding these two sites may differ, many of the same inadequacies

that the Conservation Groups identified in Plant Miller's draft closure plan are also present in Plant Greene County's. Rather than repeat these comments in their entirety, the Conservation Groups incorporate the Miller comments by reference.

At Plant Greene County, the Draft Permit and Closure Plans illegally permit coal ash to be permanently saturated in groundwater. The capped ash pond proposed by the Draft Permit and Closure Plans will not be five (5) feet above the uppermost aquifer. There is no determination in the documents of the true extent of the contamination currently at the site or the nature and extent of the contamination plum emanating from the ash pond. Alabama Power has offered no plan to remediate contamination that has already migrated off-site. These same problems plague the Miller Ash Pond Closure Plans and Draft Permit. This is, in part, because Alabama Power is offering the same cap in place solution, with slight modifications, at all of its coal ash sites. Solid waste disposal facilities were never meant to be sited in unlined pits next to rivers, and permitting them in these locations creates the same suite of pollution problems.

Alabama Power's closure plan contains the following specific deficiencies which must be addressed by ADEM before the Department may issue a final permit for its ash pond. These deficiencies include, but may not be limited to:

- 1) the Draft Permit and Closure Plans as written, do not require the ash pond to come into compliance with federal and state CCR rules;
- 2) the Draft Permit and Closure Plans allow the continued location of the ash pond in area where it cannot be permitted by law;
- 3) the Draft Permit and Closure Plans should require and include more information about the extent of contamination from the ash pond;
- 4) the Draft Permit and Closure Plans do not consider contamination that has migrated off-site, or the remediation of that contamination;
- 5) the Draft Permit and Closure Plans do not consider the long-term maintenance of an artificial cap;
- 6) the Draft Permit and Closure Plans do not consider responsibility for this facility after the 30 year post closure care period;
- 7) the Draft Permit and Closure Plans lack key modeling information;
- 8) ADEM unnecessarily grants Alabama Power a variance from including boron as an Appendix IV monitoring parameter;
- 9) neither ADEM nor Alabama Power provides any information about alternative closure methods; therefore, the public is limited in its knowledge about closure techniques that would be more protective of human health and the environment.

Due to these concerns, and possibly others, ADEM should not issue the draft permit nor approve the closure plan as written. Both the permit and the closure plan would allow the ash pond to continue polluting surrounding ground and surface waters for decades, or even centuries, in violation of state and federal law. There is no possible way that ADEM would permit a facility in this location today, and

Alabama Power has not provided adequate evidence of why they must leave their coal ash in place. The closure of the Plant Greene County's ash pond requires a permanent solution, and this solution is not it.

## ***II. Legal Background***

In 2015, the Environmental Protection Agency ("EPA") published a rule to regulate CCR as a non-hazardous waste under the Resource Conservation and Recovery Act subtitle D.<sup>1</sup> The rulemaking established national minimum operating and monitoring requirements for the management and disposal of CCR ("2015 federal CCR Rules").<sup>2</sup> The rules were instituted to protect human health and the environment from CCR, which is known to leach into groundwater and surface water, particularly at unlined or inadequately lined surface impoundments.<sup>3</sup> The rulemaking noted that "constituents of most environmental concern in CCR are metals, such as antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver and thallium," and many of those pollutants are highly toxic to humans and the environment.<sup>4</sup> EPA further noted that CCR from coal-fired electric power plants constitute "one of the largest industrial waste streams in the United States," at 110 million tons produced in 2012.<sup>5</sup>

In 2016, Congress passed the Water Infrastructure Improvements for the Nation Act ("WIIN Act"), amending RCRA to authorize EPA to approve state CCR permitting programs and to establish a federal CCR permitting program for states without approved permitting programs.<sup>6</sup> Accordingly, after the WIIN Act, states had the option to develop their own programs to permit CCR facilities, as long as the programs were "at least as protective" as federal criteria, but states were not required to develop and submit a CCR permit program to EPA.<sup>7</sup>

In 2018, ADEM adopted a state CCR permitting program pursuant to the WIIN Act and the 2015 federal CCR rules.<sup>8</sup> ADEM's CCR permitting program and regulations were considerably weaker than the federal regulations and included numerous "flexibilities" and variances from the requirements of the 2015 federal CCR rules.<sup>9</sup> These "flexibilities" were based on EPA guidance from 2017, but those

---

<sup>1</sup> EPA, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 80 Fed. Reg. 21,302 (Apr. 17, 2015) (codified as 40 C.F.R. Part 257) [hereinafter "2015 Rule"].

<sup>2</sup> *Id.*

<sup>3</sup> *Id.* at 21,311.

<sup>4</sup> *Id.*

<sup>5</sup> *Id.* at 21,303.

<sup>6</sup> Pub. L. No. 114-322, 130 Stat. 1628 (2016) (codified at 42 U.S.C. § 6945(d)).

<sup>7</sup> *Id.*

<sup>8</sup> ADEM, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, ADEM Administrative Code 335-13-15 (Apr. 24, 2018) (codified as Ala. Admin. Code § 335-13-15).

<sup>9</sup> SELC, Comment Letter, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, ADEM Administrative Code 335-13-15 (Mar. 21, 2018).

"flexibilities" were never adopted in whole by EPA.<sup>10</sup> Against arguments by the Conservation Groups, the state Environmental Management Commission ("EMC") approved the state CCR program in 2018.<sup>11</sup>

In addition, federal courts have also weighed in, finding that EPA acted arbitrarily and capriciously in enacting the 2015 federal CCR rules in that some provisions were not protective enough of human health and the environment under RCRA, based on EPA's scientific analyses underlying the 2015 rules.<sup>12</sup> Furthermore, EPA has tried to rollback certain provisions of the 2015 CCR federal rules.<sup>13</sup>

The result of these various changes to the federal rules, and through legal challenges, is that ADEM has had to go back to the drawing board and amend the state CCR permitting program on numerous occasions. Mostly recently, ADEM proposed revisions to the state CCR regulations in March of 2020.<sup>14</sup> If ADEM simply drafted a state permitting program as least as protective of human health and the environment as the 2015 federal CCR Rules, with adequate protections based on recent court rulings, the multiple revisions of the state permitting program could possibly have been avoided. If ADEM required more protections than the 2015 federal CCR Rules, then these revisions would have been avoided. Yet, ADEM did not choose that route.

The bottom line is that no version of ADEM's state CCR permitting program has been approved by EPA, and ADEM's latest changes to the state CCR program have not yet been adopted by the state EMC. Therefore, the state is still operating under a CCR permitting program that has not been approved by EPA. Utilities in Alabama with these coal ash facilities slated for closure must simultaneously comply with both the state permitting program and the 2015 federal CCR rules.

### ***III. Plant Greene County and the Ash Pond***

Originally constructed between 1960 and 1965, the ash pond at Plant Greene County currently occupies approximately 489 acres on the banks of the Black Warrior River near Forkland, Alabama.<sup>15 16</sup>

---

<sup>10</sup> EPA, Release of Interim Final Guidance for State Coal Combustion Residuals Permit Programs; Comment Request, 82 Fed. Reg. 38,685 (Aug. 15, 2017).

<sup>11</sup> ADEM, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments, ADEM Administrative Code 335-13-15 (Apr. 24, 2018) (codified as Ala. Admin. Code § 335-13-15).

<sup>12</sup> *Util. Solid Waste Activities Grp. v. EPA*, 901F.3d414 (D.C. Cir. 2018) (*USWAG*).

<sup>13</sup> 14 *E.g.* "Phase One, Part One" of these rollbacks adopted alternative performance standards for CCR unit operators, revised groundwater protection standards for four constituents for which no Maximum Contaminant Level is established, and extended the deadline by which operators must stop adding waste to polluting units EPA, Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One), 83 Fed. Reg. 36435 (July 30, 2018) (codified as 40 C.F.R. Part 257).

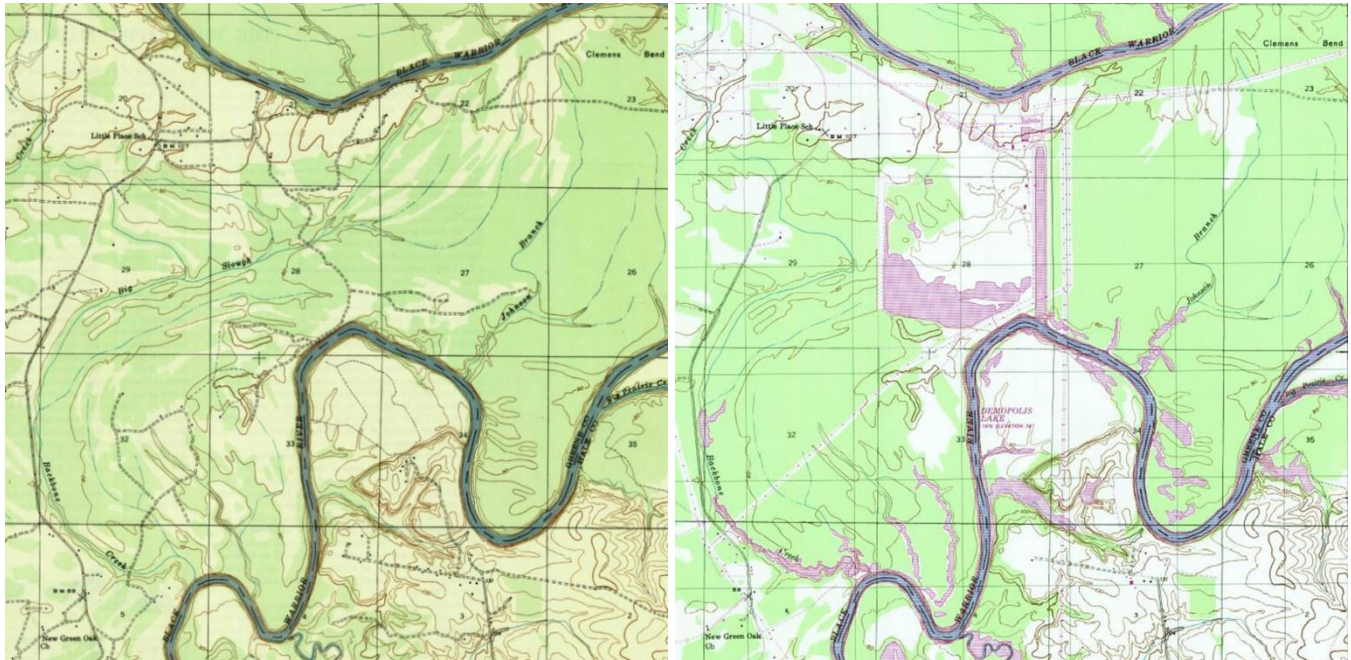
<sup>14</sup> ADEM, Notice of Public Hearing for Proposed Revisions to the Solid Waste Program Division 335-13, ADEM Administrative Code (Mar. 22, 2020) (due to the COVID-19 pandemic, ADEM allowed an extension of comments to these revisions until Nov. 5, 2020).

<sup>15</sup> Alabama Power Company. History of Construction. at 1-2 (Appendix 4 of Draft Permit) [hereinafter "History of Construction"]; Alabama Power Company, Amended Closure Plan for Ash Pond, at 1, 3 (Apr. 2020) (Appendix 9 of Draft Permit) [hereinafter "Amended Closure Plan"].

<sup>16</sup> Alabama Power Company. Amended Closure Plan for Ash Pond. Appendix 9 of the permit.



Alabama Power's documents erroneously state that its ash pond was constructed on top of wetlands in the South Needham Creek and Coleman Branch watersheds.<sup>17</sup> According to USGS topographic maps, the ash pond was built across Big Slough, and associated streams and wetlands, which flows into Backbone Creek, a tributary of the Black Warrior River.



1947 USGS Topographic Map | Big Slough | Backbone Creek | Black Warrior River | 1979 USGS Topographic Map



Wetlands | Backbone Creek | Black Warrior River | USGS Topographic Map | 2018

A stream named Big Slough was essentially cut in half by the construction of Plant Greene County, its coal ash pond, and its barge canal in the mid-1960s. Big Slough and surrounding wetlands throughout

<sup>17</sup> *Id.*

the middle of this large river bend were buried beneath and contaminated by toxic coal ash. Big Slough continues to flow from the West side of the coal ash pond to the southwest into Backbone Creek, which flows into the Black Warrior downriver. The coal ash pond is surrounded by a large earthen dike that contains over fifty years-worth of toxic coal ash waste, now estimated to be 10.3 million tons.



Plant Greene County's Toxic Coal Ash Pond on the lower Black Warrior River | L-2016, R-2019 | Flights by [SouthWings.org](https://SouthWings.org)

The Black Warrior River receives millions of gallons of Alabama Power's coal ash polluted water each day through a wastewater discharge permitted via their ADEM issued National Pollutant Discharge Elimination System permit AL0002917, which does not include necessary upgrades that comport with current science on river and health protections. Alabama Power's NPDES permit was re-issued on March 29, 2019 and will expire on March 31, 2024.



Alabama Power's coal ash NPDES wastewater discharge into the Black Warrior River





May 2014 | Orange/red seeps contaminated with coal ash flowing from ash pond dike along eastern barge canal | Dec. 14



July 2016 | Orange seeps contaminated with coal ash flowing from ash pond dike along eastern barge canal



December 2018 | Orange seeps contaminated with coal ash flowing from ash pond dike along eastern barge canal





May 2019 | Seep flowing from South ash pond dike



Wastewater pumping and treatment plant for dewatering ash pond

Capping coal ash in place at Plant Greene County will not erase the very real connection that exists between Alabama Power’s toxic coal ash, Big Slough buried underneath it, the wetlands and floodplain in was plopped in the middle of, and the groundwater it is sitting in. All of this water is flowing and moving constantly, creating an ongoing pathway for continued contamination of groundwater throughout the area, local streams, wetlands, and the lower Black Warrior River.

Alabama Power stopped burning coal at Plant Greene County in March of 2016 after converting all of its electric production to natural gas, meaning that the plant is no longer generating new coal ash.<sup>18</sup> However, at last inspection, the ash pond was filled to capacity, containing over 10,300,000 cubic yards of coal ash.<sup>19</sup> Constructed over fifty years ago, the coal ash pond at Plant Greene County fails to meet the specifications required under current regulations for the disposal of coal ash. For instance, the ash pond was constructed without any bottom liner, leaving the coal ash and its toxic constituents to leach into surrounding wetlands, streams, and groundwater, the average level of which is less than 5 feet below the pond.<sup>20 21</sup> In fact, documents included with the permit indicate that coal ash currently resides, and will continue to reside after closure, within the water table. These factors are among the primary reasons that closure of the facility is required.<sup>22</sup>

Alabama Power plans to use the cap-in-place closure method for the Plant Greene County ash pond. The Company plans to remove and treat the water in the pond (a process known as “dewatering”),

<sup>18</sup> Roberson, Anna Catherine (2016). Alabama News Center. *Federal mandates drive Greene County plant’s move from coal to gas*. <https://alabamaneewscenter.com/2016/09/13/federal-mandates-drive-greene-county-plants-move-from-coal-to-gas/>

<sup>19</sup> Alabama Power Company. Report of Annual Inspection. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/operating-criteria/Report%20of%20Annual%20Inspection%202019%20-%20Ash%20Pond.pdf>

<sup>20</sup> Alabama Power Company. Liner Design Criteria. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/design-criteria/Liner%20Design%20Criteria%20-%20Ash%20Pond.pdf>

<sup>21</sup> Alabama Power Company. Location Restriction Demonstration. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/location-restriction-demonstration/Location%20Restriction%20Demonstration%20-%20Plant%20Greene%20County%20Ash%20Pond.pdf>

<sup>22</sup> See, 40 CFR § 257.60; Southern Company Services, 2020. 2019 Annual Groundwater Monitoring and Corrective Action Report Alabama Power Company Plant Greene County Ash Pond

consolidate the waste ash to a final footprint of approximately 250 acres, and then cover the ash with an impermeable liner and a system of channels and ditches for stormwater control.<sup>23</sup> Alabama Power began the first step of dewatering the pond on or about April 8, 2019 with final closure of the pond expected in late 2025.<sup>24 25 26</sup> That dewatering process had to be stopped almost immediately because of the toxicity of the wastewater Alabama Power was discharging from the ash pond.<sup>27</sup> ADEM issued a Notice of Violation to the Company December 19, 2019 for multiple toxicity test failures.

Even after final pond closure, the remaining ash will continue to be located in close proximity to the underlying aquifer and the bottom of the ash will be stored within the groundwater table. Alabama Power's Assessment of Corrective Measures (ACM) for Plant Greene County was filed with ADEM on July 11, 2019.

In that document, the Company proposes to address the groundwater contamination by a process known as "monitored natural attenuation ("MNA"), and plans to "reduce the source contribution to groundwater" and "enhance subsurface hydraulics for other treatments" by constructing a vertical barrier wall that will extend into the "low permeability Demopolis Chalk" below the pond.<sup>28</sup> The selected remedy of monitored natural attenuation here means that the Company will continue to monitor groundwater while allowing natural chemical and physical processes in the subsurface environment to remove, dilute, or immobilize the contaminants.<sup>29</sup> In other words, Alabama Power will do little to treat the present or future groundwater contamination on site or in the surrounding environment, other than adopt a wait-and-see attitude with possible (not guaranteed) future actions. While the ACM contemplates several other potentially viable corrective measures, the Company has not committed to employing these measures, asserting that one or more of these technologies may be used as adaptive site management as a supplement to the selected remedy, if necessary.

EPA guidance (2015) recommends a four-tiered approach should be used to establish whether MNA can be successfully implemented at a given site. ACM at 11. The first step is to demonstrate that the extent of groundwater impacts is stable, *id.*, which the Company has failed to do. Second, Alabama Power should determine the mechanisms and rates of attenuation, *id.*, which the Company has failed to do. Third, Alabama Power should determine if the capacity of the aquifer is sufficient to attenuate the mass of constituents in groundwater and that the immobilized constituents are stable, *id.* The Company has failed to consider this step. The fourth and final step is for Alabama Power to design a performance monitoring program based on the mechanisms of attenuation and establish contingency remedies

---

<sup>23</sup> Alabama Power Company. Amended Closure Plan for Ash Pond. Appendix 9 of the permit.

<sup>24</sup> Letter from Alabama Power to Alabama Department of Environmental Management *Re: Commencement of Dewatering Activities* (Apr. 5, 2019).

<sup>25</sup> According to the Alabama Department of Environmental Management's "eFile" system, APCO had multiple toxicity test failures in June and September 2019 at Greene and had to suspend dewatering through the end of 2019. ADEM issued a Notice of Violation to APCO for the toxicity failures. <http://app.adem.alabama.gov/eFile/>.

<sup>26</sup> Alabama Power Company. Amended Closure Plan for Ash Pond. Appendix 9 of the permit.

<sup>27</sup> September 24, 2019 Letter from Alabama Power to ADEM.

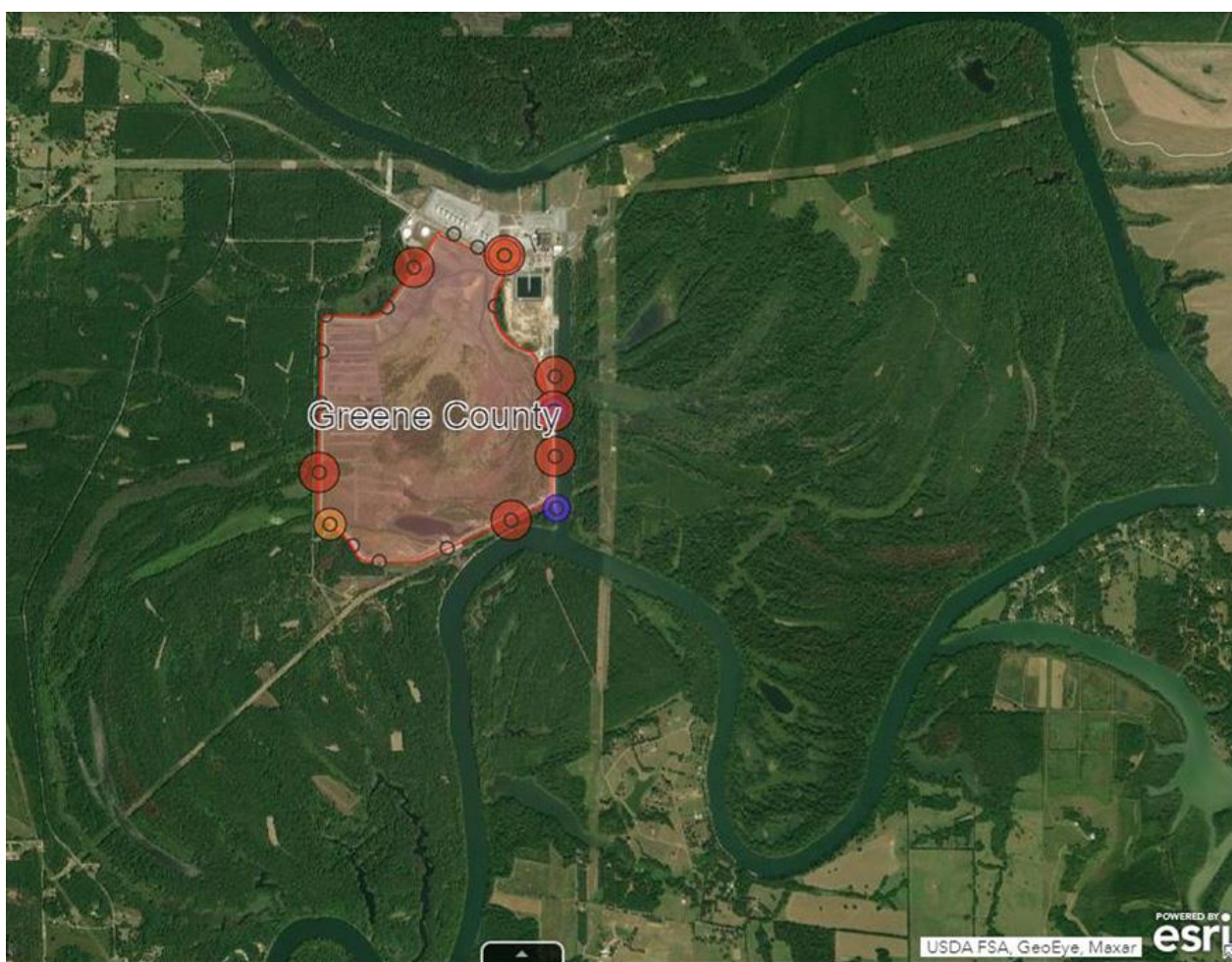
<sup>28</sup> Alabama Power Company. Assessment of Corrective Measures Greene County Ash Pond. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/groundwater-monitoring-and-corrective-action/Assessment%20of%20Corrective%20Measures%20Greene%20County%20Ash%20Pond.pdf>

<sup>29</sup> *Id.*



(tailored to site-specific conditions) should MNA not perform adequately. The Company has failed to do so.

Alabama Power has yet to demonstrate how monitored natural attenuation will work, evaluate whether it is a feasible remedy based upon site specific conditions at Plant Greene County, or even analyze whether the aquifer has sufficient capacity to absorb all the toxic coal ash pollution.<sup>30</sup> Even without these assurances, the Assessment of Corrective Measures notes that the process of MNA could take *two decades* or more after final closure to allow contaminants to bleed out of the source and move through the groundwater into the environment so that the groundwater monitoring will begin to measure levels that meet groundwater protection standards, meaning that it may be 2045 or later until the coal ash contaminants have moved out of the measured groundwater sites into the surrounding environment, assuming MNA “works.”



Satellite Imagery of Plant Greene Co. Ash pond | red spots depict arsenic groundwater violations | [AlabamaCoalAsh.org](http://AlabamaCoalAsh.org)

Plant Greene County is located within a large bend of the lower Black Warrior River in a wetland complex in the river’s floodplain. Review of aerial imagery of the area surrounding Ash Pond reveals surface features indicative of a meandering, dynamic river system. The Greene County Ash Pond was built in a floodplain, surrounded by the Black Warrior River on three sides, on top of streams and

<sup>30</sup> See November 14, 2019 Letter from ADEM’s Heather M. Jones to APCO’s Dustin Brooks at 7

wetlands, and dug below the groundwater table. In addition, there is a dredged barge canal on the east side of the Ash Pond. A dynamic river floodplain is too hydrologically connected and active to be an appropriate location for a permanent toxic waste storage facility. This Ash Pond, whether capped or not, will always be subject to the natural river processes that will eventually erode through it, and the surface morphology shows that these river processes are recently active throughout the region.

Under current conditions coal ash-contaminated groundwater is flowing radially (in all directions) away from the ash impoundment. The extent of ash contamination of groundwater in all directions away from the impoundment has not been determined. The extent of contaminant plumes migrating downgradient with groundwater flow has not been reported. No modeling has been reported that evaluates the impact of the draft. An assessment of the extent of the contamination and appropriate modeling must drive the closure plan and be incorporated into the permit.

The draft permit does call for constructing new CCR containment berms inside existing berms. A vertical barrier wall structure, a bentonite “slurry” wall keyed into the Demopolis Chalk that underlies the site, would be constructed beneath the new CCR berms. Contaminated groundwater will still be present outside of the perimeter of the bentonite slurry wall once the closure of the Ash Pond is completed. Potential impacts associated with this residual contaminated groundwater should be evaluated, and measures should be implemented to address this contamination.

A synthetic “Closure Turf” cap would cover the consolidated coal ash waste. Even if construction of the subsurface wall around the entire perimeter of the consolidated waste area is successful, there will continue to be some movement of water into and out of the impoundment. In this kind of environment, nothing is truly “impermeable” and contamination will surely continue. No modeling of the closed facility has been reported that evaluates the volume of water that can be expected to infiltrate into the covered CCR waste by lateral inflow, infiltration through the cap, and upward flow from underlying materials.

According to EPA’s environmental justice mapping and screening tool, the areas around Plant Greene County have three environmental justice indexes above the 80<sup>th</sup> percentile.<sup>31</sup> These indexes measure the environmental burden upon the surrounding community; the higher the index score, the greater the burden on the local community. Plant Greene County’s score for wastewater discharge concerns is 90.4.

#### ***IV. Ground and Surface Water Pollution***

Alabama Power’s construction of the Plant Greene County Ash Pond in streams, wetlands, and associated groundwater has polluted and continues to pollute groundwater below and around the pond. Alabama Power’s own testing demonstrates that the groundwater is contaminated with arsenic, cobalt, and lithium concentrations that exceed levels deemed safe by EPA.<sup>32</sup> In fact, arsenic levels in

---

<sup>31</sup> (<https://echo.epa.gov/detailed-facility-report?fid=110000608398>).

<sup>32</sup> Alabama Power Company. Notice of Groundwater Protection Standard Exceedance.

<https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/groundwater-monitoring-and-corrective-action/2019%201st%20Semi-Annual%20GWPS%20Exceedance%20Notification%20-%20Plant%20Greene%20County%20Ash%20Pond.pdf>

groundwater at Plant Greene County have been measured at up to 75 times greater than the safe level determined by EPA.<sup>33</sup> The table below details Alabama Power's groundwater violations around the ash pond.

<b>Plant Greene County Groundwater Protection Standards Exceedances</b>					
<b>Annual 2018</b>	<b>Well Number</b>	<b>Analyte</b>	<b>GWPS</b>	<b>Result</b>	<b>Percent Above GWPS</b>
1st Semi-Annual (June)	MW-1	Arsenic	0.006	0.0189	315%
	MW-5	Arsenic	0.006	0.432	7200%
	MW-10	Arsenic	0.006	0.0152	253%
	MW-14	Arsenic	0.006	0.0289	482%
	MW-15	Lithium	0.04	0.547	1368%
	MW-16	Arsenic	0.006	0.0701	1168%
	MW-17	Arsenic	0.006	0.299	4983%
		Lithium	0.04	0.583	1458%
	MW-18	Arsenic	0.006	0.0509	848%
2nd Semi-Annual (November)	MW-1	Arsenic	0.006	0.0195	325%
		Cobalt	0.006	0.0758	1263%
	MW-5	Arsenic	0.006	0.454	7567%
	MW-10	Arsenic	0.006	0.0233	388%
	MW-11	Cobalt	0.006	0.036	600%
	MW-14	Arsenic	0.006	0.0372	620%
	MW-15	Lithium	0.04	0.492	1230%
	MW-16	Arsenic	0.006	0.0648	1080%
	MW-17	Arsenic	0.006	0.382	6367%
		Lithium	0.04	0.531	1328%
	MW-18	Arsenic	0.006	0.0661	1102%

In addition to the significant exceedances of groundwater protection standards highlighted in the table above, the existing groundwater monitoring system has also detected statistically significant increases in ash-related contaminants, including boron, calcium, chloride, TDS and pH in wells located downgradient of the ash pond.<sup>34</sup> These exceedances were observed around the entire perimeter of the Ash Pond and through the full depth of monitoring. Data from Alabama Power's groundwater monitoring in 2019, also showing pervasive contamination, is summarized in the table below.

<sup>33</sup> Alabama Power Company. 2018 Annual Groundwater Monitoring and Corrective Action Report. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/groundwater-monitoring-and-corrective-action/2018%20Annual%20Groundwater%20Monitoring%20and%20Corrective%20Action%20Report%20-%20Plant%20Greene%20County%20Ash%20Pond.pdf>

<sup>34</sup> Alabama Power Company. 2018 Annual Groundwater Monitoring and Corrective Action Report. <https://www.alabamapower.com/content/dam/alabamapower/Our%20Company/How%20We%20Operate/ccr/plant-greene-county/ash-pond/groundwater-monitoring-and-corrective-action/2018%20Annual%20Groundwater%20Monitoring%20and%20Corrective%20Action%20Report%20-%20Plant%20Greene%20County%20Ash%20Pond.pdf>



Plant Greene County Groundwater Protection Standards Exceedances					
Annual 2019	Well Number	Analyte	GWPS	Result	Percent Above GWPS
1st Semi- Annual (March)	MW-1	Arsenic	0.01	0.0267	267%
		Cobalt	0.0167	0.176	1054%
	MW-2	Arsenic	0.01	0.0101	101%
	MW-5	Arsenic	0.01	0.455	4550%
		Lithium	0.04	0.0988	247%
	MW-8	Lithium	0.04	0.0537	134%
	MW-9	Lithium	0.04	0.0931	233%
	MW-10	Arsenic	0.01	0.014	140%
		Lithium	0.04	0.115	288%
	MW-11	Cobalt	0.0167	0.0292	175%
		Lithium	0.04	0.119	298%
	MW-12	Lithium	0.04	0.0532	133%
		Molybdenum	0.1	0.11	110%
	MW-13	Lithium	0.04	0.123	308%
	MW-14	Arsenic	0.01	0.0264	264%
		Cobalt	0.0167	0.0303	181%
		Lithium	0.04	1.11	2775%
	MW-15	Cobalt	0.0167	0.0184	110%
		Lithium	0.04	0.57	1425%
	MW-16	Arsenic	0.01	0.0952	952%
		Cobalt	0.0167	0.0177	106%
		Lithium	0.04	0.558	1395%
2nd Semi- Annual (September)	MW-17	Arsenic	0.01	0.32	3200%
		Cobalt	0.0167	0.0192	115%
		Lithium	0.04	0.595	1488%
	MW-18	Arsenic	0.01	0.0477	477%
		Lithium	0.04	0.378	945%
	MW-21	Lithium	0.04	0.0531	133%
	MW-1	Arsenic	0.01	0.0226	226%
	MW-2	Arsenic	0.01	0.022	220%
	MW-5	Arsenic	0.01	0.406	4060%
		Lithium	0.04	0.117	293%
	MW-8	Lithium	0.04	0.0982	246%
	MW-9	Arsenic	0.01	0.0108	108%
		Cobalt	0.0167	0.0177	106%
		Lithium	0.04	0.128	320%
	MW-10	Arsenic	0.01	0.0132	132%
		Cobalt	0.0167	0.0191	114%
		Lithium	0.04	0.112	280%
	MW-11	Cobalt	0.0167	0.02	120%
		Lithium	0.04	0.124	310%
	MW-12	Lithium	0.04	0.0598	150%
		Molybdenum	0.1	0.134	134%
	MW-13	Lithium	0.04	0.246	615%
		Thallium	0.002	0.00214	107%
	MW-14	Arsenic	0.01	0.0263	263%
		Cobalt	0.0167	0.0278	166%
		Lithium	0.04	0.765	1913%
	MW-15	Cobalt	0.0167	0.0201	120%
		Lithium	0.04	0.6	1500%
	MW-16	Arsenic	0.01	0.0786	786%
		Lithium	0.04	0.581	1453%
	MW-17	Arsenic	0.01	0.356	3560%
		Lithium	0.04	0.571	1428%
	MW-18	Arsenic	0.01	0.0498	498%
		Cobalt	0.0167	0.0174	104%
		Lithium	0.04	0.408	1020%
	MW-21	Lithium	0.04	0.0862	216%

The bottom of the disposed ash is now and will continue to be located below the water table. Cross-sections included with the closure plan indicate that the bottom of the ash/top of underlying sediment is located at an elevation of approximately 80-feet above mean sea level (amsl).<sup>35</sup> Maps of the potentiometric surface, included in groundwater monitoring reports, show that the groundwater elevation varies from approximately 80 to 95-feet (amsl). Drawings included with the closure plan indicate that the normal water elevation between the inner and outer dikes will be 87.5-feet amsl.<sup>36</sup> This is the lowest elevation that water would be expected to drain to, even if the proposed synthetic cap and barrier walls had zero defects and allowed no infiltration into the waste, something that is very unlikely. Accordingly, the draft permit will allow a minimum of 7.5 and possibly as much as 15-feet of coal ash permanently submerged in groundwater.

With coal ash remaining in the groundwater, contamination of the groundwater and surface water will not end. There will be constant and ongoing leaching of toxic contaminants into groundwater, streams, and the Black Warrior River for decades, if not centuries.

Furthermore, the federal and state rules require that the closure plan describe “how the final cover system will achieve performance standards specified in...this section.”<sup>37</sup> In particular, a closure plan must demonstrate that, if the coal ash is left in place, it will achieve the following performance standards:

- 1) “Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere;”<sup>38</sup>
- 2) “Preclude the probability of future impoundment of water, sediment, or slurry;”<sup>39</sup>
- 3) “Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.”<sup>40</sup>

Thus, Alabama Power’s closure plans must demonstrate that groundwater will not continue to flow through the coal ash, in order to satisfy the requirement to “[c]ontrol minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters.” If groundwater remains in the coal ash basin, the basin would be still be considered an impoundment that stores an accumulation of CCR liquids. The closure plan retains the current dams on site, and they will continue to impound water and impound coal ash sediments and slurry. And although Alabama Power plans a “slurry wall” at this site, pollution will continue. Thus, the draft permit and closure plan will violate the performance standards found in § 40 C.F.R 102(d) and corresponding state law.

---

<sup>35</sup> Alabama Power Company. Amended Closure Plan for Ash Pond, sheet 803. Appendix 9 of the permit.

<sup>36</sup> Alabama Power Company. Amended Closure Plan for Ash Pond, sheet 907. Appendix 9 of the permit.

<sup>37</sup> 40 C.F.R § 102(b)(1)(iii); Ala. Admin. Code r. § 335-13-15-.07(3)(b)1.(iii).

<sup>38</sup> 40 C.F.R. § 257.102(d)(1)(i); Ala. Admin. Code r. § 335-13-15-.07(3)(d)1.(i).

<sup>39</sup> 40 C.F.R. § 257.102(d)(1)(ii); Ala. Admin. Code r. § 335-13-15-.07(3)(d)1.(ii).

<sup>40</sup> 40 C.F.R. § 257.102(d)(2)(i); Ala. Admin. Code r. § 335-13-15-.07(3)(d)2.(i).

In addition, as groundwater continues to saturate coal ash within the proposed cap-in-place storage area, then the draft closure plan cannot satisfy the requirement that “[f]ree liquids must be eliminated by removing wastes or solidifying the remaining wastes and waste residues.”<sup>41</sup> “Free liquids” are defined under RCRA as “liquids that readily separate from the solid portion of a waste under ambient temperature and pressure.”<sup>42</sup> Groundwater that saturates coal ash in an unlined impoundment constitute free liquids that readily separate from the solid portion of the waste. Groundwater readily separates from coal ash because it flows through the coal ash, as shown by the movement of pollutants out of the unlined ash pond; it does not remain in the coal ash indefinitely, but rather flows out of the ash and is replaced by new groundwater coming into the basin. Utilities throughout the Southeast routinely separate ash from groundwater by allowing the groundwater to flow out of the coal ash after it is excavated from below the water table. A closure plan that fails to stop the infiltration of groundwater into an unlined basin violates the CCR rules. Alabama Power has not shown how a “slurry wall” in this location will completely keep groundwater out of the Ash Pond.

In addition, the proposed permit should require Alabama Power to disclose how much coal ash will remain saturated with groundwater under the closure plan. There does not appear to be any reported effort or requirement in the closure plan to show how much coal ash will remain saturated. The public has a right to know this information, and ADEM should require it. Importantly, there is also no modeling or estimate in the closure plan of how long it may take for groundwater quality to meet applicable groundwater standards.

As proposed by the draft closure plan, the contaminated water will continue to pollute the underlying and surrounding groundwater for decades, and likely centuries. Due to these facts, the draft permit and closure plan does not and cannot meet state and federal CCR performance standards required under the cap-in-place closure method.<sup>43</sup>

As ADEM has documented and Alabama Power has acknowledged, toxic pollutants from the Plant Greene County Ash Pond are already contaminating state waters. Plant Greene County was the subject of an ADEM Administrative Order due to MCL exceedances for arsenic and lithium.<sup>44</sup> Alabama Power’s 2019 groundwater monitoring report, required by the federal CCR regulations, shows similar statistical exceedances of groundwater protection standards. Leaving coal ash permanently submerged in groundwater will allow that contamination of ground and surface water to continue for the foreseeable future.

In addition, CCR contaminated groundwater released from the Greene County CCR impoundment is likely to have been transported downgradient and accumulated in wetland and stream-bottom sediments outside of the footprint of the current Ash Pond. This problem will get even worse with the supposed remedy of monitored natural attenuation because contaminants will continue to groundwater where it is being monitored into the surrounding environment. Even where dilution

---

<sup>41</sup> § 40 C.F.R 102(d)(2)(i).

<sup>42</sup> § 40 C.F.R 257.53.

<sup>43</sup> 40 CFR 102(d).

<sup>44</sup> ADEM, In the Matter of Alabama Power Company Plant Greene County Electric Generating Plant.

precludes the possibility of detecting contamination in river water, high concentrations of CCR contaminants can accumulate in sediments, potentially impacting benthic and wetland organisms. There is no indication that accumulation of CCR-related contaminants in wetland sediments or river bottom sediments downgradient of the CCR impoundment has been investigated by the permittee. Black Warrior Riverkeeper, however, has conducted some analysis of surface water and sediments downgradient of the ash pond.

Samples taken at Plant Greene County's NPDES outfall DSN002 and seeps from the coal ash pond by Black Warrior Riverkeeper indicate the presence of many coal ash pollutants in ash pond effluent that far exceed concentrations found in nearby, background surface waters.<sup>45</sup> Furthermore, Black Warrior Riverkeeper sediment samples demonstrate that many of these toxic pollutants are accumulating below the NPDES outfall and seeps creating a store, or sink, of these pollutants that will continue to be released to surface water over time.<sup>46</sup> Black Warrior Riverkeeper's sediment samples also show that radionuclide concentrations in the soil below the ash pond NPDES outfall and ash pond seeps are significantly higher than the concentrations in sediment samples taken from a nearby, reference location.<sup>47</sup>

At Part IV.A., the draft permit provides that the "Permittee shall not cause a discharge of pollutants into waters of the State, including wetlands, that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), Alabama Water Pollution Control Act, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 and/or section 404 of the Clean Water Act, or cause non-point source pollution." However, the Plant Green County ash pond is already polluting groundwater, which is considered a water of the state under Ala. Admin. Code r. 335-6-6-.02(fff). According Alabama Power's own admissions, they will continue polluting groundwater for the next 25 years or more. ADEM cannot issue a permit where the permittee acknowledges it cannot comply for decades into the future.

## **V. *Dam Safety***

Using cap-in-place as proposed by the draft closure plan fails to address the threat of a potential catastrophic dam failure or release of ash at Plant Greene County. Over 10.3 million cubic yards of coal ash are stored along the banks of the Black Warrior River at Plant Greene County. Improper maintenance or the possibility of extreme weather events or natural disasters damaging the dike system could result in a dam breach or failure that could release massive quantities of toxic coal ash into the river. Under federal regulations, the ash pond at Plant Greene County was classified as a Significant Hazard, meaning that a dam failure or improper operation of the facility would likely result in significant economic loss or environmental damage.<sup>48</sup> The map below depicts that area that could be

---

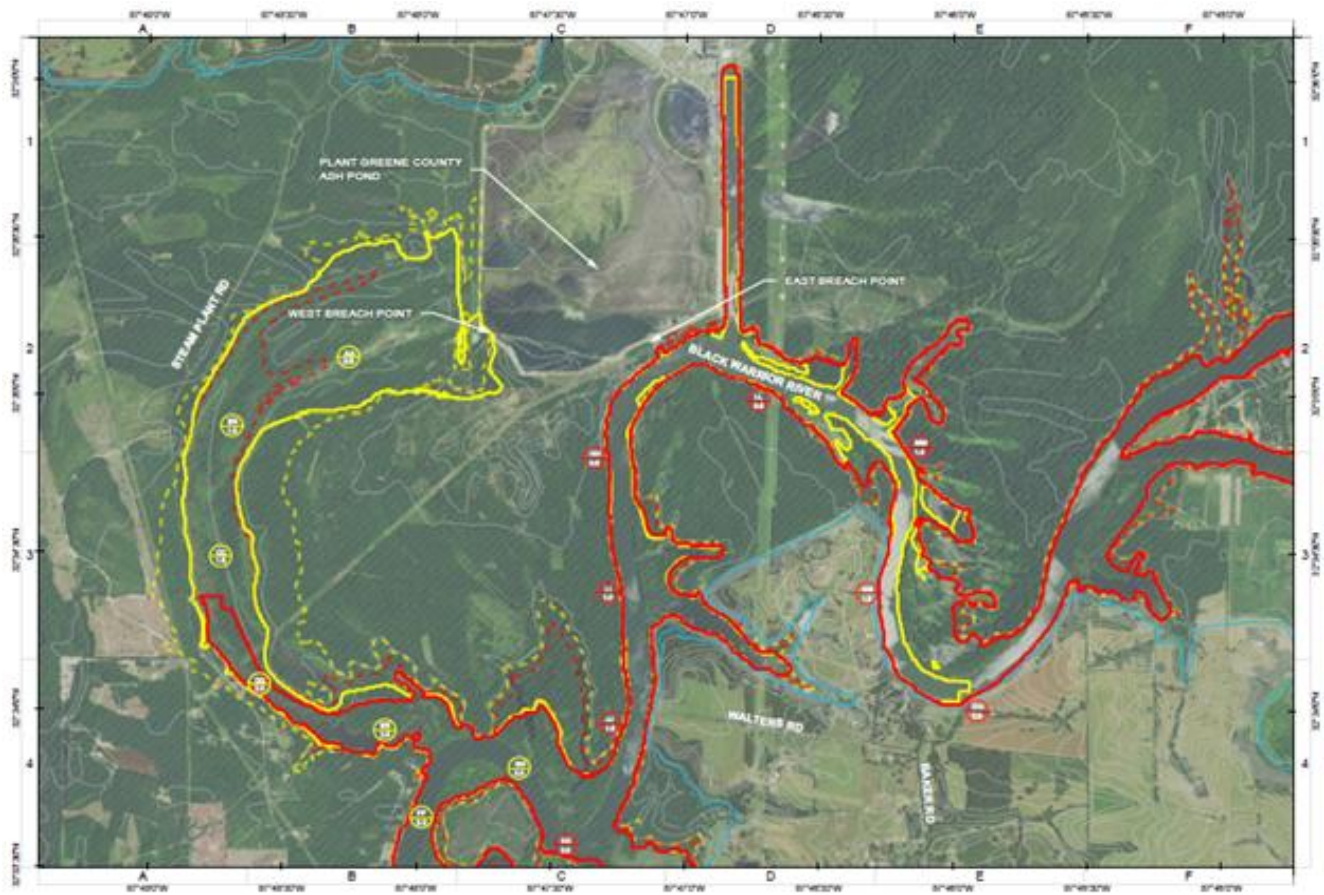
<sup>45</sup> See Attachment 2 (analytical results showing significant differences in concentrations of aluminum, arsenic, barium, boron, iron, lithium, strontium, vanadium, and zinc, to name a few).

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

<sup>48</sup> Alabama Power Company. Emergency Action Plan. Appendix 3 of the permit.

flooded with coal ash and contaminated water under current conditions at the pond in the event of such a catastrophe.<sup>49</sup>



Map Depicting Area Potentially Inundated in the Event of Dam Failure at Plant Greene County

Meandering river channels are not stationary. Lateral migration or avulsion of the channel, likely initiated during a storm-related flood event, will impinge on and undercut the berms. All sides of the impoundment will eventually be subject to erosion as migration and/or avulsion of the river's channels progress. The man-made barge canal bordering the East dike of the ash pond was dredged for years, and the dike along it suffers from instability caused by erosion along the water's edge. Constructed with a steep slope, covered with geotextile fabric and rip-rap, and lacking vegetation and root structure, the ash pond East dike will continue to be prone to erosion and instability.

Even under a now routine flood event such as the 1%-annual-chance-flood, floodwater is predicted to impinge on the berms around waste disposal area.<sup>50</sup> While a 1%-annual-chance-flood would not be expected to overtop the existing berms, the berms will be subjected to erosive conditions that could necessitate berm maintenance and/or repair actions. It is widely acknowledged that these weather-induced events are increasing in severity and are projected to increase even more in the future, as impacts of climate change are felt in communities across the country. The potential breach or collapse

<sup>49</sup> Alabama Power Company. Inundation Maps. Appendix 3.B of the permit.

<sup>50</sup> See attached FEMA 1% annual chance flood map

of an already unstable dam must be carefully weighed here. “More frequent and intense extreme weather and climate-related events, as well as changes in average climate conditions, are expected to continue to damage infrastructure, ecosystems, and social systems that provide essential benefits to communities.”<sup>51</sup> As storm events increase in intensity and become more common, high water levels that overtop the berms and increase the potential for catastrophic release of wastes become more likely. Chances of the catastrophic release of some portion of the 10,300,000 cubic yards of CCR waste stored in the impoundment will increase over time. It has happened before at Plant Greene County: on May 29, 2003 “excessive rains and flooding at the site” caused the Black Warrior River to overflow into and inundate the ash pond and surrounding area.<sup>52</sup> This caused Alabama Power to have a permit violation for total suspended solids. The Company acknowledged that there were “no steps which could have been taken to prevent the exceedance.”<sup>53</sup>

Such a breach or release, which has happened before, would have a catastrophic impact on the vulnerable communities surrounding the pond, underscoring the point that it is lower-income and other marginalized groups to experience greater impacts from climate and weather related events.<sup>54</sup> Under these circumstances, leaving the consolidated toxic ash in place in such a dynamic location with only a 30-year post closure care period is wholly inadequate.

## **VI. Long-term Care and Maintenance**

It is difficult for the public to weigh in on the long term care and maintenance of the closed ash pond at Plant Greene County: “[f]ully detailed long-term maintenance and corrective action strategies have not yet been determined, which have the potential to influence current estimates.”<sup>55</sup> Alabama Power is asking ADEM and the public to support its plan to cap-in-place toxic ash that is contaminating ground and surface water, with no detailed plans for how the coal ash pond will be maintained, what will drive corrective action or additional maintenance, what the range of corrective action measures will be, and what metrics will measure the success of any corrective action measures. This incomplete approach is unacceptable, given the danger that coal ash contamination poses to ground and surface water, wildlife, and public health for decades or more.

The draft permit proposes to control infiltration into the waste by installing an artificial cap with a design life only 100+ years.<sup>56</sup> Infiltration through the cap will increase as the artificial turf degrades. Production and release of leachate from the capped CCR will increase concurrently with degradation of the artificial turf cover. When added to the saturation of the remaining coal ash from groundwater and surface water discussed previously, the infiltration that will naturally occur as the cap degrades compels a more robust long-term solution.

---

<sup>51</sup> Fourth National Climate Assessment (November 2018), found at <https://nca2018.globalchange.gov/>

<sup>52</sup> May 29, 2003 Alabama Power NCF (attached).

<sup>53</sup> *Id.*

<sup>54</sup> *Id.*

<sup>55</sup> Amended Closure Plan for Ash Pond. Appendix 9 of the Permit at combined pdf. p. 480.

<sup>56</sup> See ClosureTurf Brochure at 5

Since the post-closure care period is only 30 years, the closure permit must identify a responsible party post-closure and set aside dedicated funding for monitoring, maintenance, and possible corrective actions, including cap replacement and excavation. These measures are critical to protect taxpayers from being on the hook for maintenance and cleanup costs in the future. Given that Alabama Power has not provided any specifics about how long MNA will take or whether it is even feasible, the closure plan must guarantee responsibility and funding in perpetuity.

## ***VII. Proposed Variances***

The draft permit should not allow a boron variance from required assessment monitoring. Boron is a very reliable indicator of impact to water quality from CCR waste.<sup>57</sup> The groundwater monitoring results from Alabama Power indicates that concentrations of boron were significantly elevated above anticipated background conditions in some monitoring wells (often exceeding 1mg/L). The World Health Organization recommends reducing boron concentrations in drinking water to below 0.5 mg/L.<sup>58</sup> Including boron as an Appendix IV constituent is more protective of human health and the environment, especially at a site where there is confirmed coal ash contamination.

ADEM's original state CCR permitting program included boron as an Appendix IV contaminant that had to be monitored, which the Conservation Groups supported.<sup>59</sup> Yet ADEM now proposes to drop boron from Appendix IV monitoring without explanation. Because including boron is more protective of human health and the environment, ADEM must include boron as an Appendix IV constituent for monitoring in the draft permit.

## ***VIII. Alternatives to Cap-in-Place***

Alabama Power has not provided any information comparing their predetermined cap-in-place plans versus excavation and removal. Instead, the Company has presented only one plan to the public for controlling their extensive pollution from Plant Greene County's Ash Pond: capping the pollution in place in a dynamic wetland system on top of streams and wetlands. Alternatives to this risky closure plan, along with costs and timelines, should have been provided to the public prior to the federally-mandated public meetings held in 2020, and they should still be provided to the public. Alabama Power has already received approval for a rate increase to deal with coal ash closure costs, yet there has been no public transparency into how Alabama Power determined its current chosen remedy and whether or not it make the most financial sense in the short or long terms. As proposed, the closure plan will not fix groundwater contamination now or in the future because contaminated water will continue to seep

---

<sup>57</sup> Jennifer S. Harkin, et al., *Evidence for Coal Ash Ponds Leaking in the Southeastern United States*, *Env'tl Sci. & Tech.* (accepted May 27, 2016), <https://sites.nicholas.duke.edu/avnervengoshlfiles/2011108/EST-Coalash-pondleaking.pdf>, at 1-2.

<sup>58</sup> WHO, *Boron in Drinking Water Background document for development of WHO Guidelines for Drinking-water Quality* (2003), at 10, [https://www.who.int/water\\_sanitation\\_health/dwq/boron.pdf](https://www.who.int/water_sanitation_health/dwq/boron.pdf).

<sup>59</sup> See ADEM, *Reconciliation Statement for ADEM Administrative Code Division 335-13 Solid Waste Program Regulations* (2018), at 7 ("The Department agrees that boron should be added to Appendix IV so that it is included in assessment monitoring, therefore, the final regulations have been modified to include boron in Appendix IV.").



unabated, out of the CCR waste into the surrounding aquifer, streams, and river. Mitigating groundwater contamination is one of the primary reasons for the ash pond closure. Moreover, the public should know how the alternative of excavation and removal may compare, in effectiveness and costs.

Unfortunately, utilities and regulatory authorities too often focus on actions like those at the heart of the draft permit and plan that offer the illusion of regulatory compliance at the lowest possible cost. In too many cases this approach results in regulatory mistakes and a long compliance train, with costs and compliance attainment that significantly exceed original estimates. Here, any additional costs will be paid for by ratepayers. ADEM must require Alabama Power to incorporate a financial comparison of the proposed remedy with excavation and recycling or removal to a lined landfill.

#### ***IX. Closure at Other Coal-fired Power Plants in the Region***

Alabama Power is increasingly becoming an outlier in how the company handles its coal ash waste. Utilities in North Carolina, South Carolina and Virginia are excavating and removing (clean closure) all coal ash from sites with unlined impoundments. In Tennessee, TVA is excavating and removing at least two sites, and even Alabama Power's sister utility, Georgia Power, is excavating and removing all of its coastal sites, as well as others.

In North Carolina, after a catastrophic 39,000-ton coal ash spill in 2014 at the Dan River site, the state legislature passed the Coal Ash Management Act, which charged the operators of state coal ash impoundments with proposing safe coal ash disposal plans for the North Carolina Department of Environmental Quality (NCDEQ) to approve.<sup>60</sup> After settlements lead to excavation and removal of about half of Duke Energy's sites, NCDEQ rejected Duke's proposal to cap-in-place the remaining half of surface impoundments, ordering the utility to instead excavate the coal ash and put it in lined landfills.<sup>61</sup> In an announcement of NCDEQ's order, NCDEQ's Secretary stated: **"DEQ rigorously reviewed the proposals, and the science points us clearly to excavation as the only way to protect public health and the environment."**<sup>62</sup>

Virginia's government has also taken steps to protect its citizens and environment from coal ash pollution. In March 2019, the governor signed bipartisan Virginia legislation requiring the excavation of all 27 million cubic yards of coal ash housed in Virginia's unlined surface impoundments.<sup>63</sup> The new law required all the coal ash be recycled or placed into lined landfills.<sup>64</sup> The Governor stated: **"The**

---

<sup>60</sup> Catherine Morehouse, *North Carolina coal ash battle comes to a head as Duke challenges cleanup order*, Utility Dive (May 2, 2019), <https://www.utilitydive.com/news/north-carolina-coal-ash-battle-comes-to-a-head-as-duke-challenges-cleanup-o/553798/>.

<sup>61</sup> John Downey, *New state order on Duke Energy's coal-ash cleanup could significantly increase costs*, Charlotte Business Journal (Apr. 1, 2019), <https://www.bizjournals.com/charlotte/news/2019/04/01/new-state-order-on-duke-energys-coal-ash-cleanup.html>.

<sup>62</sup> NCDEQ, *DEQ Orders Duke Energy to Excavate Coal Ash at Six Remaining Sites* (Apr. 1, 2019), <https://deq.nc.gov/news/press-releases/2019/04/01/deq-orders-duke-energy-excavate-coal-ash-six-remaining-sites>.

<sup>63</sup> Mel Leonor, *Northam signs legislation to excavate and clean up coal ash*, Richmond Times Dispatch (Mar. 20, 2019), [https://richmond.com/news/local/government-politics/northam-signs-legislation-to-excavate-and-clean-up-coal-ash/article\\_a17ef9d1-f6a4-5b62-b553-2c00bea79966.html](https://richmond.com/news/local/government-politics/northam-signs-legislation-to-excavate-and-clean-up-coal-ash/article_a17ef9d1-f6a4-5b62-b553-2c00bea79966.html).

<sup>64</sup> *Id.*



**potential risks to public health and water quality posed by unlined coal ash ponds in [Virginia] are far too great for us to continue with business as usual.”<sup>65</sup>**

South Carolina stands out as even more of a regional leader on coal ash. In 2012, in response to pressure from local citizens, South Carolina’s state-owned utility agreed to excavate and remove all of its coal ash, without legislation requiring it to do so.<sup>66</sup> South Carolina’s leadership has yielded tangible benefits for its communities and environment. For example, as was state in the South Carolina *Post and Courier* “[a]rsenic levels in groundwater at the Grainger site, once 110 times higher than federal standards, have declined by as much as 90 percent. Arsenic in Wateree’s groundwater is down by as much as 80 percent.”<sup>67</sup> And in 2018, South Carolina avoided a potential environmental catastrophe when hurricane flood waters for the first time inundated a coal ash pond on the Waccamaw River – which fortunately had been excavated of ash by Santee Cooper the year before.

The Tennessee Valley Authority reached a settlement with environmental groups to resolve a long legal battle over coal ash, agreeing to excavate and remove 12 million tons of coal ash at its Gallatin Plant.<sup>68</sup> And at the former Allen Fossil Plant, TVA is removing all 3.5 million cubic yards of coal ash after detecting high levels of arsenic and other coal ash toxins at groundwater monitoring wells in 2017.<sup>69</sup> TVA considered cap-in-place at Allen, but that option “was eliminated from consideration in the draft EIS [(Environmental Impact Statement)].”<sup>70</sup>

Finally, in Georgia, Alabama Power’s sister company Georgia Power is completely excavating 19 of its coal ash ponds.<sup>71</sup> One of the surface impoundments slated for complete excavation is the Plant Bowen Ash Pond 1, which contains approximately 20,400,000 cubic yards of CCR.<sup>72</sup>

Alabama stands in contrast to all of its neighbors. Utilities are taking common sense measures to protect groundwater and the environment from coal ash pollution by removing the coal ash to dry, upland lined landfills from sites where the coal ash would remain in groundwater and continue to pollute, such as the Plant Greene County Ash Pond

---

<sup>65</sup> *Id.*

<sup>66</sup> Rhiannon Fionn, *North Carolina’s “leadership” on coal ash pales compared to its neighbor*, Energy News Network (July 18, 2016), <https://energynews.us/2016/07/18/southeast/north-carolinas-leadership-on-coal-ash-pales-compared-to-its-neighbor/>.

<sup>67</sup> David Wren, *South Carolina Utilities Lead The Region In Efforts To Clean Up Coal Ash Pollution*, Post and Courier (July 15, 2017), [https://www.postandcourier.com/business/south-carolina-utilities-lead-the-region-in-efforts-to-clean/article\\_bcfb1eec-670a-11e7-a2ea-e778e26af132.html](https://www.postandcourier.com/business/south-carolina-utilities-lead-the-region-in-efforts-to-clean/article_bcfb1eec-670a-11e7-a2ea-e778e26af132.html).

<sup>68</sup> Catherine Morehouse, *TVA agrees to excavate 12M tons of coal ash after 5-year battle*, Utility Dive (June 14, 2019), <https://www.utilitydive.com/news/tva-agrees-to-excavate-12m-tons-of-coal-ash-after-5-year-battle/556875/>.

<sup>69</sup> Adrian Sainz, *TVA to remove coal ash from retired Tennessee plant*, Associated Press (Mar. 6, 2020), <https://apnews.com/article/e61daa7f4ed99b8e44088833a7874554>.

<sup>70</sup> TVA, *TVA Plans for Removal of Coal Ash at Former Allen Fossil Plant Site Press Release* (Mar. 6, 2020), <https://www.tva.com/newsroom/press-releases/tva-plans-for-removal-of-coal-ash-at-former-allen-fossil-plant-site>.

<sup>71</sup> Georgia Power, *Groundwater Monitoring & Information: Georgia Power’s Ash Pond Closure Process*, <https://www.georgiapower.com/company/environmental-compliance/ground-monitoring-dewatering.html> (last visited on Oct. 25, 2020).

<sup>72</sup> Georgia Power, *Amended Written Closure Plan 40 C.F.R. Part 257.102 Plant Bowen Ash Pond 1 (AP-1)* (Sept. 27, 2018), [https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-bowen/20180927\\_clospln\\_bow\\_ap\\_amended\\_final.pdf](https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/plant-bowen/20180927_clospln_bow_ap_amended_final.pdf), at 2.

## **X. Conclusion**

The draft permit as issued allows pollution in place for decades or more. There are alternatives to Alabama Power's closure plan which are more protective of human health and the environment, yet Alabama Power is choosing the least cost option, and ADEM is allowing it through this draft permit.


Most importantly, the draft permit and closure plan will not meet performance standards and location restrictions under state and federal law. Accordingly, ADEM's draft permit and the Company's closure plan violate the "open dumping" provisions of RCRA. Alabama Power cannot be allowed to operate an illegal open dump at Plant Greene County in perpetuity.<sup>73</sup>

For the reasons discussed above, Conservation Groups request that ADEM revise the draft permit to meet all requirements of state and federal law, as well as require Alabama Power to develop a closure plan that will similarly comply with the law. If you have any questions or would like to discuss any of our recommendations, please do not hesitate to contact the undersigned.

Respectfully submitted,



Nelson Brooke  
Riverkeeper  
Black Warrior Riverkeeper



John Kinney  
Enforcement Coordinator  
Black Warrior Riverkeeper



Eva Dillard  
Staff Attorney  
Black Warrior Riverkeeper

---

<sup>73</sup> 40 C.F.R. § 257.1(a)(2) ("Practices failing to satisfy any of the criteria in . . . §§257.50 through 257.107 constitute open dumping, which is prohibited under section 4005 of the Act.")

**s/Keith Johnston**

Keith Johnston

Amble Johnson

The Southern Environmental Law Center

A handwritten signature in black ink, appearing to read "Cindy Lowry". The signature is fluid and cursive, with a long horizontal stroke at the end.

Cindy Lowry

Executive Director,

Alabama Rivers Alliance

cc: Scott Story  
Stephen Cobb

**Attachment 1 –  
Plant Greene County Aerial Image**



# Greene County Site Location

Legend

13

25

Google Earth

© 2020 Google



1 mi





**Attachment 2 –  
Black Warrior Riverkeeper Sample Results**

August 08, 2016

Nelson Brooke  
Black Warrior River Keeper  
712 37th Street South  
Birmingham, AL 35222

RE: Project: Green Co.  
Pace Project No.: 2040138

Dear Nelson Brooke:

Enclosed are the analytical results for sample(s) received by the laboratory on July 25, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melissa MacNaughton  
Melissa.MacNaughton@pacelabs.com  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## CERTIFICATIONS

Project: Green Co.

Pace Project No.: 2040138

---

### New Orleans Certification IDs

California Env. Lab Accreditation Program Branch:  
11277CA

Florida Department of Health (NELAC): E87595

Illinois Environmental Protection Agency: 0025721

Kansas Department of Health and Environment (NELAC):  
E-10266

Louisiana Dept. of Environmental Quality (NELAC/LELAP):  
02006

Pennsylvania Dept. of Env Protection (NELAC): 68-04202

Texas Commission on Env. Quality (NELAC):  
T104704405-09-TX

U.S. Dept. of Agriculture Foreign Soil Import: P330-10-  
00119

Commonwealth of Virginia (TNI): 480246

---

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..



## SAMPLE SUMMARY

Project: Green Co.

Pace Project No.: 2040138

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2040138001	discharge @ Mooring cell five	Water	07/21/16 14:15	07/25/16 08:05
2040138002	NPDES Outfall	Water	07/21/16 16:45	07/25/16 08:05
2040138003	Background	Water	07/21/16 17:45	07/25/16 08:05
2040138004	discharge @ Mooring cell five	Solid	07/21/16 14:15	07/25/16 08:05
2040138005	Background	Solid	07/21/16 17:45	07/25/16 08:05

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## SAMPLE ANALYTE COUNT

Project: Green Co.

Pace Project No.: 2040138

Lab ID	Sample ID	Method	Analysts	Analytes Reported
2040138001	discharge @ Mooring cell five	EPA 6020	KJR	28
2040138002	NPDES Outfall	EPA 6020	KJR	28
2040138003	Background	EPA 6020	KJR	28
2040138004	discharge @ Mooring cell five	EPA 6020	KJR	28
2040138005	Background	EPA 6020	KJR	28

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## PROJECT NARRATIVE

Project: Green Co.

Pace Project No.: 2040138

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** August 08, 2016

### General Information:

5 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 59725

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040138004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 246551)
  - Aluminum
  - Antimony
  - Barium
  - Beryllium
  - Chromium
  - Iron
  - Lead
  - Lithium
  - Magnesium
  - Manganese
  - Nickel

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## PROJECT NARRATIVE

Project: Green Co.

Pace Project No.: 2040138

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** August 08, 2016

QC Batch: 59725

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040138004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Silicon
- Strontium
- Titanium
- Vanadium
- Zinc
- MSD (Lab ID: 246552)
  - Aluminum
  - Antimony
  - Barium
  - Calcium
  - Chromium
  - Iron
  - Lithium
  - Magnesium
  - Manganese
  - Molybdenum
  - Nickel
  - Silicon
  - Strontium
  - Titanium
  - Vanadium
  - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 246552)
  - Antimony
  - Arsenic
  - Barium
  - Strontium

QC Batch: 59712

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040078001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 246498)
  - Calcium
  - Silicon
  - Sodium
- MSD (Lab ID: 246499)
  - Barium
  - Calcium
  - Magnesium
  - Silicon
  - Sodium
  - Strontium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## PROJECT NARRATIVE

Project: Green Co.

Pace Project No.: 2040138

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** August 08, 2016

### Additional Comments:

Analyte Comments:

QC Batch: 59725

N2: The lab does not hold TNI accreditation for this parameter.

- BLANK (Lab ID: 246549)
  - Silicon
- Background (Lab ID: 2040138005)
  - Silicon
- LCS (Lab ID: 246550)
  - Silicon
- MS (Lab ID: 246551)
  - Silicon
- MSD (Lab ID: 246552)
  - Silicon
- discharge @ Mooring cell five (Lab ID: 2040138004)
  - Silicon

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## ANALYTICAL RESULTS

Project: Green Co.

Pace Project No.: 2040138

**Sample:** discharge @ Mooring cell five      **Lab ID:** 2040138001      Collected: 07/21/16 14:15      Received: 07/25/16 08:05      Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010						
Aluminum	0.42	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7429-90-5	
Antimony	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-36-0	
Arsenic	0.0062	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-38-2	
Barium	0.033	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-39-3	
Beryllium	0.0011	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-41-7	
Boron	1.6	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:32	7440-42-8	
Cadmium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-43-9	
Calcium	203	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7440-70-2	
Chromium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-47-3	
Cobalt	0.072	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-48-4	
Copper	ND	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:32	7440-50-8	
Iron	63.1	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7439-89-6	
Lead	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7439-92-1	
Lithium	0.34	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7439-93-2	
Magnesium	44.0	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7439-95-4	
Manganese	6.7	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7439-96-5	
Molybdenum	ND	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:32	7439-98-7	
Nickel	0.14	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-02-0	
Potassium	12.7	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7440-09-7	
Selenium	0.0032	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7782-49-2	
Silicon	9.5	mg/L	0.050	1	07/26/16 15:21	08/01/16 12:32	7440-21-3	
Silver	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:32	7440-22-4	
Sodium	55.6	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:32	7440-23-5	
Strontium	1.3	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-24-6	
Thallium	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:32	7440-28-0	
Titanium	0.0019	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:32	7440-32-6	
Vanadium	ND	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:32	7440-62-2	
Zinc	0.055	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:32	7440-66-6	

**Sample:** NPDES Outfall      **Lab ID:** 2040138002      Collected: 07/21/16 16:45      Received: 07/25/16 08:05      Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010						
Aluminum	0.18	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7429-90-5	
Antimony	0.0034	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-36-0	
Arsenic	0.16	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-38-2	
Barium	0.34	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-41-7	
Boron	0.37	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:35	7440-42-8	
Cadmium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-43-9	
Calcium	25.2	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7440-70-2	
Chromium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-47-3	
Cobalt	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-48-4	
Copper	ND	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:35	7440-50-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## ANALYTICAL RESULTS

Project: Green Co.  
Pace Project No.: 2040138

Sample: NPDES Outfall		Lab ID: 2040138002	Collected: 07/21/16 16:45	Received: 07/25/16 08:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010						
Iron	0.46	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7439-89-6	
Lead	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7439-92-1	
Lithium	0.28	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7439-93-2	
Magnesium	8.1	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7439-95-4	
Manganese	0.21	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7439-96-5	
Molybdenum	0.11	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:35	7439-98-7	
Nickel	0.0032	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-02-0	
Potassium	4.1	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7440-09-7	
Selenium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7782-49-2	
Silicon	0.55	mg/L	0.050	1	07/26/16 15:21	08/01/16 12:35	7440-21-3	
Silver	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:35	7440-22-4	
Sodium	17.1	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:35	7440-23-5	
Strontium	0.40	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-24-6	
Thallium	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:35	7440-28-0	
Titanium	0.0046	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:35	7440-32-6	
Vanadium	0.0053	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:35	7440-62-2	
Zinc	ND	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:35	7440-66-6	

Sample: Background		Lab ID: 2040138003	Collected: 07/21/16 17:45	Received: 07/25/16 08:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010						
Aluminum	ND	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7429-90-5	
Antimony	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-36-0	
Arsenic	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-38-2	
Barium	0.023	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-39-3	
Beryllium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-41-7	
Boron	0.015	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:39	7440-42-8	
Cadmium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-43-9	
Calcium	5.1	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7440-70-2	
Chromium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-47-3	
Cobalt	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-48-4	
Copper	ND	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:39	7440-50-8	
Iron	0.20	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7439-89-6	
Lead	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7439-92-1	
Lithium	0.0011	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7439-93-2	
Magnesium	0.66	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7439-95-4	
Manganese	0.0090	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7439-96-5	
Molybdenum	ND	mg/L	0.0030	1	07/26/16 15:21	08/01/16 12:39	7439-98-7	
Nickel	0.0013	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-02-0	
Potassium	0.72	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7440-09-7	
Selenium	ND	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7782-49-2	
Silicon	4.4	mg/L	0.050	1	07/26/16 15:21	08/01/16 12:39	7440-21-3	
Silver	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:39	7440-22-4	
Sodium	1.9	mg/L	0.10	1	07/26/16 15:21	08/01/16 12:39	7440-23-5	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## ANALYTICAL RESULTS

Project: Green Co.  
Pace Project No.: 2040138

Sample: Background		Lab ID: 2040138003	Collected: 07/21/16 17:45	Received: 07/25/16 08:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010						
Strontium	0.039	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-24-6	
Thallium	ND	mg/L	0.00050	1	07/26/16 15:21	08/01/16 12:39	7440-28-0	
Titanium	0.0023	mg/L	0.0010	1	07/26/16 15:21	08/01/16 12:39	7440-32-6	
Vanadium	ND	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:39	7440-62-2	
Zinc	ND	mg/L	0.0050	1	07/26/16 15:21	08/01/16 12:39	7440-66-6	

Sample: discharge @ Mooring cell five		Lab ID: 2040138004	Collected: 07/21/16 14:15	Received: 07/25/16 08:05	Matrix: Solid			
Results reported on a "wet-weight" basis								
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Aluminum	3870	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7429-90-5	M1
Antimony	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-36-0	M1,R1
Arsenic	1.4	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-38-2	R1
Barium	1690	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-39-3	M1,R1
Beryllium	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-41-7	M1
Boron	ND	mg/kg	1.5	5	07/26/16 16:36	08/03/16 11:01	7440-42-8	
Cadmium	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-43-9	
Calcium	2190	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7440-70-2	M1
Chromium	4.6	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-47-3	M1
Cobalt	0.72	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-48-4	
Copper	5.4	mg/kg	1.5	5	07/26/16 16:36	08/03/16 11:01	7440-50-8	
Iron	9350	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7439-89-6	M1
Lead	11.3	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7439-92-1	M1
Lithium	1.9	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7439-93-2	M1
Magnesium	429	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7439-95-4	M1
Manganese	25.6	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7439-96-5	M1
Molybdenum	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7439-98-7	M1
Nickel	1.4	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-02-0	M1
Potassium	241	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7440-09-7	B
Selenium	0.76	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7782-49-2	
Silicon	2200	mg/kg	73.5	5	07/26/16 16:36	08/03/16 11:01	7440-21-3	M1,N2
Silver	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-22-4	
Sodium	87.1	mg/kg	29.4	5	07/26/16 16:36	08/03/16 11:01	7440-23-5	
Strontium	55.3	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-24-6	M1,R1
Thallium	ND	mg/kg	0.29	5	07/26/16 16:36	08/03/16 11:01	7440-28-0	
Titanium	7.0	mg/kg	1.5	5	07/26/16 16:36	08/03/16 11:01	7440-32-6	M1
Vanadium	6.9	mg/kg	1.5	5	07/26/16 16:36	08/03/16 11:01	7440-62-2	M1
Zinc	6.7	mg/kg	1.5	5	07/26/16 16:36	08/03/16 11:01	7440-66-6	M1

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..



## ANALYTICAL RESULTS

Project: Green Co.

Pace Project No.: 2040138

**Sample: Background**      **Lab ID: 2040138005**      Collected: 07/21/16 17:45      Received: 07/25/16 08:05      Matrix: Solid

**Results reported on a "wet-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020    Preparation Method: EPA 3050						
Aluminum	486	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7429-90-5	
Antimony	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-36-0	
Arsenic	0.44	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-38-2	
Barium	4.7	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-39-3	
Beryllium	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-41-7	
Boron	ND	mg/kg	1.3	5	07/26/16 16:36	08/03/16 11:16	7440-42-8	
Cadmium	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-43-9	
Calcium	37.7	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7440-70-2	
Chromium	2.9	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-47-3	
Cobalt	0.78	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-48-4	
Copper	ND	mg/kg	1.3	5	07/26/16 16:36	08/03/16 11:16	7440-50-8	
Iron	2070	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7439-89-6	
Lead	0.95	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7439-92-1	
Lithium	0.33	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7439-93-2	
Magnesium	38.5	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7439-95-4	
Manganese	7.5	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7439-96-5	
Molybdenum	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7439-98-7	
Nickel	0.77	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-02-0	
Potassium	79.6	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7440-09-7	B
Selenium	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7782-49-2	
Silicon	428	mg/kg	63.8	5	07/26/16 16:36	08/03/16 11:16	7440-21-3	N2
Silver	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-22-4	
Sodium	ND	mg/kg	25.5	5	07/26/16 16:36	08/03/16 11:16	7440-23-5	
Strontium	0.51	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-24-6	
Thallium	ND	mg/kg	0.26	5	07/26/16 16:36	08/03/16 11:16	7440-28-0	
Titanium	9.5	mg/kg	1.3	5	07/26/16 16:36	08/03/16 11:16	7440-32-6	
Vanadium	2.2	mg/kg	1.3	5	07/26/16 16:36	08/03/16 11:16	7440-62-2	
Zinc	2.4	mg/kg	1.3	5	07/26/16 16:36	08/03/16 11:16	7440-66-6	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.

Pace Project No.: 2040138

QC Batch: 59725

Analysis Method: EPA 6020

QC Batch Method: EPA 3050

Analysis Description: 6020 MET

Associated Lab Samples: 2040138004, 2040138005

METHOD BLANK: 246549

Matrix: Solid

Associated Lab Samples: 2040138004, 2040138005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	ND	50.0	08/03/16 10:53	
Antimony	mg/kg	ND	0.50	08/03/16 10:53	
Arsenic	mg/kg	ND	0.50	08/03/16 10:53	
Barium	mg/kg	ND	0.50	08/03/16 10:53	
Beryllium	mg/kg	ND	0.50	08/03/16 10:53	
Boron	mg/kg	ND	2.5	08/03/16 10:53	
Cadmium	mg/kg	ND	0.50	08/03/16 10:53	
Calcium	mg/kg	ND	50.0	08/03/16 10:53	
Chromium	mg/kg	ND	0.50	08/03/16 10:53	
Cobalt	mg/kg	ND	0.50	08/03/16 10:53	
Copper	mg/kg	ND	2.5	08/03/16 10:53	
Iron	mg/kg	ND	50.0	08/03/16 10:53	
Lead	mg/kg	ND	0.50	08/03/16 10:53	
Lithium	mg/kg	ND	0.50	08/03/16 10:53	
Magnesium	mg/kg	ND	50.0	08/03/16 10:53	
Manganese	mg/kg	ND	0.50	08/03/16 10:53	
Molybdenum	mg/kg	ND	0.50	08/03/16 10:53	
Nickel	mg/kg	ND	0.50	08/03/16 10:53	
Potassium	mg/kg	ND	50.0	08/03/16 10:53	B
Selenium	mg/kg	ND	0.50	08/03/16 10:53	
Silicon	mg/kg	ND	125	08/03/16 10:53	N2
Silver	mg/kg	ND	0.50	08/03/16 10:53	
Sodium	mg/kg	ND	50.0	08/03/16 10:53	
Strontium	mg/kg	ND	0.50	08/03/16 10:53	
Thallium	mg/kg	ND	0.50	08/03/16 10:53	
Titanium	mg/kg	ND	2.5	08/03/16 10:53	
Vanadium	mg/kg	ND	2.5	08/03/16 10:53	
Zinc	mg/kg	ND	2.5	08/03/16 10:53	

LABORATORY CONTROL SAMPLE: 246550

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	1000	1130	113	80-120	
Antimony	mg/kg	10	11.1	111	84-120	
Arsenic	mg/kg	10	10.8	108	84-120	
Barium	mg/kg	10	11.2	112	85-120	
Beryllium	mg/kg	10	11.0	110	80-120	
Boron	mg/kg	10	10.9	109	80-120	
Cadmium	mg/kg	10	11.1	111	85-120	
Calcium	mg/kg	1000	1100	110	85-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.

Pace Project No.: 2040138

LABORATORY CONTROL SAMPLE: 246550

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium	mg/kg	10	11.3	113	85-120	
Cobalt	mg/kg	10	11.4	114	85-120	
Copper	mg/kg	10	11.5	115	85-120	
Iron	mg/kg	1000	1140	114	85-120	
Lead	mg/kg	10	11.0	110	83-120	
Lithium	mg/kg	10	10.9	109	80-120	
Magnesium	mg/kg	1000	1130	113	80-120	
Manganese	mg/kg	10	11.2	112	85-120	
Molybdenum	mg/kg	10	11.1	111	85-120	
Nickel	mg/kg	10	11.2	112	85-120	
Potassium	mg/kg	1000	1120	112	85-119	
Selenium	mg/kg	10	10.7	107	84-120	
Silicon	mg/kg	500	569	114	80-120	N2
Silver	mg/kg	10	11.2	112	81-120	
Sodium	mg/kg	1000	1110	111	85-120	
Strontium	mg/kg	10	11.5	115	85-120	
Thallium	mg/kg	10	11.0	110	83-120	
Titanium	mg/kg	10	10.9	109	85-120	
Vanadium	mg/kg	10	11.1	111	81-120	
Zinc	mg/kg	10	10.7	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 246551

246552

Parameter	Units	2040138004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Aluminum	mg/kg	3870	588	526	10700	9410	1160	1050	80-120	13	20	M1
Antimony	mg/kg	ND	5.9	5.3	2.7	1.8	46	34	80-120	41	20	M1,R1
Arsenic	mg/kg	1.4	5.9	5.3	8.4	6.4	118	95	80-120	26	20	R1
Barium	mg/kg	1690	5.9	5.3	1060	410	-10700	-24300	80-120	88	20	M1,R1
Beryllium	mg/kg	ND	5.9	5.3	7.4	6.4	121	116	80-120	15	20	M1
Boron	mg/kg	ND	5.9	5.3	6.1	5.4	88	85	80-120	12	20	
Cadmium	mg/kg	ND	5.9	5.3	6.4	5.5	109	104	80-120	16	20	
Calcium	mg/kg	2190	588	526	2820	2460	107	50	80-120	14	20	M1
Chromium	mg/kg	4.6	5.9	5.3	16.0	14.0	193	178	80-120	13	20	M1
Cobalt	mg/kg	0.72	5.9	5.3	6.8	6.0	104	101	80-120	12	20	
Copper	mg/kg	5.4	5.9	5.3	12.1	11.3	114	112	80-120	7	20	
Iron	mg/kg	9350	588	526	14600	12600	890	624	75-125	14	20	M1
Lead	mg/kg	11.3	5.9	5.3	20.2	16.9	152	107	80-120	18	20	M1
Lithium	mg/kg	1.9	5.9	5.3	12.9	11.7	188	186	75-125	10	20	M1
Magnesium	mg/kg	429	588	526	1230	1100	136	129	80-120	10	20	M1
Manganese	mg/kg	25.6	5.9	5.3	38.2	35.5	213	187	75-125	7	20	M1
Molybdenum	mg/kg	ND	5.9	5.3	4.8	4.0	80	73	80-120	19	20	M1
Nickel	mg/kg	1.4	5.9	5.3	9.1	7.9	131	124	80-120	14	20	M1
Potassium	mg/kg	241	588	526	865	759	106	98	80-120	13	20	
Selenium	mg/kg	0.76	5.9	5.3	5.8	5.0	87	81	80-120	15	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.

Pace Project No.: 2040138

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 246551 246552												
Parameter	Units	2040138004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
Silicon	mg/kg	2200	294	263	1980	2170	-77	-11	75-125	9	20	M1,N2
Silver	mg/kg	ND	5.9	5.3	6.1	5.2	103	98	80-120	15	20	
Sodium	mg/kg	87.1	588	526	698	609	104	99	80-120	14	20	
Strontium	mg/kg	55.3	5.9	5.3	47.6	29.2	-130	-496	75-125	48	20	M1,R1
Thallium	mg/kg	ND	5.9	5.3	7.0	6.0	116	111	80-120	15	20	
Titanium	mg/kg	7.0	5.9	5.3	16.0	15.2	153	155	75-125	5	20	M1
Vanadium	mg/kg	6.9	5.9	5.3	21.8	19.1	253	232	80-120	13	20	M1
Zinc	mg/kg	6.7	5.9	5.3	18.9	16.5	208	187	80-120	14	20	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.  
Pace Project No.: 2040138

QC Batch: 59712 Analysis Method: EPA 6020  
QC Batch Method: EPA 3010 Analysis Description: 6020 MET  
Associated Lab Samples: 2040138001, 2040138002, 2040138003

METHOD BLANK: 246496 Matrix: Water  
Associated Lab Samples: 2040138001, 2040138002, 2040138003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.10	08/01/16 11:10	
Antimony	mg/L	ND	0.0010	08/01/16 11:10	
Arsenic	mg/L	ND	0.0010	08/01/16 11:10	
Barium	mg/L	ND	0.0010	08/01/16 11:10	
Beryllium	mg/L	ND	0.0010	08/01/16 11:10	
Boron	mg/L	ND	0.0050	08/01/16 11:10	
Cadmium	mg/L	ND	0.0010	08/01/16 11:10	
Calcium	mg/L	ND	0.10	08/01/16 11:10	
Chromium	mg/L	ND	0.0010	08/01/16 11:10	
Cobalt	mg/L	ND	0.0010	08/01/16 11:10	
Copper	mg/L	ND	0.0030	08/01/16 11:10	
Iron	mg/L	ND	0.10	08/01/16 11:10	
Lead	mg/L	ND	0.0010	08/01/16 11:10	
Lithium	mg/L	ND	0.0010	08/01/16 11:10	
Magnesium	mg/L	ND	0.10	08/01/16 11:10	
Manganese	mg/L	ND	0.0010	08/01/16 11:10	
Molybdenum	mg/L	ND	0.0030	08/01/16 11:10	
Nickel	mg/L	ND	0.0010	08/01/16 11:10	
Potassium	mg/L	ND	0.10	08/01/16 11:10	
Selenium	mg/L	ND	0.0010	08/01/16 11:10	
Silicon	mg/L	ND	0.050	08/01/16 11:10	
Silver	mg/L	ND	0.00050	08/01/16 11:10	
Sodium	mg/L	ND	0.10	08/01/16 11:10	
Strontium	mg/L	ND	0.0010	08/01/16 11:10	
Thallium	mg/L	ND	0.00050	08/01/16 11:10	
Titanium	mg/L	ND	0.0010	08/01/16 11:10	
Vanadium	mg/L	ND	0.0050	08/01/16 11:10	
Zinc	mg/L	ND	0.0050	08/01/16 11:10	

LABORATORY CONTROL SAMPLE: 246497

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2	1.9	96	80-117	
Antimony	mg/L	.02	0.019	93	85-115	
Arsenic	mg/L	.02	0.018	92	83-115	
Barium	mg/L	.02	0.019	95	85-115	
Beryllium	mg/L	.02	0.018	92	80-116	
Boron	mg/L	.02	0.018	92	80-120	
Cadmium	mg/L	.02	0.019	93	85-115	
Calcium	mg/L	2	1.8	91	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.

Pace Project No.: 2040138

LABORATORY CONTROL SAMPLE: 246497

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium	mg/L	.02	0.019	94	85-115	
Cobalt	mg/L	.02	0.019	95	85-115	
Copper	mg/L	.02	0.019	96	80-120	
Iron	mg/L	2	1.9	95	80-120	
Lead	mg/L	.02	0.018	91	84-115	
Lithium	mg/L	.02	0.019	93	80-120	
Magnesium	mg/L	2	1.9	94	80-120	
Manganese	mg/L	.02	0.019	97	85-115	
Molybdenum	mg/L	.02	0.018	90	81-115	
Nickel	mg/L	.02	0.019	95	80-118	
Potassium	mg/L	2	1.9	94	80-120	
Selenium	mg/L	.02	0.018	92	85-115	
Silicon	mg/L	1	0.87	87	80-120	
Silver	mg/L	.02	0.018	92	80-115	
Sodium	mg/L	2	1.9	93	80-120	
Strontium	mg/L	.02	0.019	94	80-120	
Thallium	mg/L	.02	0.019	95	82-115	
Titanium	mg/L	.02	0.019	95	80-120	
Vanadium	mg/L	.02	0.019	94	81-115	
Zinc	mg/L	.02	0.019	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 246498

246499

Parameter	Units	2040078001		MS	MSD	MS		MSD	MS		MSD	MS		MSD	MS		MSD	% Rec		% Rec		% Rec		Max		Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	Result	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	Limits	RPD	RPD	RPD	RPD	RPD	RPD	RPD	
Aluminum	mg/L	ND	2	2	2	1.9	1.9	92	96	80-120	4	20														
Antimony	mg/L	ND	.02	.02	.02	0.019	0.020	96	98	80-120	2	20														
Arsenic	mg/L	ND	.02	.02	.02	0.019	0.019	91	95	80-120	4	20														
Barium	mg/L	0.60	.02	.02	.02	0.62	0.63	120	183	80-120	2	20	M1													
Beryllium	mg/L	ND	.02	.02	.02	0.019	0.020	95	98	80-120	3	20														
Boron	mg/L	0.046	.02	.02	.02	0.066	0.068	99	109	75-125	3	20														
Cadmium	mg/L	ND	.02	.02	.02	0.018	0.019	92	95	80-120	3	20														
Calcium	mg/L	66.8	2	2	2	70.0	72.5	160	283	80-120	3	20	M1													
Chromium	mg/L	0.0020	.02	.02	.02	0.020	0.020	88	90	80-120	3	20														
Cobalt	mg/L	ND	.02	.02	.02	0.018	0.019	90	93	80-120	3	20														
Copper	mg/L	ND	.02	.02	.02	0.018	0.020	86	97	80-120	12	20														
Iron	mg/L	ND	2	2	2	1.9	1.9	92	95	80-120	4	20														
Lead	mg/L	ND	.02	.02	.02	0.019	0.019	94	97	80-120	4	20														
Lithium	mg/L	0.019	.02	.02	.02	0.038	0.039	96	103	80-120	3	20														
Magnesium	mg/L	18.1	2	2	2	20.5	21.2	118	152	80-120	3	20	M1													
Manganese	mg/L	0.022	.02	.02	.02	0.041	0.043	97	104	80-120	4	20														
Molybdenum	mg/L	ND	.02	.02	.02	0.019	0.019	92	95	80-120	3	20														
Nickel	mg/L	0.0017	.02	.02	.02	0.019	0.020	86	90	80-120	4	20														
Potassium	mg/L	0.69	2	2	2	2.6	2.7	95	100	75-125	4	20														
Selenium	mg/L	ND	.02	.02	.02	0.017	0.018	87	91	80-120	4	20														

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA

Project: Green Co.

Pace Project No.: 2040138

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 246498												
246499												
Parameter	Units	2040078001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silicon	mg/L	19.2	1	1	20.7	21.0	155	186	75-125	1	20	M1
Silver	mg/L	ND	.02	.02	0.017	0.018	86	89	80-120	4	20	
Sodium	mg/L	62.2	2	2	65.6	67.9	168	284	75-125	3	20	M1
Strontium	mg/L	0.20	.02	.02	0.22	0.23	106	132	75-125	2	20	M1
Thallium	mg/L	ND	.02	.02	0.020	0.020	98	102	80-120	4	20	
Titanium	mg/L	ND	.02	.02	0.018	0.019	91	93	80-120	2	20	
Vanadium	mg/L	ND	.02	.02	0.021	0.022	94	98	80-120	3	20	
Zinc	mg/L	0.0049J	.02	.02	0.023	0.024	91	95	80-120	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..



## QUALIFIERS

Project: Green Co.  
Pace Project No.: 2040138

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The Nelac Institute

### ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

N2 The lab does not hold TNI accreditation for this parameter.

R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Green Co.

Pace Project No.: 2040138

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2040138004	discharge @ Mooring cell five	EPA 3050	59725	EPA 6020	59728
2040138005	Background	EPA 3050	59725	EPA 6020	59728
2040138001	discharge @ Mooring cell five	EPA 3010	59712	EPA 6020	59722
2040138002	NPDES Outfall	EPA 3010	59712	EPA 6020	59722
2040138003	Background	EPA 3010	59712	EPA 6020	59722

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..



# WO#: 2040138



Sample Condition Upon Receipt

PM: MM1

Due Date: 08/08/16

CLIENT: 20-Bik Warri

1000 Riverbend, Blvd., Suite F  
St. Rose, LA 70087

Proje

Courier: ☐ Pace Courier ☐ Hired Courier ☒ Fed X ☐ UPS ☐ DHL ☐ USPS ☐ Customer ☐ Other

Custody Seal on Cooler/Box Present: [see COC]

Custody Seals intact: ☒ Yes ☐ No

Thermometer  
Used:

- ☒ Therm Fisher IR 5
- ☐ Therm Fisher IR 6
- ☐ Therm Fisher IR 7

Type of Ice: Wet Blue None

Samples on ice: [see COC]

Cooler Temperature: [see COC]

Temp should be above freezing to 6°C

Date and Initials of person examining  
contents: 7-26-16 JMS

Temp must be measured from Temperature blank when present

Comments:

Temperature Blank Present?"	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	1
Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2
Chain of Custody Complete:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3 Analysis not filled out on COC.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	5 7/26/16 JMS
Samples Arrived within Hold Time:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6 Hex Chrome received out of HOLD
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8
Filtered vol. Rec. for Diss. tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	9
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10
All containers received within manufacture's precautionary and/or expiration dates.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11
All containers needing chemical preservation have been checked (except VOA, coliform, & O&G).	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12
All containers preservation checked found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13 If No, was preservative added? <input type="checkbox"/> Yes <input type="checkbox"/> No If added record lot no.: HNO3 _____ H2SO4 _____
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15

Client Notification/ Resolution:

Person Contacted: B. Sulkin

Date/Time: 7-26-16/1445

Comments/ Resolution:

Samples received Hot.

Shipment was sent out by client on Friday 7/22/16 regular overnight FedEx, not Saturday delivery. Received shipment on 7-25-16 (Monday).

DO NOT Run temperature sensitive test. Only run metals & exclude Hg. CM

August 26, 2016

Mr. Nelson Brooke  
Black Warrior Riverkeeper  
712 37th Street South  
Birmingham, Alabama 35222

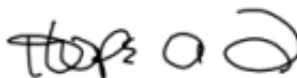
Re: Routine Analytical  
Work Order: 402298

Dear Mr. Brooke:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 25, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,



Hope Taylor  
Project Manager

Purchase Order: PO  
Enclosures

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

BWRK001 Black Warrior Riverkeeper

Client SDG: 402298 GEL Work Order: 402298

**The Qualifiers in this report are defined as follows:**

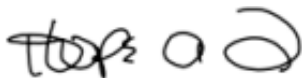
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

Reviewed by



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: discharge @ Mooring cell five  
Sample ID: 402298001  
Matrix: Water  
Collect Date: 21-JUL-16 14:15  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.342	+/-0.476	0.710	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	0.237	+/-0.406	0.356	1.00	pCi/L							
Uranium-238	U	0.361	+/-0.425	0.460	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	4.01	+/-17.9	15.8		pCi/L			MJH1	08/17/16	1124	1584525	2
Radium-226	U	-21.6	+/-33.9	39.7		pCi/L							
Radium-228	U	-1.99	+/-5.63	6.47		pCi/L							
Thorium-228	U	2.27	+/-3.55	3.29		pCi/L							
Thorium-232	U	543	+/-942	1000		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			75	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: discharge @ Mooring cell five  
Sample ID: 402298002  
Matrix: Soil  
Collect Date: 21-JUL-16 14:15  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234		1.82	+/-0.778	0.520	1.00	pCi/g			KXB2	08/04/16	1514	1584862	1
Uranium-235/236	U	-0.0234	+/-0.202	0.468	1.00	pCi/g							
Uranium-238		0.947	+/-0.559	0.237	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		12.9	+/-0.548	0.255		pCi/g			MXR1	08/18/16	1101	1584811	2
Radium-226		1.21	+/-0.0805	0.0545		pCi/g							
Radium-228		1.54	+/-0.142	0.0994		pCi/g							
Thorium-228		1.51	+/-0.0501	0.0402		pCi/g							
Thorium-232		1.54	+/-0.142	0.0994		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	07/27/16	0158	1584736

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			88.1	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor  
DL: Detection Limit  
MDA: Minimum Detectable Activity  
MDC: Minimum Detectable Concentration

Lc/LC: Critical Level  
PF: Prep Factor  
RL: Reporting Limit  
SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: NPDES Outfall  
Sample ID: 402298003  
Matrix: Water  
Collect Date: 21-JUL-16 16:45  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.394	+/-0.425	0.483	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	0.108	+/-0.303	0.323	1.00	pCi/L							
Uranium-238	U	0.220	+/-0.349	0.483	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	-1.31	+/-18.2	21.6		pCi/L			MJH1	08/17/16	1035	1584525	2
Radium-226	U	-30.6	+/-38.2	43.7		pCi/L							
Radium-228	U	-0.372	+/-6.59	6.85		pCi/L							
Thorium-228	U	1.52	+/-3.61	3.57		pCi/L							
Thorium-232	U	1570	+/-1720	1610		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			84.8	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South  
  
Birmingham, Alabama 35222  
Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: Background Project: BWRK00116  
Sample ID: 402298004 Client ID: BWRK001  
Matrix: Water  
Collect Date: 21-JUL-16 17:45  
Receive Date: 25-JUL-16  
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	-0.0333	+/-0.230	0.561	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	0.165	+/-0.324	0.449	1.00	pCi/L							
Uranium-238	U	0.0758	+/-0.213	0.227	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	-31.4	+/-25.2	33.8		pCi/L			MJH1	08/17/16	1036	1584525	2
Radium-226	U	-28.8	+/-41.2	50.8		pCi/L							
Radium-228	U	-0.876	+/-8.83	10.8		pCi/L							
Thorium-228	U	2.01	+/-4.05	3.49		pCi/L							
Thorium-232	UI	0.00	+/-1890	1250		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			96.4	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	Background	Project:	BWRK00116
Sample ID:	402298005	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	21-JUL-16 17:45		
Receive Date:	25-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234	U	0.381	+/-0.410	0.466	1.00	pCi/g			KXB2	08/04/16	1514	1584862	1
Uranium-235/236	U	0.0791	+/-0.297	0.499	1.00	pCi/g							
Uranium-238		0.505	+/-0.438	0.253	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		2.15	+/-0.185	0.103		pCi/g			MXR1	08/18/16	1101	1584811	2
Radium-226		0.510	+/-0.034	0.024		pCi/g							
Radium-228		0.585	+/-0.0638	0.0417		pCi/g							
Thorium-228		0.673	+/-0.0263	0.0188		pCi/g							
Thorium-232		0.585	+/-0.0638	0.0417		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	07/27/16	0158	1584736

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			86.1	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: August 26, 2016

Page 1 of 4

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 402298

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1584860										
QC1203592596	402298001	DUP									
Uranium-233/234	U	0.342	U	0.368	pCi/L	N/A		N/A	KXB2	08/05/16	09:51
	Uncertainty	+/-0.476		+/-0.386							
Uranium-235/236	U	0.237	U	0.339	pCi/L	N/A		N/A			
	Uncertainty	+/-0.406		+/-0.400							
Uranium-238	U	0.361	U	0.204	pCi/L	N/A		N/A			
	Uncertainty	+/-0.425		+/-0.331							
QC1203592597	LCS										
Uranium-233/234				28.5	pCi/L					08/05/16	09:51
	Uncertainty			+/-2.58							
Uranium-235/236				1.64	pCi/L						
	Uncertainty			+/-0.703							
Uranium-238	26.9			24.3	pCi/L		90.1	(75%-125%)			
	Uncertainty			+/-2.38							
QC1203592595	MB										
Uranium-233/234			U	0.256	pCi/L					08/04/16	15:13
	Uncertainty			+/-0.414							
Uranium-235/236			U	0.0858	pCi/L						
	Uncertainty			+/-0.322							
Uranium-238			U	0.299	pCi/L						
	Uncertainty			+/-0.409							
Batch	1584862										
QC1203592599	402298002	DUP									
Uranium-233/234		1.82		0.759	pCi/g	82.2		(0% - 100%)	KXB2	08/04/16	15:14
	Uncertainty	+/-0.778		+/-0.506							
Uranium-235/236	U	-0.0234		0.456	pCi/g	2.49		(0% - 100%)			
	Uncertainty	+/-0.202		+/-0.440							
Uranium-238		0.947		1.44	pCi/g	41.4		(0% - 100%)			
	Uncertainty	+/-0.559		+/-0.666							
QC1203592600	LCS										
Uranium-233/234				27.8	pCi/g					08/04/16	15:14
	Uncertainty			+/-3.07							
Uranium-235/236				0.737	pCi/g						
	Uncertainty			+/-0.609							
Uranium-238	25.2			28.8	pCi/g		114	(75%-125%)			
	Uncertainty			+/-3.13							
QC1203592598	MB										
Uranium-233/234			U	0.125	pCi/g					08/04/16	15:14
	Uncertainty			+/-0.470							
Uranium-235/236			U	0.106	pCi/g						
	Uncertainty			+/-0.589							
Uranium-238			U	-0.0396	pCi/g						

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1584862										
Uncertainty				+/-0.341							
Rad Gamma Spec											
Batch	1584525										
QC1203591804	402298001	DUP									
Potassium-40	U	4.01	U	14.1	pCi/L	N/A		N/A	MJH1	08/18/16	11:01
	Uncertainty	+/-17.9		+/-32.4							
Radium-226	U	-21.6	U	-49.7	pCi/L	N/A		N/A			
	Uncertainty	+/-33.9		+/-45.2							
Radium-228	U	-1.99	UI	0.00	pCi/L	N/A		N/A			
	Uncertainty	+/-5.63		+/-9.73							
Thorium-228	U	2.27	U	0.0135	pCi/L	N/A		N/A			
	Uncertainty	+/-3.55		+/-3.26							
Thorium-232	U	543	U	-357	pCi/L	N/A		N/A			
	Uncertainty	+/-942		+/-1640							
QC1203591805	LCS										
Americium-241	34400			37500	pCi/L		109	(75%-125%)		08/18/16	10:55
	Uncertainty			+/-1510							
Cesium-137	13400			13900	pCi/L		103	(75%-125%)			
	Uncertainty			+/-321							
Cobalt-60	13400			13600	pCi/L		102	(75%-125%)			
	Uncertainty			+/-351							
Potassium-40			U	138	pCi/L						
	Uncertainty			+/-257							
Radium-226			U	-771	pCi/L						
	Uncertainty			+/-1390							
Radium-228			U	-10	pCi/L						
	Uncertainty			+/-353							
Thorium-228			U	104	pCi/L						
	Uncertainty			+/-121							
Thorium-232			U	-4050	pCi/L						
	Uncertainty			+/-63500							
QC1203591803	MB										
Potassium-40			U	13.0	pCi/L						08/17/16 12:47
	Uncertainty			+/-22.0							
Radium-226			U	-31.9	pCi/L						
	Uncertainty			+/-36.4							
Radium-228			U	-2.39	pCi/L						
	Uncertainty			+/-6.44							
Thorium-228			U	-0.059	pCi/L						
	Uncertainty			+/-3.34							
Thorium-232			U	-1060	pCi/L						
	Uncertainty			+/-1370							
Batch	1584811										
QC1203592502	402298005	DUP									

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1584811										
Potassium-40		2.15		2.22	pCi/g	3.16		(0%-20%)	MXR1	08/19/16	11:18
	Uncertainty	+/-0.185		+/-0.277							
Radium-226		0.510		0.500	pCi/g	2.1		(0%-20%)			
	Uncertainty	+/-0.034		+/-0.0538							
Radium-228		0.585		0.626	pCi/g	6.69		(0%-20%)			
	Uncertainty	+/-0.0638		+/-0.105							
Thorium-228		0.673		0.675	pCi/g	0.252		(0%-20%)			
	Uncertainty	+/-0.0263		+/-0.0379							
Thorium-232		0.585		0.626	pCi/g	6.69		(0%-20%)			
	Uncertainty	+/-0.0638		+/-0.105							
QC1203592503	LCS										
Americium-241		489		550	pCi/g		112	(75%-125%)		08/18/16	10:55
	Uncertainty			+/-12.8							
Cesium-137		180		179	pCi/g		99.5	(75%-125%)			
	Uncertainty			+/-3.45							
Cobalt-60		164		158	pCi/g		96.1	(75%-125%)			
	Uncertainty			+/-3.87							
Potassium-40			U	2.65	pCi/g						
	Uncertainty			+/-3.41							
Radium-226			U	1.14	pCi/g						
	Uncertainty			+/-1.42							
Radium-228			U	-1.93	pCi/g						
	Uncertainty			+/-3.76							
Thorium-228			U	-0.201	pCi/g						
	Uncertainty			+/-0.917							
Thorium-232			U	-1.93	pCi/g						
	Uncertainty			+/-3.76							
QC1203592501	MB										
Potassium-40			U	0.0565	pCi/g					08/18/16	11:57
	Uncertainty			+/-0.130							
Radium-226			U	0.00772	pCi/g						
	Uncertainty			+/-0.0256							
Radium-228			U	0.00406	pCi/g						
	Uncertainty			+/-0.0373							
Thorium-228			U	0.0053	pCi/g						
	Uncertainty			+/-0.0214							
Thorium-232			U	0.00406	pCi/g						
	Uncertainty			+/-0.0373							

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

\*\* Analyte is a Tracer compound

< Result is less than value reported

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.



**Radiochemistry  
Technical Case Narrative  
Black Warrior Riverkeeper (BWRK)  
SDG #: 402298**

**Product:** Alphaspec U, Liquid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1584860

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
402298001	discharge @ Mooring cell five
402298003	NPDES Outfall
402298004	Background
1203592595	Method Blank (MB)
1203592596	402298001(discharge @ Mooring cell five) Sample Duplicate (DUP)
1203592597	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Alphaspec U, Solid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1584862

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 20

**Preparation Batch:** 1584736

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
402298002	discharge @ Mooring cell five
402298005	Background
1203592598	Method Blank (MB)
1203592599	402298002(discharge @ Mooring cell five) Sample Duplicate (DUP)
1203592600	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Liquid (Short List)

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 25

**Analytical Batch:** 1584525

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
402298001	discharge @ Mooring cell five
402298003	NPDES Outfall
402298004	Background
1203591803	Method Blank (MB)
1203591804	402298001(discharge @ Mooring cell five) Sample Duplicate (DUP)
1203591805	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Qualifier Information**

<b><u>Qualifier</u></b>	<b><u>Reason</u></b>	<b><u>Analyte</u></b>	<b><u>Sample</u></b>	<b><u>Client Sample</u></b>
UI	Data rejected due to high peak-width.	Thorium-232	402298004	Background
UI	Data rejected due to low abundance.	Radium-228	1203591804	discharge @ Mooring cell five(402298001D

**Product:** Gammaspec, Gamma, Solid (Short List)

**Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R

**Analytical Procedure:** GL-RAD-A-013 REV# 25

**Analytical Batch:** 1584811

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 20

**Preparation Batch:** 1584736

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
402298002	discharge @ Mooring cell five
402298005	Background
1203592501	Method Blank (MB)
1203592502	402298005(Background) Sample Duplicate (DUP)
1203592503	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Sample 1203592502 (BackgroundDUP) was recounted due to high relative percent difference/relative error ratio. The recount is reported.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: <u>1</u> of <u>1</u>	<b>GEL Chain of Custody and Analytical Request</b>  <b>402298</b>	GEL Laboratories, LLC 2040 Savage Road Charleston, SC 29407 Phone: (843) 556-8171 Fax: (843) 766-1178
Project #: <u>Greene Co - AL</u>		
GEL Quote #: _____		
COC Number <sup>(1)</sup> : _____		
PO Number: _____		
<b>GEL Work Order Number:</b>		

# GEL Chain of Custody and Analytical Request

**GEL Laboratories, LLC**  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

402298

GEL Work Order Number:

Client Name: *Black Water Riverkeeper* Phone #: *205-288-0223* Sample Analysis Requested <sup>(5)</sup> (Fill in the number of containers for each test)

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

TAT Requested: Normal:	Rush:	Specify:	Fax Results:	Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4
			(Subject to Surcharge)	
			Yes / No	

	Eastern	Pacific
can	254	254
also	254	254
is	254	254
in	254	254
more	254	254
ke	254	254
of	254	254
sl	254	254
ple	254	254
re	254	254
ctive	254	254
er	254	254
ou	254	254

(205) 288-0223 Nelson Brekke for instructions

Chain of Custody Signatures		Sample Shipping and Delivery Details	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

2	7-1-1	9:15am			
2	2-0	20	1		
2	2-0	20	1		
GEL PM:					

		Date Shipped:
	Amount of Shipment:	


1.) Chain of Custody Number = Client Determined	For Lab Processing Use Only:
---	------------------------------

3.) Field Filtered:	For liquid matrices, indicate with a - Y - for the sample was field filtered or - N - for sample was not field filtered.
<i>Custody Seal Intact?</i>	

[illegible]

6.) Preservative Type: **HA** = Hydrochloric Acid, **NI** = Nitric Acid, **SH** = Sodium Hydroxide, **SA** = Sulfuric Acid, **AA** = Ascorbic Acid, **HX** = Hexane, **ST** = Sodium Thiosulfate, If no preservative is added = leave field blank



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client:	BWRK	SDG/AR/COC/Work Order:	402298
Received By:	Jeff Lall	Date Received:	7/25/16
Suspected Hazard Information	Yes No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?		Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm	
Classified Radioactive II or III by RSO?		If yes, Were swipes taken of sample containers < action levels?	
COC/Samples marked containing PCBs?			
Package, COC, and/or Samples marked as beryllium or asbestos containing?		If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?		Hazard Class Shipped:	UN#:
Samples identified as Foreign Soil?			

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice (None) Other (describe) *all temperatures are recorded in Celsius 30°C
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: Secondary Temperature Device Serial # (If Applicable): ES102009184
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>			(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
16 Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7836 3855 7568

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials

Date

Page

of

GL-CHL-SR-001 Rev 3



**List of current GEL Certifications as of 26 August 2016**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: discharge @ Mooring cell five  
Sample ID: 402298001  
Matrix: Water  
Collect Date: 21-JUL-16 14:15  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
Alphaspec U, Liquid "As Received"												
Uranium-233/234	U	ND	0.710	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	ND	0.356	1.00	pCi/L							
Uranium-238	U	ND	0.460	1.00	pCi/L							
Rad Gamma Spec Analysis												
Gammaspec, Gamma, Liquid (Short List) "As Received"												
Potassium-40	U	ND	15.8		pCi/L			MJH1	08/17/16	1124	1584525	2
Radium-226	U	ND	39.7		pCi/L							
Radium-228	U	ND	6.47		pCi/L							
Thorium-228	U	ND	3.29		pCi/L							
Thorium-232	U	ND	1000		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			75	(15%-125%)

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: discharge @ Mooring cell five  
Sample ID: 402298002  
Matrix: Soil  
Collect Date: 21-JUL-16 14:15  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.82	0.520	1.00	pCi/g			KXB2	08/04/16	1514	1584862	1
Uranium-235/236	U	ND	0.468	1.00	pCi/g							
Uranium-238		0.947	0.237	1.00	pCi/g							
Rad Gamma Spec Analysis												
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"												
Potassium-40		12.9	0.255		pCi/g			MXR1	08/18/16	1101	1584811	2
Radium-226		1.21	0.0545		pCi/g							
Radium-228		1.54	0.0994		pCi/g							
Thorium-228		1.51	0.0402		pCi/g							
Thorium-232		1.54	0.0994		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	07/27/16	0158	1584736

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			88.1	(15%-125%)

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: NPDES Outfall  
Sample ID: 402298003  
Matrix: Water  
Collect Date: 21-JUL-16 16:45  
Receive Date: 25-JUL-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
Alphaspec U, Liquid "As Received"												
Uranium-233/234	U	ND	0.483	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	ND	0.323	1.00	pCi/L							
Uranium-238	U	ND	0.483	1.00	pCi/L							
Rad Gamma Spec Analysis												
Gammaspec, Gamma, Liquid (Short List) "As Received"												
Potassium-40	U	ND	21.6		pCi/L			MJH1	08/17/16	1035	1584525	2
Radium-226	U	ND	43.7		pCi/L							
Radium-228	U	ND	6.85		pCi/L							
Thorium-228	U	ND	3.57		pCi/L							
Thorium-232	U	ND	1610		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			84.8	(15%-125%)

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	Background	Project:	BWRK00116
Sample ID:	402298004	Client ID:	BWRK001
Matrix:	Water		
Collect Date:	21-JUL-16 17:45		
Receive Date:	25-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
Alphaspec U, Liquid "As Received"												
Uranium-233/234	U	ND	0.561	1.00	pCi/L			KXB2	08/04/16	1513	1584860	1
Uranium-235/236	U	ND	0.449	1.00	pCi/L							
Uranium-238	U	ND	0.227	1.00	pCi/L							
Rad Gamma Spec Analysis												
Gammaspec, Gamma, Liquid (Short List) "As Received"												
Potassium-40	U	ND	33.8		pCi/L			MJH1	08/17/16	1036	1584525	2
Radium-226	U	ND	50.8		pCi/L							
Radium-228	U	ND	10.8		pCi/L							
Thorium-228	U	ND	3.49		pCi/L							
Thorium-232	UI	ND	1250		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			96.4	(15%-125%)

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: August 26, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	Background	Project:	BWRK00116
Sample ID:	402298005	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	21-JUL-16 17:45		
Receive Date:	25-JUL-16		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234	U	ND	0.466	1.00	pCi/g			KXB2	08/04/16	1514	1584862	1
Uranium-235/236	U	ND	0.499	1.00	pCi/g							
Uranium-238		0.505	0.253	1.00	pCi/g							
Rad Gamma Spec Analysis												
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"												
Potassium-40		2.15	0.103		pCi/g			MXR1	08/18/16	1101	1584811	2
Radium-226		0.510	0.024		pCi/g							
Radium-228		0.585	0.0417		pCi/g							
Thorium-228		0.673	0.0188		pCi/g							
Thorium-232		0.585	0.0417		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	07/27/16	0158	1584736

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			86.1	(15%-125%)

### Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: August 26, 2016

Page 1 of 4

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 402298

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1584860										
QC1203592596	402298001	DUP									
Uranium-233/234		U	0.342	U	0.368	pCi/L	N/A		N/A KXB2	08/05/16	09:51
Uranium-235/236		U	0.237	U	0.339	pCi/L	N/A		N/A		
Uranium-238		U	0.361	U	0.204	pCi/L	N/A		N/A		
QC1203592597	LCS										
Uranium-233/234				28.5	pCi/L					08/05/16	09:51
Uranium-235/236				1.64	pCi/L						
Uranium-238	26.9			24.3	pCi/L		90.1	(75%-125%)			
QC1203592595	MB										
Uranium-233/234		U		0.256	pCi/L					08/04/16	15:13
Uranium-235/236		U		0.0858	pCi/L						
Uranium-238		U		0.299	pCi/L						
Batch	1584862										
QC1203592599	402298002	DUP									
Uranium-233/234			1.82		0.759	pCi/g	82.2	(0% - 100%)	KXB2	08/04/16	15:14
Uranium-235/236		U	-0.0234		0.456	pCi/g	2.49	(0% - 100%)			
Uranium-238			0.947		1.44	pCi/g	41.4	(0% - 100%)			
QC1203592600	LCS										
Uranium-233/234				27.8	pCi/g					08/04/16	15:14
Uranium-235/236				0.737	pCi/g						
Uranium-238	25.2			28.8	pCi/g		114	(75%-125%)			
QC1203592598	MB										
Uranium-233/234		U		0.125	pCi/g					08/04/16	15:14
Uranium-235/236		U		0.106	pCi/g						
Uranium-238		U		-0.0396	pCi/g						

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1584862										
Rad Gamma Spec											
Batch	1584525										
QC1203591804	402298001	DUP									
Potassium-40		U	4.01	U	14.1	pCi/L	N/A		N/A	MJH1	08/18/16 11:01
Radium-226		U	-21.6	U	-49.7	pCi/L	N/A		N/A		
Radium-228		U	-1.99	UI	0.00	pCi/L	N/A		N/A		
Thorium-228		U	2.27	U	0.0135	pCi/L	N/A		N/A		
Thorium-232		U	543	U	-357	pCi/L	N/A		N/A		
QC1203591805	LCS										
Americium-241	34400				37500	pCi/L	109	(75%-125%)		08/18/16	10:55
Cesium-137	13400				13900	pCi/L	103	(75%-125%)			
Cobalt-60	13400				13600	pCi/L	102	(75%-125%)			
Potassium-40			U		138	pCi/L					
Radium-226			U		-771	pCi/L					
Radium-228			U		-10	pCi/L					
Thorium-228			U		104	pCi/L					
Thorium-232			U		-4050	pCi/L					
QC1203591803	MB										
Potassium-40			U		13.0	pCi/L				08/17/16	12:47
Radium-226			U		-31.9	pCi/L					
Radium-228			U		-2.39	pCi/L					
Thorium-228			U		-0.059	pCi/L					
Thorium-232			U		-1060	pCi/L					
Batch	1584811										
QC1203592502	402298005	DUP									

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1584811										
Potassium-40		2.15		2.22	pCi/g	3.16		(0%-20%)	MXR1	08/19/16	11:18
Radium-226		0.510		0.500	pCi/g	2.1		(0%-20%)			
Radium-228		0.585		0.626	pCi/g	6.69		(0%-20%)			
Thorium-228		0.673		0.675	pCi/g	0.252		(0%-20%)			
Thorium-232		0.585		0.626	pCi/g	6.69		(0%-20%)			
QC1203592503	LCS										
Americium-241	489			550	pCi/g		112	(75%-125%)		08/18/16	10:55
Cesium-137	180			179	pCi/g		99.5	(75%-125%)			
Cobalt-60	164			158	pCi/g		96.1	(75%-125%)			
Potassium-40			U	2.65	pCi/g						
Radium-226			U	1.14	pCi/g						
Radium-228			U	-1.93	pCi/g						
Thorium-228			U	-0.201	pCi/g						
Thorium-232			U	-1.93	pCi/g						
QC1203592501	MB										
Potassium-40			U	0.0565	pCi/g					08/18/16	11:57
Radium-226			U	0.00772	pCi/g						
Radium-228			U	0.00406	pCi/g						
Thorium-228			U	0.0053	pCi/g						
Thorium-232			U	0.00406	pCi/g						

### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 402298

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

December 15, 2016

Nelson Brooke  
Black Warrior River Keeper  
712 37th Street South  
Birmingham, AL 35222

RE: Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

Dear Nelson Brooke:

Enclosed are the analytical results for sample(s) received by the laboratory on August 11, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Melissa MacNaughton  
Melissa.MacNaughton@pacelabs.com  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## CERTIFICATIONS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

### New Orleans Certification IDs

California Env. Lab Accreditation Program Branch:  
11277CA

Florida Department of Health (NELAC): E87595

Illinois Environmental Protection Agency: 0025721

Kansas Department of Health and Environment (NELAC):  
E-10266

Louisiana Dept. of Environmental Quality (NELAC/LELAP):  
02006

Pennsylvania Dept. of Env Protection (NELAC): 68-04202

Texas Commission on Env. Quality (NELAC):  
T104704405-09-TX

U.S. Dept. of Agriculture Foreign Soil Import: P330-10-  
00119

Commonwealth of Virginia (TNI): 480246

---

### Dallas Certification IDs:

400 West Bethany Dr Suite 190, Allen, TX 75013

EPA# TX00074

Florida Certification #: E871118

Texas Certification #: T104704232

Kansas Certification #: E-10388

Arkansas Certification #: 88-0647

Oklahoma Certification #: TX00074

Louisiana Certification #: 30686

Iowa Certification #: 408

Florida Certification #: E871118

Nevada Certification #: TX00074

---

### Asheville Certification IDs

2225 Riverside Drive, Asheville, NC 28804

Florida/NELAP Certification #: E87648

Massachusetts Certification #: M-NC030

North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40

South Carolina Certification #: 99030001

Virginia/VELAP Certification #: 460222

---

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## SAMPLE SUMMARY

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	Matrix	Date Collected	Date Received
2041030001	Sample 1-@ Mooring Cell #5	Water	08/10/16 12:00	08/11/16 10:00
2041030002	Sample 2-NPDES	Water	08/10/16 13:45	08/11/16 10:00
2041030003	Sample 3-Background	Water	08/10/16 15:20	08/11/16 10:00
2041030004	Sample 1-@ Mooring Cell #5	Solid	08/10/16 12:00	08/11/16 10:00
2041030005	Sample 2-NPDES	Solid	08/10/16 13:45	08/11/16 10:00
2041030006	Sample 3-Background	Solid	08/10/16 15:20	08/11/16 10:00

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE ANALYTE COUNT

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2041030001	Sample 1-@ Mooring Cell #5	EPA 6020	KJR	28	PASI-N
		EPA 7470	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		SM 2510B	MNJ	1	PASI-N
		SM 2540C	CN	1	PASI-N
		SM 2540D	CN	1	PASI-N
		ASTM D4239-05	MJP	1	PASI-A
		EPA 300.0	SMS2	1	PASI-N
		EPA 351.2	KEL	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-CI-E	SMS2	1	PASI-N
		SM 4500-NH3 G	KEL	1	PASI-N
		SM 4500-NO3 F	KEL	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		ASTM D516-90,02	SMS2	1	PASI-N
2041030002	Sample 2-NPDES	EPA 6020	KJR	28	PASI-N
		EPA 7470	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		SM 2510B	MNJ	1	PASI-N
		SM 2540C	CN	1	PASI-N
		SM 2540D	CN	1	PASI-N
		ASTM D4239-05	MJP	1	PASI-A
		EPA 300.0	SMS2	1	PASI-N
		EPA 351.2	CN	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-CI-E	SMS2	1	PASI-N
		SM 4500-NH3 G	KEL	1	PASI-N
		SM 4500-NO3 F	KEL	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		ASTM D516-90,02	SMS2	1	PASI-N
2041030003	Sample 3-Background	EPA 6020	KJR	28	PASI-N
		EPA 7470	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		SM 2510B	MNJ	1	PASI-N
		SM 2540C	CN	1	PASI-N
		SM 2540D	CN	1	PASI-N
		ASTM D4239-05	MJP	1	PASI-A

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE ANALYTE COUNT

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2041030004	Sample 1-@ Moorning Cell #5	EPA 300.0	SMS2	1	PASI-N
		EPA 351.2	KEL	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-CI-E	SMS2	1	PASI-N
		SM 4500-NH3 G	KEL	1	PASI-N
		SM 4500-NO3 F	KEL	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		ASTM D516-90,02	SMS2	1	PASI-N
		EPA 6020	KJR	28	PASI-N
		EPA 7471	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		ASTM D4239-05	MJP	1	PASI-A
		EPA 300.0	AJJ	1	PASI-D
		EPA 351.2	KEL	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-NH3 D	KEL	1	PASI-N
		SM 4500-NO3 F	CN	1	PASI-N
		EPA 7196	SMS2	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		EPA 9038	SMS2	1	PASI-N
2041030005	Sample 2-NPDES	EPA 9251	SMS2	1	PASI-N
		EPA 6020	KJR	28	PASI-N
		EPA 7471	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		ASTM D4239-05	MJP	1	PASI-A
		EPA 300.0	AJJ	1	PASI-D
		EPA 351.2	KEL	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-NH3 D	KEL	1	PASI-N
		SM 4500-NO3 F	CN	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		EPA 9038	SMS2	1	PASI-N
2041030006	Sample 3-Background	EPA 9251	SMS2	1	PASI-N
		EPA 6020	KJR	28	PASI-N
		EPA 7471	MHB1	1	PASI-N
		EPA 8270 by SIM	GEJ	19	PASI-N
		ASTM D4239-05	MJP	1	PASI-A

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE ANALYTE COUNT

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0	AJJ	1	PASI-D
		EPA 351.2	KEL	1	PASI-N
		EPA 365.4	KEL	1	PASI-N
		SM 4500-NH3 D	KEL	1	PASI-N
		SM 4500-NO3 F	CN	1	PASI-N
		EPA 7196	SMS2	1	PASI-N
		EPA 9012	SMS2	1	PASI-N
		EPA 9038	SMS2	1	PASI-N
		EPA 9251	SMS2	1	PASI-N

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 60852

B: Analyte was detected in the associated method blank.

- BLANK for HBN 60852 [MPRP/4675 (Lab ID: 251442)]
- Potassium

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 60852

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040649003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 251444)
  - Aluminum
  - Antimony
  - Barium
  - Chromium
  - Cobalt
  - Iron

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

QC Batch: 60852

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040649003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Lithium
- Manganese
- Nickel
- Selenium
- Silicon
- Titanium
- Vanadium
- Zinc
- MSD (Lab ID: 251445)
  - Aluminum
  - Antimony
  - Barium
  - Chromium
  - Cobalt
  - Iron
  - Magnesium
  - Manganese
  - Nickel
  - Selenium
  - Titanium
  - Vanadium
  - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 251445)
  - Barium
  - Magnesium

QC Batch: 60905

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2041030001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 251661)
  - Aluminum
  - Arsenic
  - Boron
  - Cadmium
  - Calcium
  - Chromium
  - Cobalt
  - Copper
  - Lead
  - Lithium
  - Manganese
  - Molybdenum

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

QC Batch: 60905

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2041030001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Nickel
- Selenium
- Silver
- Sodium
- Vanadium
- Zinc
- MSD (Lab ID: 251662)
  - Aluminum
  - Antimony
  - Arsenic
  - Boron
  - Cadmium
  - Calcium
  - Chromium
  - Cobalt
  - Copper
  - Lead
  - Lithium
  - Manganese
  - Molybdenum
  - Selenium
  - Silver
  - Sodium
  - Vanadium
  - Zinc

### Additional Comments:

Analyte Comments:

QC Batch: 60852

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 251442)
  - Silicon
- LCS (Lab ID: 251443)
  - Silicon
- MS (Lab ID: 251444)
  - Silicon
- MSD (Lab ID: 251445)
  - Silicon
- Sample 1-@ Mooring Cell #5 (Lab ID: 2041030004)
  - Silicon

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 6020

**Description:** 6020 MET ICPMS

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

Analyte Comments:

QC Batch: 60852

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- Sample 2-NPDES (Lab ID: 2041030005)
  - Silicon
- Sample 3-Background (Lab ID: 2041030006)
  - Silicon

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 7470

**Description:** 7470 Mercury

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for EPA 7470. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 7471

**Description:** 7471 Mercury

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 60802

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040941001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 251183)
- Mercury

R1: RPD value was outside control limits.

- MSD (Lab ID: 251183)
- Mercury

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 8270 by SIM

**Description:** 8270 MSSV PAH by SIM

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for EPA 8270 by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 61004

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2041030004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 252032)
  - Acenaphthene
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenzo(a,h)anthracene

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 8270 by SIM

**Description:** 8270 MSSV PAH by SIM

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

QC Batch: 61004

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2041030004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Phenanthrene
- Pyrene
- MSD (Lab ID: 252033)
  - Fluoranthene
  - Phenanthrene
  - Pyrene

R1: RPD value was outside control limits.

- MSD (Lab ID: 252033)
  - 2-Methylnaphthalene
  - Acenaphthene
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenzo(a,h)anthracene
  - Fluoranthene
  - Fluorene
  - Indeno(1,2,3-cd)pyrene
  - Naphthalene
  - Phenanthrene
  - Pyrene

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

---

**Method:** EPA 8270 by SIM  
**Description:** 8270 MSSV PAH by SIM SEP  
**Client:** Black Warrior Riverkeeper  
**Date:** December 15, 2016

### General Information:

3 samples were analyzed for EPA 8270 by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3510 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 60996

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 2510B

**Description:** 2510B Specific Conductance

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for SM 2510B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 2540C

**Description:** 2540C Total Dissolved Solids

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 2540D

**Description:** 2540D Total Suspended Solids

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for SM 2540D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** ASTM D4239-05

**Description:** ASTM D4239-05 Sulfur

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for ASTM D4239-05. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 325202

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 1801755)
  - Sulfur
- DUP (Lab ID: 1801804)
  - Sulfur

### Additional Comments:

Analyte Comments:

QC Batch: 325202

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- DUP (Lab ID: 1801755)
  - Sulfur
- DUP (Lab ID: 1801804)
  - Sulfur
- Sample 1-@ Mooring Cell #5 (Lab ID: 2041030001)
  - Sulfur
- Sample 1-@ Mooring Cell #5 (Lab ID: 2041030004)
  - Sulfur
- Sample 2-NPDES (Lab ID: 2041030002)
  - Sulfur
- Sample 2-NPDES (Lab ID: 2041030005)
  - Sulfur
- Sample 3-Background (Lab ID: 2041030003)
  - Sulfur

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** ASTM D4239-05

**Description:** ASTM D4239-05 Sulfur

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

Analyte Comments:

QC Batch: 325202

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- Sample 3-Background (Lab ID: 2041030006)
- Sulfur

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 300.0 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 61211

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 252717)
- Fluoride

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 351.2

**Description:** 351.2 Total Kjeldahl Nitrogen

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for EPA 351.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 351.2 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 61667

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040680001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 254529)
- Nitrogen, Kjeldahl, Total

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 365.4

**Description:** 365.4 Total Phosphorus

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for EPA 365.4. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 365.4 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 61321

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.

- DUP (Lab ID: 253156)
- Phosphorus

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 4500-Cl-E

**Description:** 4500 Chloride

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for SM 4500-Cl-E. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 4500-NH3 D

**Description:** 4500 Ammonia Soil, Distilled

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for SM 4500-NH3 D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with SM 4500-NH3 B with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 4500-NH3 G

**Description:** 4500 Ammonia Water, Distilled

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for SM 4500-NH3 G. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with SM 4500-NH3 B with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 61341

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 2040949001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 253271)
- Nitrogen, Ammonia

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 4500-NO3 F

**Description:** SM4500NO3-F, NO3-NO2

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for SM 4500-NO3 F. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with SM 4500-NO3 F with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** SM 4500-NO3 F

**Description:** 4500NO3-F, NO3-NO2

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for SM 4500-NO3 F. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 7196

**Description:** Chromium, Hexavalent, soluble

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

2 samples were analyzed for EPA 7196. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 7196 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 9012

**Description:** 9012 Cyanide, Total

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

6 samples were analyzed for EPA 9012. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 9010 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 9038

**Description:** 9038 Sulfate, Turbidimetric

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for EPA 9038. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 9038 with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** EPA 9251

**Description:** 9251 Chloride

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

**General Information:**

3 samples were analyzed for EPA 9251. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 9251 with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

**Method:** ASTM D516-90,02

**Description:** ASTM D516-9002 Sulfate Water

**Client:** Black Warrior Riverkeeper

**Date:** December 15, 2016

### General Information:

3 samples were analyzed for ASTM D516-90,02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 1-@ Mooring Cell #5 **Lab ID:** 2041030001 **Collected:** 08/10/16 12:00 **Received:** 08/11/16 10:00 **Matrix:** Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020 Preparation Method: EPA 3010									
Aluminum	0.061J	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7429-90-5	M1
Antimony	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-36-0	M1
Arsenic	0.0062	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-38-2	M1
Barium	0.034	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-39-3	
Beryllium	0.00079J	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-41-7	
Boron	1.6	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 11:45	7440-42-8	M1
Cadmium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-43-9	M1
Calcium	263	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7440-70-2	M1
Chromium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-47-3	M1
Cobalt	0.086	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-48-4	M1
Copper	ND	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 11:45	7440-50-8	M1
Iron	46.4	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7439-89-6	
Lead	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7439-92-1	M1
Lithium	0.39	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7439-93-2	M1
Magnesium	55.1	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7439-95-4	
Manganese	7.9	mg/L	0.0010	0.00086	1	08/12/16 07:44	08/16/16 11:45	7439-96-5	M1
Molybdenum	ND	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 11:45	7439-98-7	M1
Nickel	0.17	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-02-0	M1
Potassium	14.7	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7440-09-7	
Selenium	0.00056J	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7782-49-2	M1
Silicon	9.1	mg/L	0.050	0.025	1	08/12/16 07:44	08/16/16 11:45	7440-21-3	
Silver	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 11:45	7440-22-4	M1
Sodium	64.7	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 11:45	7440-23-5	M1
Strontium	1.6	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-24-6	
Thallium	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 11:45	7440-28-0	
Titanium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 11:45	7440-32-6	
Vanadium	ND	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 11:45	7440-62-2	M1
Zinc	0.072	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 11:45	7440-66-6	M1

### 7470 Mercury

Analytical Method: EPA 7470 Preparation Method: EPA 7470

Mercury	ND	ug/L	0.20	0.050	1	08/11/16 12:55	08/12/16 10:17	7439-97-6	
---------	----	------	------	-------	---	----------------	----------------	-----------	--

### 8270 MSSV PAH by SIM SEP

Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510

Acenaphthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	208-96-8	
Anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	207-08-9	
Chrysene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	206-44-0	
Fluorene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	86-73-7	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 1-@ Mooring Cell #5 **Lab ID:** 2041030001 **Collected:** 08/10/16 12:00 **Received:** 08/11/16 10:00 **Matrix:** Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8270 MSSV PAH by SIM SEP</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510									
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	193-39-5	
2-Methylnaphthalene	ND	ug/L	0.10	0.051	1	08/13/16 13:09	08/15/16 20:25	91-57-6	
Naphthalene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	91-20-3	
Phenanthrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:25	85-01-8	
Pyrene	ND	ug/L	0.10	0.053	1	08/13/16 13:09	08/15/16 20:25	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	79	%	25-150		1	08/13/16 13:09	08/15/16 20:25	321-60-8	
Terphenyl-d14 (S)	82	%	25-150		1	08/13/16 13:09	08/15/16 20:25	1718-51-0	
<b>2510B Specific Conductance</b> Analytical Method: SM 2510B									
Specific Conductance	1700	umhos/cm	1.0	1.0	1		08/12/16 11:58		
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C									
Total Dissolved Solids	1620	mg/L	10.0	10.0	1		08/16/16 16:31		
<b>2540D Total Suspended Solids</b> Analytical Method: SM 2540D									
Total Suspended Solids	22.0	mg/L	4.0	4.0	1		08/12/16 10:02		
<b>ASTM D4239-05 Sulfur</b> Analytical Method: ASTM D4239-05									
Sulfur	ND	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0									
Fluoride	ND	mg/L	0.50	0.50	5		08/17/16 15:00	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2 Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	0.72	mg/L	0.10	0.050	1	08/24/16 10:16	08/25/16 13:50	7727-37-9	
<b>365.4 Total Phosphorus</b> Analytical Method: EPA 365.4 Preparation Method: EPA 365.4									
Phosphorus	ND	mg/L	0.050	0.033	1	08/18/16 10:00	08/22/16 11:16	7723-14-0	
<b>4500 Chloride</b> Analytical Method: SM 4500-Cl-E									
Chloride	14.5	mg/L	1.0	0.50	1		08/15/16 10:55	16887-00-6	
<b>4500 Ammonia Water, Distilled</b> Analytical Method: SM 4500-NH3 G Preparation Method: SM 4500-NH3 B									
Nitrogen, Ammonia	0.69	mg/L	0.10	0.10	1	08/18/16 15:20	08/19/16 12:41	7664-41-7	
<b>4500NO3-F, NO3-NO2</b> Analytical Method: SM 4500-NO3 F									
Nitrogen, NO2 plus NO3	0.042J	mg/L	0.050	0.025	1		08/24/16 14:10		
<b>9012 Cyanide, Total</b> Analytical Method: EPA 9012 Preparation Method: EPA 9010									
Cyanide	ND	mg/L	0.010	0.0050	1	08/22/16 10:00	08/23/16 15:45	57-12-5	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

<b>Sample: Sample 1-@ Mooring Cell #5</b>		<b>Lab ID: 2041030001</b>		Collected: 08/10/16 12:00		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>ASTM D516-9002 Sulfate Water</b>									
Analytical Method: ASTM D516-90.02									
Sulfate	1140	mg/L	50.0	25.0	50		08/15/16 12:27	14808-79-8	M6

<b>Sample: Sample 2-NPDES</b>		<b>Lab ID: 2041030002</b>		Collected: 08/10/16 13:45		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>									
Analytical Method: EPA 6020 Preparation Method: EPA 3010									
Aluminum	0.16	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7429-90-5	
Antimony	0.0027	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-36-0	
Arsenic	0.33	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-38-2	
Barium	0.36	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-39-3	
Beryllium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-41-7	
Boron	0.35	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:00	7440-42-8	
Cadmium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-43-9	
Calcium	26.5	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7440-70-2	
Chromium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-47-3	
Cobalt	0.00056J	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-48-4	
Copper	0.0022J	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 12:00	7440-50-8	
Iron	0.41	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7439-89-6	
Lead	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7439-92-1	
Lithium	0.21	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7439-93-2	
Magnesium	9.7	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7439-95-4	
Manganese	0.37	mg/L	0.0010	0.00086	1	08/12/16 07:44	08/16/16 12:00	7439-96-5	
Molybdenum	0.090	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 12:00	7439-98-7	
Nickel	0.0031	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-02-0	
Potassium	4.0	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7440-09-7	
Selenium	0.00069J	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7782-49-2	
Silicon	2.0	mg/L	0.050	0.025	1	08/12/16 07:44	08/16/16 12:00	7440-21-3	
Silver	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 12:00	7440-22-4	
Sodium	20.4	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:00	7440-23-5	
Strontium	0.42	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-24-6	
Thallium	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 12:00	7440-28-0	
Titanium	0.0050	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:00	7440-32-6	
Vanadium	0.0054	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:00	7440-62-2	
Zinc	0.0027J	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:00	7440-66-6	

<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	0.050	1	08/11/16 12:55	08/12/16 10:19	7439-97-6	

<b>8270 MSSV PAH by SIM SEP</b>		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510							
Acenaphthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	208-96-8	
Anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	120-12-7	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

Sample: Sample 2-NPDES		Lab ID: 2041030002		Collected: 08/10/16 13:45		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8270 MSSV PAH by SIM SEP</b>		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510							
Benzo(a)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	207-08-9	
Chrysene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	206-44-0	
Fluorene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	193-39-5	
2-Methylnaphthalene	ND	ug/L	0.10	0.051	1	08/13/16 13:09	08/15/16 20:46	91-57-6	
Naphthalene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	91-20-3	
Phenanthrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 20:46	85-01-8	
Pyrene	ND	ug/L	0.10	0.053	1	08/13/16 13:09	08/15/16 20:46	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	73	%	25-150		1	08/13/16 13:09	08/15/16 20:46	321-60-8	
Terphenyl-d14 (S)	79	%	25-150		1	08/13/16 13:09	08/15/16 20:46	1718-51-0	
<b>2510B Specific Conductance</b>		Analytical Method: SM 2510B							
Specific Conductance	299	umhos/cm	1.0	1.0	1		08/12/16 12:01		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C							
Total Dissolved Solids	175	mg/L	10.0	10.0	1		08/16/16 16:31		
<b>2540D Total Suspended Solids</b>		Analytical Method: SM 2540D							
Total Suspended Solids	10.0	mg/L	4.0	4.0	1		08/12/16 10:02		
<b>ASTM D4239-05 Sulfur</b>		Analytical Method: ASTM D4239-05							
Sulfur	ND	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0							
Fluoride	0.13	mg/L	0.10	0.10	1		08/17/16 15:00	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b>		Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	1.1	mg/L	0.10	0.050	1	08/26/16 11:02	08/27/16 14:40	7727-37-9	
<b>365.4 Total Phosphorus</b>		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus	0.21	mg/L	0.050	0.033	1	08/18/16 10:00	08/22/16 11:17	7723-14-0	
<b>4500 Chloride</b>		Analytical Method: SM 4500-Cl-E							
Chloride	17.0	mg/L	1.0	0.50	1		08/15/16 10:55	16887-00-6	
<b>4500 Ammonia Water, Distilled</b>		Analytical Method: SM 4500-NH3 G Preparation Method: SM 4500-NH3 B							
Nitrogen, Ammonia	0.32	mg/L	0.10	0.10	1	08/18/16 15:20	08/19/16 12:43	7664-41-7	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

Sample: Sample 2-NPDES		Lab ID: 2041030002		Collected: 08/10/16 13:45		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>4500NO3-F, NO3-NO2</b>		Analytical Method: SM 4500-NO3 F							
Nitrogen, NO2 plus NO3	<b>0.065</b>	mg/L	0.050	0.025	1		08/24/16 14:11		
<b>9012 Cyanide, Total</b>		Analytical Method: EPA 9012 Preparation Method: EPA 9010							
Cyanide	ND	mg/L	0.010	0.0050	1	08/22/16 10:00	08/23/16 15:50	57-12-5	
<b>ASTM D516-9002 Sulfate Water</b>		Analytical Method: ASTM D516-90.02							
Sulfate	<b>69.2</b>	mg/L	5.0	2.5	5		08/15/16 12:23	14808-79-8	

Sample: Sample 3-Background		Lab ID: 2041030003		Collected: 08/10/16 15:20		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3010							
Aluminum	<b>0.099J</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7429-90-5	
Antimony	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-36-0	
Arsenic	<b>0.00056J</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-38-2	
Barium	<b>0.023</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-39-3	
Beryllium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-41-7	
Boron	<b>0.018</b>	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:04	7440-42-8	
Cadmium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-43-9	
Calcium	<b>5.6</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7440-70-2	
Chromium	<b>0.00064J</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-47-3	
Cobalt	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-48-4	
Copper	ND	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 12:04	7440-50-8	
Iron	<b>0.19</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7439-89-6	
Lead	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7439-92-1	
Lithium	<b>0.0012</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7439-93-2	
Magnesium	<b>0.69</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7439-95-4	
Manganese	<b>0.0054</b>	mg/L	0.0010	0.00086	1	08/12/16 07:44	08/16/16 12:04	7439-96-5	
Molybdenum	ND	mg/L	0.0030	0.0015	1	08/12/16 07:44	08/16/16 12:04	7439-98-7	
Nickel	<b>0.0012</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-02-0	
Potassium	<b>0.84</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7440-09-7	
Selenium	ND	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7782-49-2	
Silicon	<b>4.6</b>	mg/L	0.050	0.025	1	08/12/16 07:44	08/16/16 12:04	7440-21-3	
Silver	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 12:04	7440-22-4	
Sodium	<b>2.0</b>	mg/L	0.10	0.050	1	08/12/16 07:44	08/16/16 12:04	7440-23-5	
Strontium	<b>0.041</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-24-6	
Thallium	ND	mg/L	0.00050	0.00025	1	08/12/16 07:44	08/16/16 12:04	7440-28-0	
Titanium	<b>0.0025</b>	mg/L	0.0010	0.00050	1	08/12/16 07:44	08/16/16 12:04	7440-32-6	
Vanadium	ND	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:04	7440-62-2	
Zinc	ND	mg/L	0.0050	0.0025	1	08/12/16 07:44	08/16/16 12:04	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	ND	ug/L	0.20	0.050	1	08/11/16 12:55	08/12/16 10:21	7439-97-6	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Sample: Sample 3-Background		Lab ID: 2041030003		Collected: 08/10/16 15:20		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8270 MSSV PAH by SIM SEP</b>		Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3510							
Acenaphthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	208-96-8	
Anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	207-08-9	
Chrysene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	206-44-0	
Fluorene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	193-39-5	
2-Methylnaphthalene	ND	ug/L	0.10	0.051	1	08/13/16 13:09	08/15/16 21:08	91-57-6	
Naphthalene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	91-20-3	
Phenanthrene	ND	ug/L	0.10	0.050	1	08/13/16 13:09	08/15/16 21:08	85-01-8	
Pyrene	ND	ug/L	0.10	0.053	1	08/13/16 13:09	08/15/16 21:08	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	70	%.	25-150		1	08/13/16 13:09	08/15/16 21:08	321-60-8	
Terphenyl-d14 (S)	74	%.	25-150		1	08/13/16 13:09	08/15/16 21:08	1718-51-0	
<b>2510B Specific Conductance</b>		Analytical Method: SM 2510B							
Specific Conductance	48.9	umhos/cm	1.0	1.0	1		08/12/16 12:02		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C							
Total Dissolved Solids	15.0	mg/L	10.0	10.0	1		08/16/16 16:32		
<b>2540D Total Suspended Solids</b>		Analytical Method: SM 2540D							
Total Suspended Solids	6.0	mg/L	4.0	4.0	1		08/12/16 17:34		
<b>ASTM D4239-05 Sulfur</b>		Analytical Method: ASTM D4239-05							
Sulfur	ND	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0							
Fluoride	ND	mg/L	0.10	0.10	1		08/17/16 15:00	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b>		Analytical Method: EPA 351.2 Preparation Method: EPA 351.2							
Nitrogen, Kjeldahl, Total	0.19	mg/L	0.10	0.050	1	08/24/16 10:16	08/25/16 13:50	7727-37-9	
<b>365.4 Total Phosphorus</b>		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4							
Phosphorus	ND	mg/L	0.050	0.033	1	08/18/16 10:00	08/22/16 12:20	7723-14-0	
<b>4500 Chloride</b>		Analytical Method: SM 4500-Cl-E							
Chloride	2.6	mg/L	1.0	0.50	1		08/15/16 10:55	16887-00-6	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Sample: Sample 3-Background		Lab ID: 2041030003		Collected: 08/10/16 15:20		Received: 08/11/16 10:00		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>4500 Ammonia Water, Distilled</b>		Analytical Method: SM 4500-NH3 G Preparation Method: SM 4500-NH3 B							
Nitrogen, Ammonia	0.10	mg/L	0.10	0.10	1	08/18/16 15:20	08/19/16 11:55	7664-41-7	
<b>4500NO3-F, NO3-NO2</b>		Analytical Method: SM 4500-NO3 F							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	0.025	1		08/24/16 14:13		
<b>9012 Cyanide, Total</b>		Analytical Method: EPA 9012 Preparation Method: EPA 9010							
Cyanide	ND	mg/L	0.010	0.0050	1	08/22/16 10:00	08/23/16 15:50	57-12-5	
<b>ASTM D516-9002 Sulfate Water</b>		Analytical Method: ASTM D516-90,02							
Sulfate	2.1	mg/L	1.0	0.50	1		08/15/16 12:21	14808-79-8	

Sample: Sample 1-@ Moorning Cell #5		Lab ID: 2041030004		Collected: 08/10/16 12:00		Received: 08/11/16 10:00		Matrix: Solid	
-------------------------------------	--	--------------------	--	---------------------------	--	--------------------------	--	---------------	--

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b>		Analytical Method: EPA 6020 Preparation Method: EPA 3050							
Aluminum	5780	mg/kg	27.2	6.3	5	08/11/16 13:25	08/16/16 10:59	7429-90-5	
Antimony	ND	mg/kg	0.27	0.057	5	08/11/16 13:25	08/16/16 10:59	7440-36-0	
Arsenic	1.6	mg/kg	0.27	0.073	5	08/11/16 13:25	08/16/16 10:59	7440-38-2	
Barium	66.0	mg/kg	0.27	0.11	5	08/11/16 13:25	08/16/16 10:59	7440-39-3	
Beryllium	0.80	mg/kg	0.27	0.084	5	08/11/16 13:25	08/16/16 10:59	7440-41-7	
Boron	1.7	mg/kg	1.4	0.27	5	08/11/16 13:25	08/16/16 10:59	7440-42-8	
Cadmium	ND	mg/kg	0.27	0.095	5	08/11/16 13:25	08/16/16 10:59	7440-43-9	
Calcium	1550	mg/kg	27.2	7.5	5	08/11/16 13:25	08/16/16 10:59	7440-70-2	
Chromium	5.9	mg/kg	0.27	0.082	5	08/11/16 13:25	08/16/16 10:59	7440-47-3	
Cobalt	6.4	mg/kg	0.27	0.073	5	08/11/16 13:25	08/16/16 10:59	7440-48-4	
Copper	4.0	mg/kg	1.4	0.34	5	08/11/16 13:25	08/16/16 10:59	7440-50-8	
Iron	8800	mg/kg	27.2	14.0	5	08/11/16 13:25	08/16/16 10:59	7439-89-6	
Lead	8.0	mg/kg	0.27	0.057	5	08/11/16 13:25	08/16/16 10:59	7439-92-1	
Lithium	9.0	mg/kg	0.27	0.17	5	08/11/16 13:25	08/16/16 10:59	7439-93-2	
Magnesium	448	mg/kg	27.2	7.0	5	08/11/16 13:25	08/16/16 10:59	7439-95-4	
Manganese	38.3	mg/kg	0.27	0.20	5	08/11/16 13:25	08/16/16 10:59	7439-96-5	
Molybdenum	ND	mg/kg	0.27	0.15	5	08/11/16 13:25	08/16/16 10:59	7439-98-7	
Nickel	9.8	mg/kg	0.27	0.090	5	08/11/16 13:25	08/16/16 10:59	7440-02-0	
Potassium	382	mg/kg	27.2	8.8	5	08/11/16 13:25	08/16/16 10:59	7440-09-7	
Selenium	0.62	mg/kg	0.27	0.12	5	08/11/16 13:25	08/16/16 10:59	7782-49-2	
Silicon	1380	mg/kg	67.9	24.1	5	08/11/16 13:25	08/16/16 10:59	7440-21-3	N2
Silver	ND	mg/kg	0.27	0.054	5	08/11/16 13:25	08/16/16 10:59	7440-22-4	
Sodium	82.2	mg/kg	27.2	5.8	5	08/11/16 13:25	08/16/16 10:59	7440-23-5	
Strontium	9.7	mg/kg	0.27	0.11	5	08/11/16 13:25	08/16/16 10:59	7440-24-6	
Thallium	0.14J	mg/kg	0.27	0.079	5	08/11/16 13:25	08/16/16 10:59	7440-28-0	
Titanium	10.0	mg/kg	1.4	0.63	5	08/11/16 13:25	08/16/16 10:59	7440-32-6	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

**Sample:** Sample 1-@ Mooring Cell #5    **Lab ID:** 2041030004    **Collected:** 08/10/16 12:00    **Received:** 08/11/16 10:00    **Matrix:** Solid

**Results reported on a "wet-weight" basis**

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020    Preparation Method: EPA 3050									
Vanadium	11.2	mg/kg	1.4	0.11	5	08/11/16 13:25	08/16/16 10:59	7440-62-2	
Zinc	21.0	mg/kg	1.4	0.29	5	08/11/16 13:25	08/16/16 10:59	7440-66-6	
<b>7471 Mercury</b> Analytical Method: EPA 7471    Preparation Method: EPA 7471									
Mercury	0.043	mg/kg	0.012	0.0029	1	08/11/16 13:20	08/15/16 09:50	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM    Preparation Method: EPA 3546									
Acenaphthene	2.6J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	83-32-9	M1,R1
Acenaphthylene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	208-96-8	
Anthracene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	120-12-7	M1,R1
Benzo(a)anthracene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	56-55-3	M1,R1
Benzo(a)pyrene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	50-32-8	M1,R1
Benzo(b)fluoranthene	2.1J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	205-99-2	M1,R1
Benzo(g,h,i)perylene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	191-24-2	M1,R1
Benzo(k)fluoranthene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	207-08-9	M1,R1
Chrysene	2.5J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	218-01-9	M1,R1
Dibenz(a,h)anthracene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	53-70-3	M1,R1
Fluoranthene	8.0	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	206-44-0	M1,R1
Fluorene	1.9J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	86-73-7	M1,R1
Indeno(1,2,3-cd)pyrene	ND	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	193-39-5	M1,R1
2-Methylnaphthalene	2.3J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	91-57-6	R1
Naphthalene	3.1J	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	91-20-3	R1
Phenanthrene	5.8	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	85-01-8	M1,R1
Pyrene	5.8	ug/kg	3.3	1.7	1	08/14/16 12:23	08/16/16 14:18	129-00-0	M1,R1
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	70	%.	22-119		1	08/14/16 12:23	08/16/16 14:18	321-60-8	
Terphenyl-d14 (S)	50	%.	30-149		1	08/14/16 12:23	08/16/16 14:18	1718-51-0	
<b>ASTM D4239-05 Sulfur</b> Analytical Method: ASTM D4239-05									
Sulfur	0.0304	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0    Preparation Method: EPA 300.0									
Fluoride	ND	mg/kg	2.5	0.44	1	08/17/16 07:21	08/17/16 10:51	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2    Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	451	mg/kg	48.1	48.1	1	08/16/16 12:43	08/17/16 11:32	7727-37-9	
<b>365.4 Total Phosphorus</b> Analytical Method: EPA 365.4    Preparation Method: EPA 365.4									
Phosphorus	175	mg/kg	96.2	96.2	10	08/15/16 10:30	08/16/16 12:13	7723-14-0	
<b>4500 Ammonia Soil, Distilled</b> Analytical Method: SM 4500-NH3 D    Preparation Method: SM 4500-NH3 B									
Nitrogen, Ammonia	29.6	mg/kg	5.0	5.0	1	08/12/16 09:19	08/17/16 17:30	7664-41-7	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 1-@ Mooring Cell #5 **Lab ID:** 2041030004 **Collected:** 08/10/16 12:00 **Received:** 08/11/16 10:00 **Matrix:** Solid

*Results reported on a "wet-weight" basis*

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>SM4500NO3-F, NO3-NO2</b> Analytical Method: SM 4500-NO3 F Preparation Method: SM 4500-NO3 F									
Nitrogen, NO2 plus NO3	22.2	mg/kg	4.9	4.9	10	08/12/16 11:23	08/12/16 17:01		
<b>Chromium, Hexavalent, soluble</b> Analytical Method: EPA 7196 Preparation Method: EPA 7196									
Chromium, Hexavalent	ND	mg/kg	0.93	0.46	10	08/15/16 11:58	08/15/16 14:10	18540-29-9	M6
<b>9012 Cyanide, Total</b> Analytical Method: EPA 9012 Preparation Method: EPA 9010									
Cyanide	ND	mg/kg	1.0	0.50	1	08/22/16 10:00	08/23/16 15:50	57-12-5	
<b>9038 Sulfate, Turbidimetric</b> Analytical Method: EPA 9038 Preparation Method: EPA 9038									
Sulfate	1940	mg/kg	463	463	10	08/15/16 11:58	08/15/16 14:13	14808-79-8	
<b>9251 Chloride</b> Analytical Method: EPA 9251 Preparation Method: EPA 9251									
Chloride	392	mg/kg	92.6	46.3	10	08/15/16 11:58	08/15/16 14:06	16887-00-6	

**Sample:** Sample 2-NPDES **Lab ID:** 2041030005 **Collected:** 08/10/16 13:45 **Received:** 08/11/16 10:00 **Matrix:** Solid

*Results reported on a "wet-weight" basis*

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	4250	mg/kg	36.2	8.4	5	08/11/16 13:25	08/16/16 11:02	7429-90-5	
Antimony	0.11J	mg/kg	0.36	0.076	5	08/11/16 13:25	08/16/16 11:02	7440-36-0	
Arsenic	10.5	mg/kg	0.36	0.098	5	08/11/16 13:25	08/16/16 11:02	7440-38-2	
Barium	238	mg/kg	0.36	0.14	5	08/11/16 13:25	08/16/16 11:02	7440-39-3	
Beryllium	0.38	mg/kg	0.36	0.11	5	08/11/16 13:25	08/16/16 11:02	7440-41-7	
Boron	1.5J	mg/kg	1.8	0.36	5	08/11/16 13:25	08/16/16 11:02	7440-42-8	
Cadmium	ND	mg/kg	0.36	0.13	5	08/11/16 13:25	08/16/16 11:02	7440-43-9	
Calcium	2420	mg/kg	36.2	10.0	5	08/11/16 13:25	08/16/16 11:02	7440-70-2	
Chromium	6.1	mg/kg	0.36	0.11	5	08/11/16 13:25	08/16/16 11:02	7440-47-3	
Cobalt	2.2	mg/kg	0.36	0.098	5	08/11/16 13:25	08/16/16 11:02	7440-48-4	
Copper	7.3	mg/kg	1.8	0.46	5	08/11/16 13:25	08/16/16 11:02	7440-50-8	
Iron	7050	mg/kg	36.2	18.6	5	08/11/16 13:25	08/16/16 11:02	7439-89-6	
Lead	5.9	mg/kg	0.36	0.076	5	08/11/16 13:25	08/16/16 11:02	7439-92-1	
Lithium	8.7	mg/kg	0.36	0.23	5	08/11/16 13:25	08/16/16 11:02	7439-93-2	
Magnesium	1030	mg/kg	36.2	9.4	5	08/11/16 13:25	08/16/16 11:02	7439-95-4	
Manganese	98.1	mg/kg	0.36	0.26	5	08/11/16 13:25	08/16/16 11:02	7439-96-5	
Molybdenum	5.0	mg/kg	0.36	0.20	5	08/11/16 13:25	08/16/16 11:02	7439-98-7	
Nickel	3.3	mg/kg	0.36	0.12	5	08/11/16 13:25	08/16/16 11:02	7440-02-0	
Potassium	388	mg/kg	36.2	11.7	5	08/11/16 13:25	08/16/16 11:02	7440-09-7	
Selenium	0.27J	mg/kg	0.36	0.16	5	08/11/16 13:25	08/16/16 11:02	7782-49-2	
Silicon	1750	mg/kg	90.6	32.1	5	08/11/16 13:25	08/16/16 11:02	7440-21-3	N2
Silver	ND	mg/kg	0.36	0.072	5	08/11/16 13:25	08/16/16 11:02	7440-22-4	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 2-NPDES **Lab ID:** 2041030005 **Collected:** 08/10/16 13:45 **Received:** 08/11/16 10:00 **Matrix:** Solid

**Results reported on a "wet-weight" basis**

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Sodium	39.7	mg/kg	36.2	7.7	5	08/11/16 13:25	08/16/16 11:02	7440-23-5	
Strontium	14.5	mg/kg	0.36	0.15	5	08/11/16 13:25	08/16/16 11:02	7440-24-6	
Thallium	0.11J	mg/kg	0.36	0.11	5	08/11/16 13:25	08/16/16 11:02	7440-28-0	
Titanium	26.6	mg/kg	1.8	0.84	5	08/11/16 13:25	08/16/16 11:02	7440-32-6	
Vanadium	9.1	mg/kg	1.8	0.15	5	08/11/16 13:25	08/16/16 11:02	7440-62-2	
Zinc	13.3	mg/kg	1.8	0.39	5	08/11/16 13:25	08/16/16 11:02	7440-66-6	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	ND	mg/kg	0.012	0.0031	1	08/11/16 13:20	08/15/16 09:52	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	3.7	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	83-32-9	
Acenaphthylene	ND	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	208-96-8	
Anthracene	13.0	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	120-12-7	
Benzo(a)anthracene	21.7	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	56-55-3	
Benzo(a)pyrene	23.8	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	50-32-8	
Benzo(b)fluoranthene	46.9	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	205-99-2	
Benzo(g,h,i)perylene	26.7	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	191-24-2	
Benzo(k)fluoranthene	18.6	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	207-08-9	
Chrysene	28.8	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	218-01-9	
Dibenz(a,h)anthracene	6.3	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	53-70-3	
Fluoranthene	48.9	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	206-44-0	
Fluorene	2.5J	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	86-73-7	
Indeno(1,2,3-cd)pyrene	21.8	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	193-39-5	
2-Methylnaphthalene	ND	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	91-57-6	
Naphthalene	ND	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	91-20-3	
Phenanthrene	36.6	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	85-01-8	
Pyrene	37.9	ug/kg	3.3	1.6	1	08/14/16 12:23	08/16/16 14:40	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	68	%.	22-119		1	08/14/16 12:23	08/16/16 14:40	321-60-8	
Terphenyl-d14 (S)	50	%.	30-149		1	08/14/16 12:23	08/16/16 14:40	1718-51-0	
<b>ASTM D4239-05 Sulfur</b> Analytical Method: ASTM D4239-05									
Sulfur	ND	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0 Preparation Method: EPA 300.0									
Fluoride	2.5	mg/kg	2.5	0.44	1	08/17/16 07:21	08/17/16 11:08	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2 Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	230	mg/kg	49.5	49.5	1	08/16/16 12:43	08/17/16 10:41	7727-37-9	
<b>365.4 Total Phosphorus</b> Analytical Method: EPA 365.4 Preparation Method: EPA 365.4									
Phosphorus	129	mg/kg	9.9	9.9	1	08/15/16 10:30	08/16/16 12:15	7723-14-0	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample: Sample 2-NPDES** **Lab ID: 2041030005** Collected: 08/10/16 13:45 Received: 08/11/16 10:00 Matrix: Solid

*Results reported on a "wet-weight" basis*

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>4500 Ammonia Soil, Distilled</b> Analytical Method: SM 4500-NH3 D Preparation Method: SM 4500-NH3 B									
Nitrogen, Ammonia	<b>33.2</b>	mg/kg	5.0	5.0	1	08/12/16 09:19	08/17/16 17:31	7664-41-7	
<b>SM4500NO3-F, NO3-NO2</b> Analytical Method: SM 4500-NO3 F Preparation Method: SM 4500-NO3 F									
Nitrogen, NO2 plus NO3	<b>6.0</b>	mg/kg	4.9	4.9	10	08/12/16 11:23	08/12/16 17:02		
<b>9012 Cyanide, Total</b> Analytical Method: EPA 9012 Preparation Method: EPA 9010									
Cyanide	ND	mg/kg	1.0	0.50	1	08/22/16 10:00	08/23/16 15:50	57-12-5	
<b>9038 Sulfate, Turbidimetric</b> Analytical Method: EPA 9038 Preparation Method: EPA 9038									
Sulfate	<b>9610</b>	mg/kg	2290	2290	50	08/15/16 11:58	08/15/16 14:21	14808-79-8	
<b>9251 Chloride</b> Analytical Method: EPA 9251 Preparation Method: EPA 9251									
Chloride	<b>1850</b>	mg/kg	91.7	45.9	10	08/15/16 11:58	08/15/16 14:07	16887-00-6	

**Sample: Sample 3-Background** **Lab ID: 2041030006** Collected: 08/10/16 15:20 Received: 08/11/16 10:00 Matrix: Solid

*Results reported on a "wet-weight" basis*

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Aluminum	<b>568</b>	mg/kg	27.8	6.4	5	08/11/16 13:25	08/16/16 11:06	7429-90-5	
Antimony	ND	mg/kg	0.28	0.058	5	08/11/16 13:25	08/16/16 11:06	7440-36-0	
Arsenic	<b>0.58</b>	mg/kg	0.28	0.075	5	08/11/16 13:25	08/16/16 11:06	7440-38-2	
Barium	<b>5.7</b>	mg/kg	0.28	0.11	5	08/11/16 13:25	08/16/16 11:06	7440-39-3	
Beryllium	<b>0.089J</b>	mg/kg	0.28	0.086	5	08/11/16 13:25	08/16/16 11:06	7440-41-7	
Boron	<b>0.29J</b>	mg/kg	1.4	0.28	5	08/11/16 13:25	08/16/16 11:06	7440-42-8	
Cadmium	ND	mg/kg	0.28	0.097	5	08/11/16 13:25	08/16/16 11:06	7440-43-9	
Calcium	<b>78.4</b>	mg/kg	27.8	7.7	5	08/11/16 13:25	08/16/16 11:06	7440-70-2	
Chromium	<b>1.4</b>	mg/kg	0.28	0.083	5	08/11/16 13:25	08/16/16 11:06	7440-47-3	
Cobalt	<b>1.3</b>	mg/kg	0.28	0.075	5	08/11/16 13:25	08/16/16 11:06	7440-48-4	
Copper	<b>0.65J</b>	mg/kg	1.4	0.35	5	08/11/16 13:25	08/16/16 11:06	7440-50-8	
Iron	<b>2080</b>	mg/kg	27.8	14.3	5	08/11/16 13:25	08/16/16 11:06	7439-89-6	
Lead	<b>1.1</b>	mg/kg	0.28	0.058	5	08/11/16 13:25	08/16/16 11:06	7439-92-1	
Lithium	<b>0.48</b>	mg/kg	0.28	0.18	5	08/11/16 13:25	08/16/16 11:06	7439-93-2	
Magnesium	<b>62.3</b>	mg/kg	27.8	7.2	5	08/11/16 13:25	08/16/16 11:06	7439-95-4	
Manganese	<b>14.7</b>	mg/kg	0.28	0.20	5	08/11/16 13:25	08/16/16 11:06	7439-96-5	
Molybdenum	ND	mg/kg	0.28	0.15	5	08/11/16 13:25	08/16/16 11:06	7439-98-7	
Nickel	<b>0.91</b>	mg/kg	0.28	0.092	5	08/11/16 13:25	08/16/16 11:06	7440-02-0	
Potassium	<b>106</b>	mg/kg	27.8	9.0	5	08/11/16 13:25	08/16/16 11:06	7440-09-7	B
Selenium	ND	mg/kg	0.28	0.12	5	08/11/16 13:25	08/16/16 11:06	7782-49-2	
Silicon	<b>429</b>	mg/kg	69.4	24.6	5	08/11/16 13:25	08/16/16 11:06	7440-21-3	N2
Silver	ND	mg/kg	0.28	0.055	5	08/11/16 13:25	08/16/16 11:06	7440-22-4	
Sodium	ND	mg/kg	27.8	5.9	5	08/11/16 13:25	08/16/16 11:06	7440-23-5	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 3-Background **Lab ID:** 2041030006 **Collected:** 08/10/16 15:20 **Received:** 08/11/16 10:00 **Matrix:** Solid

**Results reported on a "wet-weight" basis**

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>6020 MET ICPMS</b> Analytical Method: EPA 6020 Preparation Method: EPA 3050									
Strontium	1.0	mg/kg	0.28	0.11	5	08/11/16 13:25	08/16/16 11:06	7440-24-6	
Thallium	ND	mg/kg	0.28	0.081	5	08/11/16 13:25	08/16/16 11:06	7440-28-0	
Titanium	11.7	mg/kg	1.4	0.65	5	08/11/16 13:25	08/16/16 11:06	7440-32-6	
Vanadium	2.4	mg/kg	1.4	0.12	5	08/11/16 13:25	08/16/16 11:06	7440-62-2	
Zinc	3.5	mg/kg	1.4	0.30	5	08/11/16 13:25	08/16/16 11:06	7440-66-6	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	ND	mg/kg	0.0095	0.0024	1	08/11/16 13:20	08/15/16 09:54	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	83-32-9	
Acenaphthylene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	208-96-8	
Anthracene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	120-12-7	
Benzo(a)anthracene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	56-55-3	
Benzo(a)pyrene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	205-99-2	
Benzo(g,h,i)perylene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	191-24-2	
Benzo(k)fluoranthene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	207-08-9	
Chrysene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	53-70-3	
Fluoranthene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	206-44-0	
Fluorene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	193-39-5	
2-Methylnaphthalene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	91-57-6	
Naphthalene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	91-20-3	
Phenanthrene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	85-01-8	
Pyrene	ND	ug/kg	3.2	1.6	1	08/14/16 12:23	08/16/16 15:01	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	75	%.	22-119		1	08/14/16 12:23	08/16/16 15:01	321-60-8	
Terphenyl-d14 (S)	48	%.	30-149		1	08/14/16 12:23	08/16/16 15:01	1718-51-0	
<b>ASTM D4239-05 Sulfur</b> Analytical Method: ASTM D4239-05									
Sulfur	ND	% (w/w)	0.020	0.020	1		08/16/16 14:43		N2
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0 Preparation Method: EPA 300.0									
Fluoride	ND	mg/kg	2.5	0.44	1	08/17/16 07:21	08/17/16 11:26	16984-48-8	
<b>351.2 Total Kjeldahl Nitrogen</b> Analytical Method: EPA 351.2 Preparation Method: EPA 351.2									
Nitrogen, Kjeldahl, Total	63.0	mg/kg	49.2	49.2	1	08/16/16 12:43	08/17/16 10:41	7727-37-9	
<b>365.4 Total Phosphorus</b> Analytical Method: EPA 365.4 Preparation Method: EPA 365.4									
Phosphorus	49.1	mg/kg	9.8	9.8	1	08/15/16 10:30	08/16/16 12:16	7723-14-0	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## ANALYTICAL RESULTS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

**Sample:** Sample 3-Background **Lab ID:** 2041030006 Collected: 08/10/16 15:20 Received: 08/11/16 10:00 Matrix: Solid

**Results reported on a "wet-weight" basis**

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>4500 Ammonia Soil, Distilled</b>									
Analytical Method: SM 4500-NH3 D Preparation Method: SM 4500-NH3 B									
Nitrogen, Ammonia	<b>79.7</b>	mg/kg	5.0	5.0	1	08/12/16 09:19	08/17/16 17:34	7664-41-7	
<b>SM4500NO3-F, NO3-NO2</b>									
Analytical Method: SM 4500-NO3 F Preparation Method: SM 4500-NO3 F									
Nitrogen, NO2 plus NO3	ND	mg/kg	4.7	4.7	10	08/12/16 11:23	08/12/16 17:03		
<b>Chromium, Hexavalent, soluble</b>									
Analytical Method: EPA 7196 Preparation Method: EPA 7196									
Chromium, Hexavalent	ND	mg/kg	0.94	0.47	10	08/15/16 11:58	08/15/16 14:10	18540-29-9	
<b>9012 Cyanide, Total</b>									
Analytical Method: EPA 9012 Preparation Method: EPA 9010									
Cyanide	ND	mg/kg	1.0	0.50	1	08/22/16 10:00	08/23/16 15:50	57-12-5	
<b>9038 Sulfate, Turbidimetric</b>									
Analytical Method: EPA 9038 Preparation Method: EPA 9038									
Sulfate	<b>823</b>	mg/kg	472	472	10	08/15/16 11:58	08/15/16 14:13	14808-79-8	
<b>9251 Chloride</b>									
Analytical Method: EPA 9251 Preparation Method: EPA 9251									
Chloride	<b>383</b>	mg/kg	94.3	47.2	10	08/15/16 11:58	08/15/16 14:07	16887-00-6	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60797 Analysis Method: EPA 7470  
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 251151 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	0.050	08/12/16 09:50	

LABORATORY CONTROL SAMPLE: 251152

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	1	1.1	106	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251484 251485

Parameter	Units	2041008001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	0.00026 mg/L	1	1	1.3	1.3	102	105	75-125	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60802 Analysis Method: EPA 7471  
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 251180 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.020	0.0050	08/15/16 09:05	

LABORATORY CONTROL SAMPLE: 251181

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.1	0.10	105	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251182 251183

Parameter	Units	2040941001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.46	.091	.083	0.56	0.70	105	280	75-125	22	20	M1, R1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60852 Analysis Method: EPA 6020  
QC Batch Method: EPA 3050 Analysis Description: 6020 MET  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 251442 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/kg	ND	50.0	11.6	08/16/16 10:12	
Antimony	mg/kg	ND	0.50	0.10	08/16/16 10:12	
Arsenic	mg/kg	ND	0.50	0.14	08/16/16 10:12	
Barium	mg/kg	ND	0.50	0.20	08/16/16 10:12	
Beryllium	mg/kg	ND	0.50	0.16	08/16/16 10:12	
Boron	mg/kg	ND	2.5	0.50	08/16/16 10:12	
Cadmium	mg/kg	ND	0.50	0.18	08/16/16 10:12	
Calcium	mg/kg	ND	50.0	13.8	08/16/16 10:12	
Chromium	mg/kg	ND	0.50	0.15	08/16/16 10:12	
Cobalt	mg/kg	ND	0.50	0.14	08/16/16 10:12	
Copper	mg/kg	ND	2.5	0.63	08/16/16 10:12	
Iron	mg/kg	ND	50.0	25.7	08/16/16 10:12	
Lead	mg/kg	ND	0.50	0.10	08/16/16 10:12	
Lithium	mg/kg	ND	0.50	0.32	08/16/16 10:12	
Magnesium	mg/kg	ND	50.0	12.9	08/16/16 10:12	
Manganese	mg/kg	ND	0.50	0.36	08/16/16 10:12	
Molybdenum	mg/kg	ND	0.50	0.28	08/16/16 10:12	
Nickel	mg/kg	ND	0.50	0.16	08/16/16 10:12	
Potassium	mg/kg	28.4J	50.0	16.2	08/16/16 10:12	B
Selenium	mg/kg	ND	0.50	0.22	08/16/16 10:12	
Silicon	mg/kg	ND	125	44.3	08/16/16 10:12	N2
Silver	mg/kg	ND	0.50	0.10	08/16/16 10:12	
Sodium	mg/kg	ND	50.0	10.7	08/16/16 10:12	
Strontium	mg/kg	ND	0.50	0.20	08/16/16 10:12	
Thallium	mg/kg	ND	0.50	0.14	08/16/16 10:12	
Titanium	mg/kg	ND	2.5	1.2	08/16/16 10:12	
Vanadium	mg/kg	ND	2.5	0.21	08/16/16 10:12	
Zinc	mg/kg	ND	2.5	0.54	08/16/16 10:12	

LABORATORY CONTROL SAMPLE: 251443

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	1000	1060	106	80-120	
Antimony	mg/kg	10	9.7	97	84-120	
Arsenic	mg/kg	10	9.6	96	84-120	
Barium	mg/kg	10	10.2	102	85-120	
Beryllium	mg/kg	10	9.8	98	80-120	
Boron	mg/kg	10	10.1	101	80-120	
Cadmium	mg/kg	10	10	100	85-120	
Calcium	mg/kg	1000	1030	103	85-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

LABORATORY CONTROL SAMPLE: 251443

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium	mg/kg	10	10.2	102	85-120	
Cobalt	mg/kg	10	10.1	101	85-120	
Copper	mg/kg	10	10.3	103	85-120	
Iron	mg/kg	1000	1040	104	85-120	
Lead	mg/kg	10	10	100	83-120	
Lithium	mg/kg	10	10.1	101	80-120	
Magnesium	mg/kg	1000	1020	102	80-120	
Manganese	mg/kg	10	10.4	104	85-120	
Molybdenum	mg/kg	10	9.8	98	85-120	
Nickel	mg/kg	10	10.1	101	85-120	
Potassium	mg/kg	1000	1060	106	85-119	
Selenium	mg/kg	10	9.6	96	84-120	
Silicon	mg/kg	500	500	100	80-120	N2
Silver	mg/kg	10	10.1	101	81-120	
Sodium	mg/kg	1000	1010	101	85-120	
Strontium	mg/kg	10	10.2	102	85-120	
Thallium	mg/kg	10	9.9	99	83-120	
Titanium	mg/kg	10	10.1	101	85-120	
Vanadium	mg/kg	10	10.3	103	81-120	
Zinc	mg/kg	10	10.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251444

251445

Parameter	Units	2040649003	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		Result	Spike Conc.	Spike Conc.								
Aluminum	mg/kg	10500	926	943	15200	14600	509	434	80-120	4	20	M1
Antimony	mg/kg	ND	9.3	9.4	6.2	6.8	66	70	80-120	8	20	M1
Arsenic	mg/kg	2.3	9.3	9.4	12.1	12.4	106	107	80-120	2	20	
Barium	mg/kg	133	9.3	9.4	132	177	-21	457	80-120	29	20	M1,R1
Beryllium	mg/kg	ND	9.3	9.4	10.2	10.4	108	107	80-120	2	20	
Boron	mg/kg	2.7	9.3	9.4	12.8	13.6	108	115	80-120	6	20	
Cadmium	mg/kg	ND	9.3	9.4	9.4	9.8	101	102	80-120	3	20	
Calcium	mg/kg	1590	926	943	2430	2550	91	101	80-120	5	20	
Chromium	mg/kg	232	9.3	9.4	306	252	795	209	80-120	19	20	M1
Cobalt	mg/kg	30.7	9.3	9.4	48.1	48.0	188	183	80-120	0	20	M1
Copper	mg/kg	31.0	9.3	9.4	42.1	40.8	119	104	80-120	3	20	
Iron	mg/kg	32100	926	943	41500	40800	1010	927	75-125	2	20	M1
Lead	mg/kg	20.9	9.3	9.4	32.0	30.8	120	105	80-120	4	20	
Lithium	mg/kg	5.3	9.3	9.4	17.1	16.9	128	122	75-125	2	20	M1
Magnesium	mg/kg	17100	926	943	17900	24700	96	808	80-120	32	20	M1,R1
Manganese	mg/kg	520	9.3	9.4	563	593	467	776	75-125	5	20	M1
Molybdenum	mg/kg	ND	9.3	9.4	7.9	8.3	81	84	80-120	5	20	
Nickel	mg/kg	220	9.3	9.4	253	296	355	808	80-120	16	20	M1
Potassium	mg/kg	519	926	943	1470	1480	103	102	80-120	1	20	
Selenium	mg/kg	ND	9.3	9.4	6.8	7.4	71	76	80-120	8	20	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251444												
251445												
Parameter	Units	2040649003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Silicon	mg/kg	1310	463	472	1590	1680	61	79	75-125	6	20	M1,N2
Silver	mg/kg	ND	9.3	9.4	8.9	9.3	96	98	80-120	4	20	
Sodium	mg/kg	47.0	926	943	886	924	91	93	80-120	4	20	
Strontium	mg/kg	3.2	9.3	9.4	11.9	12.3	94	96	75-125	3	20	
Thallium	mg/kg	ND	9.3	9.4	9.7	10.0	104	106	80-120	3	20	
Titanium	mg/kg	464	9.3	9.4	598	562	1450	1050	75-125	6	20	M1
Vanadium	mg/kg	85.5	9.3	9.4	111	105	275	207	80-120	5	20	M1
Zinc	mg/kg	64.8	9.3	9.4	77.2	76.6	134	125	80-120	1	20	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60905 Analysis Method: EPA 6020  
QC Batch Method: EPA 3010 Analysis Description: 6020 MET  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 251659 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	mg/L	ND	0.10	0.050	08/16/16 10:28	
Antimony	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Arsenic	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Barium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Beryllium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Boron	mg/L	ND	0.0050	0.0025	08/16/16 10:28	
Cadmium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Calcium	mg/L	ND	0.10	0.050	08/16/16 10:28	
Chromium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Cobalt	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Copper	mg/L	ND	0.0030	0.0015	08/16/16 10:28	
Iron	mg/L	ND	0.10	0.050	08/16/16 10:28	
Lead	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Lithium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Magnesium	mg/L	ND	0.10	0.050	08/16/16 10:28	
Manganese	mg/L	ND	0.0010	0.00086	08/16/16 10:28	
Molybdenum	mg/L	ND	0.0030	0.0015	08/16/16 10:28	
Nickel	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Potassium	mg/L	ND	0.10	0.050	08/16/16 10:28	
Selenium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Silicon	mg/L	ND	0.050	0.025	08/16/16 10:28	
Silver	mg/L	ND	0.00050	0.00025	08/16/16 10:28	
Sodium	mg/L	ND	0.10	0.050	08/16/16 10:28	
Strontium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Thallium	mg/L	ND	0.00050	0.00025	08/16/16 10:28	
Titanium	mg/L	ND	0.0010	0.00050	08/16/16 10:28	
Vanadium	mg/L	ND	0.0050	0.0025	08/16/16 10:28	
Zinc	mg/L	ND	0.0050	0.0025	08/16/16 10:28	

LABORATORY CONTROL SAMPLE: 251660

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/L	2	2.1	106	80-117	
Antimony	mg/L	.02	0.020	99	85-115	
Arsenic	mg/L	.02	0.020	100	83-115	
Barium	mg/L	.02	0.020	101	85-115	
Beryllium	mg/L	.02	0.020	99	80-116	
Boron	mg/L	.02	0.020	101	80-120	
Cadmium	mg/L	.02	0.021	103	85-115	
Calcium	mg/L	2	2.0	100	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

LABORATORY CONTROL SAMPLE: 251660

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium	mg/L	.02	0.020	101	85-115	
Cobalt	mg/L	.02	0.020	101	85-115	
Copper	mg/L	.02	0.021	106	80-120	
Iron	mg/L	2	2.0	100	80-120	
Lead	mg/L	.02	0.019	97	84-115	
Lithium	mg/L	.02	0.020	101	80-120	
Magnesium	mg/L	2	2.0	99	80-120	
Manganese	mg/L	.02	0.020	102	85-115	
Molybdenum	mg/L	.02	0.020	101	81-115	
Nickel	mg/L	.02	0.020	101	80-118	
Potassium	mg/L	2	1.9	93	80-120	
Selenium	mg/L	.02	0.020	102	85-115	
Silicon	mg/L	1	0.98	98	80-120	
Silver	mg/L	.02	0.020	100	80-115	
Sodium	mg/L	2	1.9	96	80-120	
Strontium	mg/L	.02	0.020	101	80-120	
Thallium	mg/L	.02	0.019	97	82-115	
Titanium	mg/L	.02	0.021	103	80-120	
Vanadium	mg/L	.02	0.020	100	81-115	
Zinc	mg/L	.02	0.020	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251661

251662

Parameter	Units	2041030001	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual
		Result	Spike Conc.	Spike Conc.							
Aluminum	mg/L	0.061J	2	2	1.6	1.6	78	78	80-120	1	20 M1
Antimony	mg/L	ND	.02	.02	0.016	0.016	80	79	80-120	1	20 M1
Arsenic	mg/L	0.0062	.02	.02	0.017	0.017	54	53	80-120	0	20 M1
Barium	mg/L	0.034	.02	.02	0.051	0.051	84	84	80-120	0	20
Beryllium	mg/L	0.00079J	.02	.02	0.018	0.018	84	84	80-120	0	20
Boron	mg/L	1.6	.02	.02	1.7	1.7	530	480	75-125	1	20 M1
Cadmium	mg/L	ND	.02	.02	0.014	0.014	72	72	80-120	1	20 M1
Calcium	mg/L	263	2	2	270	271	360	400	80-120	0	20 M1
Chromium	mg/L	ND	.02	.02	0.014	0.014	71	71	80-120	0	20 M1
Cobalt	mg/L	0.086	.02	.02	0.10	0.10	74	76	80-120	0	20 M1
Copper	mg/L	ND	.02	.02	0.011	0.012	52	57	80-120	9	20 M1
Iron	mg/L	46.4	2	2	48.7	48.8	116	120	80-120	0	20
Lead	mg/L	ND	.02	.02	0.016	0.016	79	79	80-120	0	20 M1
Lithium	mg/L	0.39	.02	.02	0.42	0.42	180	158	80-120	1	20 M1
Magnesium	mg/L	55.1	2	2	57.4	57.4	119	116	80-120	0	20
Manganese	mg/L	7.9	.02	.02	8.1	8.1	825	1040	80-120	1	20 M1
Molybdenum	mg/L	ND	.02	.02	0.010	0.010	51	51	80-120	0	20 M1
Nickel	mg/L	0.17	.02	.02	0.18	0.18	78	80	80-120	0	20 M1
Potassium	mg/L	14.7	2	2	16.8	16.9	105	110	75-125	1	20
Selenium	mg/L	0.00056J	.02	.02	0.012	0.011	55	55	80-120	1	20 M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251661											
251662											
Parameter	Units	2041030001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Silicon	mg/L	9.1	1	1	10	10	94	92	75-125	0	20
Silver	mg/L	ND	.02	.02	0.012	0.012	62	62	80-120	0	20 M1
Sodium	mg/L	64.7	2	2	67.6	67.8	144	153	75-125	0	20 M1
Strontium	mg/L	1.6	.02	.02	1.6	1.6	110	95	75-125	0	20
Thallium	mg/L	ND	.02	.02	0.016	0.016	82	81	80-120	1	20
Titanium	mg/L	ND	.02	.02	0.016	0.016	80	81	80-120	1	20
Vanadium	mg/L	ND	.02	.02	0.014	0.014	69	69	80-120	0	20 M1
Zinc	mg/L	0.072	.02	.02	0.084	0.085	58	63	80-120	1	20 M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61004 Analysis Method: EPA 8270 by SIM  
QC Batch Method: EPA 3546 Analysis Description: 8270/3546 MSSV PAH by SIM  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252030 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Acenaphthene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Acenaphthylene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Anthracene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Benzo(a)anthracene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Benzo(a)pyrene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Benzo(b)fluoranthene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Benzo(g,h,i)perylene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Benzo(k)fluoranthene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Chrysene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Dibenz(a,h)anthracene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Fluoranthene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Fluorene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Naphthalene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Phenanthrene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
Pyrene	ug/kg	ND	3.3	1.7	08/16/16 13:35	
2-Fluorobiphenyl (S)	%	82	22-119		08/16/16 13:35	
Terphenyl-d14 (S)	%	84	30-149		08/16/16 13:35	

LABORATORY CONTROL SAMPLE: 252031

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/kg	66.7	50.0	75	29-121	
Acenaphthene	ug/kg	66.7	52.9	79	36-115	
Acenaphthylene	ug/kg	66.7	47.1	71	35-115	
Anthracene	ug/kg	66.7	55.3	83	35-116	
Benzo(a)anthracene	ug/kg	66.7	45.5	68	27-115	
Benzo(a)pyrene	ug/kg	66.7	45.4	68	32-115	
Benzo(b)fluoranthene	ug/kg	66.7	46.6	70	33-115	
Benzo(g,h,i)perylene	ug/kg	66.7	46.7	70	30-115	
Benzo(k)fluoranthene	ug/kg	66.7	50.9	76	35-115	
Chrysene	ug/kg	66.7	50.0	75	30-115	
Dibenz(a,h)anthracene	ug/kg	66.7	48.0	72	30-121	
Fluoranthene	ug/kg	66.7	49.1	74	37-122	
Fluorene	ug/kg	66.7	47.8	72	36-115	
Indeno(1,2,3-cd)pyrene	ug/kg	66.7	47.7	72	31-117	
Naphthalene	ug/kg	66.7	54.1	81	33-115	
Phenanthrene	ug/kg	66.7	50.5	76	33-115	
Pyrene	ug/kg	66.7	47.8	72	22-115	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

LABORATORY CONTROL SAMPLE: 252031

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Fluorobiphenyl (S)	%.			85	22-119	
Terphenyl-d14 (S)	%.			73	30-149	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 252032 252033

Parameter	Units	2041030004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2-Methylnaphthalene	ug/kg	2.3J	64.5	66.6	91.4	62.4	138	90	10-163	38	20	R1
Acenaphthene	ug/kg	2.6J	64.5	66.6	271	73.5	417	107	10-157	115	20	M1,R1
Acenaphthylene	ug/kg	ND	64.5	66.6	60.1	57.8	93	87	10-137	4	20	
Anthracene	ug/kg	ND	64.5	66.6	492	89.2	761	132	10-169	139	20	M1,R1
Benzo(a)anthracene	ug/kg	ND	64.5	66.6	638	88.4	987	131	10-154	151	20	M1,R1
Benzo(a)pyrene	ug/kg	ND	64.5	66.6	437	72.1	676	107	10-152	143	20	M1,R1
Benzo(b)fluoranthene	ug/kg	2.1J	64.5	66.6	579	78.8	894	115	10-156	152	20	M1,R1
Benzo(g,h,i)perylene	ug/kg	ND	64.5	66.6	278	58.1	430	87	10-127	131	20	M1,R1
Benzo(k)fluoranthene	ug/kg	ND	64.5	66.6	254	66.1	391	97	10-151	117	20	M1,R1
Chrysene	ug/kg	2.5J	64.5	66.6	570	81.9	879	119	10-149	150	20	M1,R1
Dibenz(a,h)anthracene	ug/kg	ND	64.5	66.6	114	46.7	177	70	10-124	84	20	M1,R1
Fluoranthene	ug/kg	8.0	64.5	66.6	1430	148	2210	210	10-180	163	20	M1,R1
Fluorene	ug/kg	1.9J	64.5	66.6	324	72.5	499	106	10-154	127	20	M1,R1
Indeno(1,2,3-cd)pyrene	ug/kg	ND	64.5	66.6	251	57.5	388	86	10-126	125	20	M1,R1
Naphthalene	ug/kg	3.1J	64.5	66.6	79.9	63.7	119	91	10-161	23	20	R1
Phenanthrene	ug/kg	5.8	64.5	66.6	1690	161	2610	233	10-172	165	20	M1,R1
Pyrene	ug/kg	5.8	64.5	66.6	1160	124	1780	178	10-170	161	20	M1,R1
2-Fluorobiphenyl (S)	%.						96	81	22-119			
Terphenyl-d14 (S)	%.						86	62	30-149			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper  
Pace Project No.: 2041030

QC Batch: 60996 Analysis Method: EPA 8270 by SIM  
QC Batch Method: EPA 3510 Analysis Description: 8270 Water by SIM MSSV  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 252002 Matrix: Water  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
2-Methylnaphthalene	ug/L	ND	0.10	0.051	08/15/16 15:02	
Acenaphthene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Acenaphthylene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Anthracene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Benzo(a)anthracene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Benzo(a)pyrene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Chrysene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Fluoranthene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Fluorene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Naphthalene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Phenanthrene	ug/L	ND	0.10	0.050	08/15/16 15:02	
Pyrene	ug/L	ND	0.10	0.053	08/15/16 15:02	
2-Fluorobiphenyl (S)	%	68	25-150		08/15/16 15:02	
Terphenyl-d14 (S)	%	78	25-150		08/15/16 15:02	

LABORATORY CONTROL SAMPLE: 252003

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Methylnaphthalene	ug/L	4	2.8	70	35-150	
Acenaphthene	ug/L	4	3.0	75	35-150	
Acenaphthylene	ug/L	4	2.7	68	35-150	
Anthracene	ug/L	4	3.5	87	35-150	
Benzo(a)anthracene	ug/L	4	3.0	76	35-150	
Benzo(a)pyrene	ug/L	4	3.0	75	35-150	
Benzo(b)fluoranthene	ug/L	4	3.1	77	35-150	
Benzo(g,h,i)perylene	ug/L	4	2.8	70	35-150	
Benzo(k)fluoranthene	ug/L	4	3.3	83	35-150	
Chrysene	ug/L	4	3.2	81	35-150	
Dibenz(a,h)anthracene	ug/L	4	2.8	70	35-150	
Fluoranthene	ug/L	4	3.1	78	35-150	
Fluorene	ug/L	4	2.8	71	35-150	
Indeno(1,2,3-cd)pyrene	ug/L	4	2.9	72	35-150	
Naphthalene	ug/L	4	2.9	72	35-150	
Phenanthrene	ug/L	4	3.2	80	35-150	
Pyrene	ug/L	4	3.2	80	35-150	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

LABORATORY CONTROL SAMPLE: 252003

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Fluorobiphenyl (S)	%.			84	25-150	
Terphenyl-d14 (S)	%.			89	25-150	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60958

Analysis Method: SM 2510B

QC Batch Method: SM 2510B

Analysis Description: 2510B Specific Conductance

Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 251823

Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Specific Conductance	umhos/cm	ND	1.0	1.0	08/12/16 11:53	

LABORATORY CONTROL SAMPLE: 251824

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Specific Conductance	umhos/cm	1410	1410	100	95-105	

SAMPLE DUPLICATE: 251825

Parameter	Units	2041030001 Result	Dup Result	RPD	Max RPD	Qualifiers
Specific Conductance	umhos/cm	1700	1710	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61164 Analysis Method: SM 2540C  
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 252533 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	10.0	10.0	08/16/16 16:30	

LABORATORY CONTROL SAMPLE: 252534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	100	96.0	96	80-120	

SAMPLE DUPLICATE: 252535

Parameter	Units	2040950015 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	35.0	30.0	15	20	

SAMPLE DUPLICATE: 252580

Parameter	Units	2040950012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	90.0	90.0	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60895

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 2041030001, 2041030002

METHOD BLANK: 251625

Matrix: Water

Associated Lab Samples: 2041030001, 2041030002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	4.0	4.0	08/12/16 09:55	

LABORATORY CONTROL SAMPLE: 251626

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	90.0	90	80-120	

SAMPLE DUPLICATE: 251627

Parameter	Units	2040957005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	3350	3120	7	20	

SAMPLE DUPLICATE: 251628

Parameter	Units	2040991003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60987

Analysis Method: SM 2540D

QC Batch Method: SM 2540D

Analysis Description: 2540D Total Suspended Solids

Associated Lab Samples: 2041030003

METHOD BLANK: 251939

Matrix: Water

Associated Lab Samples: 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	4.0	4.0	08/12/16 17:33	

LABORATORY CONTROL SAMPLE: 251940

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/L	100	91.0	91	80-120	

SAMPLE DUPLICATE: 251941

Parameter	Units	2041030003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	6.0	6.0	0	20	

SAMPLE DUPLICATE: 251942

Parameter	Units	2041080001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	13.0	15.0	14	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 325202      Analysis Method: ASTM D4239-05  
QC Batch Method: ASTM D4239-05      Analysis Description: ASTM D4239-05 Sulfur  
Associated Lab Samples: 2041030001, 2041030002, 2041030003, 2041030004, 2041030005, 2041030006

SAMPLE DUPLICATE: 1801755

Parameter	Units	92308273001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	0.0427	0.0235	58	10	D6,N2

SAMPLE DUPLICATE: 1801804

Parameter	Units	92308817001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfur	% (w/w)	0.116	0.0967	18	10	D6,N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 59684 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 251865 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/kg	ND	2.5	0.44	08/17/16 10:15	

LABORATORY CONTROL SAMPLE: 251866

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/kg	50	47.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 251883 251884

Parameter	Units	2041030006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/kg	ND	50	50	46.9	48.6	94	97	90-110	4	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61211 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 252715 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	ND	0.10	0.10	08/17/16 15:00	

LABORATORY CONTROL SAMPLE: 252716

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2	2.0	100	90-110	

MATRIX SPIKE SAMPLE: 252718

Parameter	Units	2041173001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	3.2	50	48.5	91	90-110	

SAMPLE DUPLICATE: 252717

Parameter	Units	2041173001 Result	Dup Result	RPD	Max RPD	Qualifiers
Fluoride	mg/L	3.2	3.6	14	10 D6	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61039 Analysis Method: EPA 351.2  
QC Batch Method: EPA 351.2 Analysis Description: 351.2 TKN  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252149 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	ND	50.0	50.0	08/16/16 17:01	

LABORATORY CONTROL SAMPLE: 252150

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	525	507	97	80-120	

MATRIX SPIKE SAMPLE: 252152

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	451	241	640	79	75-125	

SAMPLE DUPLICATE: 252151

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/kg	451	409	10	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch:	61667	Analysis Method:	EPA 351.2
QC Batch Method:	EPA 351.2	Analysis Description:	351.2 TKN
Associated Lab Samples: 2041030001, 2041030003			

METHOD BLANK: 254526 Matrix: Water

Associated Lab Samples: 2041030001, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.094J	0.10	0.050	08/25/16 12:35	

LABORATORY CONTROL SAMPLE: 254527

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5.2	4.9	94	80-120	

MATRIX SPIKE SAMPLE: 254529

Parameter	Units	2040680001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.88	2.5	2.3	57	75-125	M1

SAMPLE DUPLICATE: 254528

Parameter	Units	2040680001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.88	0.92	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch:	61882	Analysis Method:	EPA 351.2
QC Batch Method:	EPA 351.2	Analysis Description:	351.2 TKN
Associated Lab Samples:	2041030002		

METHOD BLANK: 255347 Matrix: Water

Associated Lab Samples: 2041030002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	ND	0.10	0.050	08/27/16 14:38	

LABORATORY CONTROL SAMPLE: 255348

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	5.2	5.1	96	80-120	

MATRIX SPIKE SAMPLE: 255350

Parameter	Units	2041639002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.77	2.5	3.5	111	75-125	

SAMPLE DUPLICATE: 255349

Parameter	Units	2041639002 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Kjeldahl, Total	mg/L	0.77	0.77	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61040

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Total Phosphorus

Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252153

Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/kg	ND	10.0	10.0	08/16/16 11:15	

LABORATORY CONTROL SAMPLE: 252154

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/kg	203	202	100	80-120	

MATRIX SPIKE SAMPLE: 252156

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/kg	175	241	371	81	75-125	

SAMPLE DUPLICATE: 252155

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/kg	175	163	7	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61086

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 2041030003

METHOD BLANK: 252301

Matrix: Water

Associated Lab Samples: 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.050	0.033	08/22/16 11:18	

LABORATORY CONTROL SAMPLE: 252302

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	98	80-120	

MATRIX SPIKE SAMPLE: 253168

Parameter	Units	2041030003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	ND	2.5	2.4	95	75-125	

SAMPLE DUPLICATE: 253167

Parameter	Units	2041030003 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	ND	0.039J		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61321

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 2041030001, 2041030002

METHOD BLANK: 253154

Matrix: Water

Associated Lab Samples: 2041030001, 2041030002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.050	0.033	08/22/16 12:14	

LABORATORY CONTROL SAMPLE: 253155

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.2	107	80-120	

MATRIX SPIKE SAMPLE: 253157

Parameter	Units	2040950010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.11	2.5	2.5	97	75-125	

SAMPLE DUPLICATE: 253156

Parameter	Units	2040950010 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.11	0.18	48	20 D6	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61027 Analysis Method: SM 4500-Cl-E  
QC Batch Method: SM 4500-Cl-E Analysis Description: 4500 Chloride  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 252100 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.54J	1.0	0.50	08/15/16 10:45	

LABORATORY CONTROL SAMPLE: 252101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	107	105	98	90-110	

MATRIX SPIKE SAMPLE: 252103

Parameter	Units	2041030001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	14.5	100	117	103	75-125	

SAMPLE DUPLICATE: 252102

Parameter	Units	2041030001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	14.5	14.6	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60913 Analysis Method: SM 4500-NH3 D  
QC Batch Method: SM 4500-NH3 B Analysis Description: 4500 Ammonia, Distilled  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 251686 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/kg	ND	5.0	5.0	08/17/16 17:25	

LABORATORY CONTROL SAMPLE: 251687

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/kg	50	40.7	81	80-120	

MATRIX SPIKE SAMPLE: 251689

Parameter	Units	2040726001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/kg	2470	188	3210	395	75-125	M6

SAMPLE DUPLICATE: 251688

Parameter	Units	2040726001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/kg	2470	3000	19	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61341 Analysis Method: SM 4500-NH3 G  
QC Batch Method: SM 4500-NH3 B Analysis Description: 4500 Ammonia, Distilled  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 253268 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, Ammonia	mg/L	ND	0.10	0.10	08/19/16 12:25	

LABORATORY CONTROL SAMPLE: 253269

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	1	0.88	88	80-120	

MATRIX SPIKE SAMPLE: 253271

Parameter	Units	2040949001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, Ammonia	mg/L	0.11	1	0.76	65	75-125	M1

SAMPLE DUPLICATE: 253270

Parameter	Units	2040949001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, Ammonia	mg/L	0.11	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 60921 Analysis Method: SM 4500-NO3 F  
QC Batch Method: SM 4500-NO3 F Analysis Description: SM4500NO3-F, Nitrate  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 251715 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	ND	0.50	0.50	08/12/16 16:56	

LABORATORY CONTROL SAMPLE: 251716

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	17.7	18.4	104	80-120	

MATRIX SPIKE SAMPLE: 251718

Parameter	Units	2040726001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	ND	369	380	99	80-120	

SAMPLE DUPLICATE: 251717

Parameter	Units	2040726001 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	ND	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61556 Analysis Method: SM 4500-NO3 F  
QC Batch Method: SM 4500-NO3 F Analysis Description: SM4500NO3-F, Nitrate, Preserved  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 254115 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.050	0.025	08/24/16 14:02	

LABORATORY CONTROL SAMPLE: 254116

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	1.8	1.8	104	90-110	

MATRIX SPIKE SAMPLE: 254118

Parameter	Units	2040995009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	0.44	1	1.5	102	80-120	

SAMPLE DUPLICATE: 254117

Parameter	Units	2040995009 Result	Dup Result	RPD	Max RPD	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	0.44	0.39	13	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61031 Analysis Method: EPA 7196  
QC Batch Method: EPA 7196 Analysis Description: 7196 Chromium, Hexavalent  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252115 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	0.062J	0.10	0.050	08/15/16 11:58	

LABORATORY CONTROL SAMPLE: 252116

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	2	2.2	110	80-120	

MATRIX SPIKE SAMPLE: 252118

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	23.4	10.5	45	75-125	M6

SAMPLE DUPLICATE: 252117

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61467 Analysis Method: EPA 9012  
QC Batch Method: EPA 9010 Analysis Description: 9012 Cyanide  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 253819 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cyanide	mg/kg	ND	1.0	0.50	08/23/16 15:45	

LABORATORY CONTROL SAMPLE: 253820

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/kg	5	4.7	94	80-120	

MATRIX SPIKE SAMPLE: 253822

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/kg	ND	5	4.4	88	75-125	

SAMPLE DUPLICATE: 253821

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Cyanide	mg/kg	ND	ND		20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch:	61465	Analysis Method:	EPA 9012
QC Batch Method:	EPA 9010	Analysis Description:	EPA 9012 Cyanide
Associated Lab Samples:	2041030001, 2041030002, 2041030003		

METHOD BLANK: 253817 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Cyanide	mg/L	ND	0.010	0.0050	08/23/16 15:45	

LABORATORY CONTROL SAMPLE: 253818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide	mg/L	.1	0.094	94	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61034 Analysis Method: EPA 9038  
QC Batch Method: EPA 9038 Analysis Description: 9038 Sulfate, Turbidimetric  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252126 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/kg	ND	50.0	50.0	08/15/16 10:47	

LABORATORY CONTROL SAMPLE: 252127

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/kg	200	211	105	90-110	

MATRIX SPIKE SAMPLE: 252129

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/kg	1940	935	2700	81	75-125	

SAMPLE DUPLICATE: 252128

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/kg	1940	1910	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61032 Analysis Method: EPA 9251  
QC Batch Method: EPA 9251 Analysis Description: 9251 Chloride  
Associated Lab Samples: 2041030004, 2041030005, 2041030006

METHOD BLANK: 252120 Matrix: Solid

Associated Lab Samples: 2041030004, 2041030005, 2041030006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/kg	5.4J	10.0	5.0	08/15/16 10:45	

LABORATORY CONTROL SAMPLE: 252121

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/kg	1070	1050	98	90-110	

MATRIX SPIKE SAMPLE: 252123

Parameter	Units	2041030004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/kg	392	9350	10200	105	75-125	

SAMPLE DUPLICATE: 252122

Parameter	Units	2041030004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/kg	392	351	11	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

QC Batch: 61025 Analysis Method: ASTM D516-90,02  
QC Batch Method: ASTM D516-90,02 Analysis Description: ASTM D516-9002 Sulfate Water  
Associated Lab Samples: 2041030001, 2041030002, 2041030003

METHOD BLANK: 252092 Matrix: Water

Associated Lab Samples: 2041030001, 2041030002, 2041030003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	0.50	08/15/16 10:47	

LABORATORY CONTROL SAMPLE: 252093

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	20	21.0	105	90-110	

MATRIX SPIKE SAMPLE: 252165

Parameter	Units	2041030001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	1140	10	1030	-1060	75-125	M6

SAMPLE DUPLICATE: 252164

Parameter	Units	2041030001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	1140	1140	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALIFIERS

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The Nelac Institute

### LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-D Pace Analytical Services - Dallas

PASI-N Pace Analytical Services - New Orleans

### BATCH QUALIFIERS

Batch: 61072

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

### ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

M6 Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

N2 The lab does not hold NELAC/TNI accreditation for this parameter.

R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2041030004	Sample 1-@ Mooring Cell #5	EPA 3050	60852	EPA 6020	60859
2041030005	Sample 2-NPDES	EPA 3050	60852	EPA 6020	60859
2041030006	Sample 3-Background	EPA 3050	60852	EPA 6020	60859
2041030001	Sample 1-@ Mooring Cell #5	EPA 3010	60905	EPA 6020	60910
2041030002	Sample 2-NPDES	EPA 3010	60905	EPA 6020	60910
2041030003	Sample 3-Background	EPA 3010	60905	EPA 6020	60910
2041030001	Sample 1-@ Mooring Cell #5	EPA 7470	60797	EPA 7470	60862
2041030002	Sample 2-NPDES	EPA 7470	60797	EPA 7470	60862
2041030003	Sample 3-Background	EPA 7470	60797	EPA 7470	60862
2041030004	Sample 1-@ Mooring Cell #5	EPA 7471	60802	EPA 7471	60881
2041030005	Sample 2-NPDES	EPA 7471	60802	EPA 7471	60881
2041030006	Sample 3-Background	EPA 7471	60802	EPA 7471	60881
2041030004	Sample 1-@ Mooring Cell #5	EPA 3546	61004	EPA 8270 by SIM	61163
2041030005	Sample 2-NPDES	EPA 3546	61004	EPA 8270 by SIM	61163
2041030006	Sample 3-Background	EPA 3546	61004	EPA 8270 by SIM	61163
2041030001	Sample 1-@ Mooring Cell #5	EPA 3510	60996	EPA 8270 by SIM	61072
2041030002	Sample 2-NPDES	EPA 3510	60996	EPA 8270 by SIM	61072
2041030003	Sample 3-Background	EPA 3510	60996	EPA 8270 by SIM	61072
2041030001	Sample 1-@ Mooring Cell #5	SM 2510B	60958		
2041030002	Sample 2-NPDES	SM 2510B	60958		
2041030003	Sample 3-Background	SM 2510B	60958		
2041030001	Sample 1-@ Mooring Cell #5	SM 2540C	61164		
2041030002	Sample 2-NPDES	SM 2540C	61164		
2041030003	Sample 3-Background	SM 2540C	61164		
2041030001	Sample 1-@ Mooring Cell #5	SM 2540D	60895		
2041030002	Sample 2-NPDES	SM 2540D	60895		
2041030003	Sample 3-Background	SM 2540D	60987		
2041030001	Sample 1-@ Mooring Cell #5	ASTM D4239-05	325202		
2041030002	Sample 2-NPDES	ASTM D4239-05	325202		
2041030003	Sample 3-Background	ASTM D4239-05	325202		
2041030004	Sample 1-@ Mooring Cell #5	ASTM D4239-05	325202		
2041030005	Sample 2-NPDES	ASTM D4239-05	325202		
2041030006	Sample 3-Background	ASTM D4239-05	325202		
2041030004	Sample 1-@ Mooring Cell #5	EPA 300.0	59684	EPA 300.0	59689
2041030005	Sample 2-NPDES	EPA 300.0	59684	EPA 300.0	59689
2041030006	Sample 3-Background	EPA 300.0	59684	EPA 300.0	59689
2041030001	Sample 1-@ Mooring Cell #5	EPA 300.0	61211		
2041030002	Sample 2-NPDES	EPA 300.0	61211		
2041030003	Sample 3-Background	EPA 300.0	61211		
2041030004	Sample 1-@ Mooring Cell #5	EPA 351.2	61039	EPA 351.2	61173
2041030005	Sample 2-NPDES	EPA 351.2	61039	EPA 351.2	61173
2041030006	Sample 3-Background	EPA 351.2	61039	EPA 351.2	61173

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2041030001	Sample 1-@ Mooring Cell #5	EPA 351.2	61667	EPA 351.2	61790
2041030002	Sample 2-NPDES	EPA 351.2	61882	EPA 351.2	61923
2041030003	Sample 3-Background	EPA 351.2	61667	EPA 351.2	61790
2041030004	Sample 1-@ Mooring Cell #5	EPA 365.4	61040	EPA 365.4	61141
2041030005	Sample 2-NPDES	EPA 365.4	61040	EPA 365.4	61141
2041030006	Sample 3-Background	EPA 365.4	61040	EPA 365.4	61141
2041030001	Sample 1-@ Mooring Cell #5	EPA 365.4	61321	EPA 365.4	61492
2041030002	Sample 2-NPDES	EPA 365.4	61321	EPA 365.4	61492
2041030003	Sample 3-Background	EPA 365.4	61086	EPA 365.4	61493
2041030001	Sample 1-@ Mooring Cell #5	SM 4500-CI-E	61027		
2041030002	Sample 2-NPDES	SM 4500-CI-E	61027		
2041030003	Sample 3-Background	SM 4500-CI-E	61027		
2041030004	Sample 1-@ Mooring Cell #5	SM 4500-NH3 B	60913	SM 4500-NH3 D	61244
2041030005	Sample 2-NPDES	SM 4500-NH3 B	60913	SM 4500-NH3 D	61244
2041030006	Sample 3-Background	SM 4500-NH3 B	60913	SM 4500-NH3 D	61244
2041030001	Sample 1-@ Mooring Cell #5	SM 4500-NH3 B	61341	SM 4500-NH3 G	61403
2041030002	Sample 2-NPDES	SM 4500-NH3 B	61341	SM 4500-NH3 G	61403
2041030003	Sample 3-Background	SM 4500-NH3 B	61341	SM 4500-NH3 G	61403
2041030004	Sample 1-@ Mooring Cell #5	SM 4500-NO3 F	60921	SM 4500-NO3 F	60960
2041030005	Sample 2-NPDES	SM 4500-NO3 F	60921	SM 4500-NO3 F	60960
2041030006	Sample 3-Background	SM 4500-NO3 F	60921	SM 4500-NO3 F	60960
2041030001	Sample 1-@ Mooring Cell #5	SM 4500-NO3 F	61556		
2041030002	Sample 2-NPDES	SM 4500-NO3 F	61556		
2041030003	Sample 3-Background	SM 4500-NO3 F	61556		
2041030004	Sample 1-@ Mooring Cell #5	EPA 7196	61031	EPA 7196	61063
2041030005	Sample 2-NPDES	EPA 7196	61031	EPA 7196	61063
2041030006	Sample 3-Background	EPA 7196	61031	EPA 7196	61063
2041030004	Sample 1-@ Mooring Cell #5	EPA 9010	61467	EPA 9012	61567
2041030005	Sample 2-NPDES	EPA 9010	61467	EPA 9012	61567
2041030006	Sample 3-Background	EPA 9010	61467	EPA 9012	61567
2041030001	Sample 1-@ Mooring Cell #5	EPA 9010	61465	EPA 9012	61566
2041030002	Sample 2-NPDES	EPA 9010	61465	EPA 9012	61566
2041030003	Sample 3-Background	EPA 9010	61465	EPA 9012	61566
2041030004	Sample 1-@ Mooring Cell #5	EPA 9038	61034	EPA 9038	61065
2041030005	Sample 2-NPDES	EPA 9038	61034	EPA 9038	61065
2041030006	Sample 3-Background	EPA 9038	61034	EPA 9038	61065
2041030004	Sample 1-@ Mooring Cell #5	EPA 9251	61032	EPA 9251	61064
2041030005	Sample 2-NPDES	EPA 9251	61032	EPA 9251	61064
2041030006	Sample 3-Background	EPA 9251	61032	EPA 9251	61064
2041030001	Sample 1-@ Mooring Cell #5	ASTM D516-90,02	61025		
2041030002	Sample 2-NPDES	ASTM D516-90,02	61025		

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Black Warrior Riverkeeper

Pace Project No.: 2041030

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2041030003	Sample 3-Background	ASTM D516-90,02	61025		

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**CHAIN-OF-CUSTODY / Analytical Request**  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields

**WO# : 2041030**



**2041030**

<b>Section A</b>		<b>Section B</b>		<b>Section C</b>	
<b>Required Client Info:</b>		<b>Required Project Information:</b>		<b>Invoice Information:</b>	
Company:	Black Warrior Riverkeeper	Report To:	Nelson Brooke	Attention:	
Address:	712 37th Street South	Copy To:	Sulkin Hughes.net	Company Name:	
Birmingham, AL 35222		Project Name:	Barry Sullivan	Address:	
Email:	nbrooke@blackwarriorriver.org	Purchase Order #:		Pace Quote:	
Phone:	205-458-0095	Fax:		Pace Project Manager:	melissa.macknaughton@pacelabs.com
Requested Due Date:		Project #:		Pace Profile #:	7630
				AL	
				Regulatory Agency	
				State / Location	

ITEM #	MATRIX	CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	PRESERVATIVES						ANALYSES TEST	Y/N	Requested Analysis (Y/N)											
				START	END	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME												
1	Sample 1 - @ Mooring Cell #5	WT	WTG	8/10/16	noon	8:50																					
2	"	"	SLG	"	"	"	"																				
3	Sample 2 - NPDES	WT	WTG	8/10/16	1:45	8:13																					
4	"	"	SLG	"	"	"	"																				
5	Sample 3 - Background	WT	WTG	8/10/16	3:20	8:01																					
6	"	"	SLG	"	"	"	"																				
7																											
8																											
9																											
10																											
11																											
12																											

<b>ADDITIONAL COMMENTS</b>		<b>RELINQUISHED BY / AFFILIATION</b>		<b>DATE</b>		<b>TIME</b>		<b>ACCEPTED BY / AFFILIATION</b>		<b>DATE</b>		<b>TIME</b>		<b>TEMP in C</b>		<b>Received on</b>		<b>Ice</b>		<b>Sealed</b>		<b>Cooler</b>		<b>Samples</b>		<b>Intact</b>	
run analyses per quote		Barry Sullivan - Env Court		8/10/16		4:43pm		Barry Sullivan		8/10/16		4:43															
JDS Apo		8/10/16		1000																							

# WO#: 2041030



## Sample Condition Upon Receipt

1000 Riverbend Blvd., Suite F  
St. Rose, LA 70087

PM: MM1

Due Date: 08/25/16

CLIENT: 20-Blk Warri

Proje

Courier: ☒ Pace Courier ☐ Hired Courier ☐ Fed X ☐ UPS ☐ DHL ☐ USPS ☐ Customer ☐ Other

Custody Seal on Cooler/Box Present: [see COC]

Custody Seals intact: ☒ Yes ☐ No

Thermometer  
Used:

- ☐ Therm Fisher IR 5  
☐ Therm Fisher IR 6  
☒ Therm Fisher IR 7

Type of Ice: Wet Blue None

Samples on ice: [see COC]

Cooler Temperature: [see COC]

Temp should be above freezing to 6°C

Date and Initials of person examining  
contents: 8-11-16 JMB

Temp must be measured from Temperature blank when present

Comments:

Temperature Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	1
Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2
Chain of Custody Complete:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3
Chain of Custody Relinquished:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8
Filtered vol. Rec. for Diss. tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	9
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10
All containers received within manufacture's precautionary and/or expiration dates.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11
All containers needing chemical preservation have been checked (except VOA, coliform, & O&G).	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12
All containers preservation checked found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15

### Client Notification/ Resolution:

Person Contacted: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_



**EASI Job Number: 46160**

Laboratory Report prepared for:

---

**PACE ANALYTICAL SERVICES**

1000 Riverbend Blvd.

Suite F

St. Rose, LA 70087

*Attention: Ms. Melissa MacNaughton*

*Workorder: 2041030*

---

**Report Narrative**

On August 11, 2016 three (3) samples were received for analytical characterization. Sample results are shown on the following pages. The chain of custody and the quality assurance / quality control data is attached to the report. If you have any questions regarding this report, please contact me at your convenience.

APPROVED BY:

Michael Antoine  
Laboratory Director

DATE: 08/12/16

**Total Number of Report Pages: 3**

The results contained within this report relate only to the analyses conducted and to the samples received by the laboratory. The results also conform to current requirements of LAC 33:1, AIHA and NELAC unless noted. This report shall not be reproduced, except in full, without written approval of EASI, LLC. EASI, LLC is accredited by the American Industrial Hygiene Association, **AIHA Lab number 102300**, and the Louisiana Department of Environmental Quality, **LELAP Certificate number 02036**.

*NOTE:* This report is intended only for the use of the individual to whom it is addressed and may contain information that is privileged and/or confidential. If this report was received via facsimile or e-mail and the reader is not the intended recipient or the employee responsible for delivering the report to the intended recipient, you are hereby notified that any dissemination, distribution, or copying of this document is

## Laboratory Report

**Sample Identification:** Sample 1 - @ Mooring Cell #5

**Sample Date:** August 10, 2016

**Sample Time:** 1200

**Laboratory Number:** 4616001

**Matrix:** Aqueous

Analysis Parameter	Analysis Result	Analysis Units	PQL	Method	Analysis Date & Time	By
Hexavalent Chromium	BQL	mg/l	0.010	3500-CrD	081116/1145	RT

**Sample Identification:** Sample 2 - NPDES

**Sample Date:** August 10, 2016

**Sample Time:** 1345

**Laboratory Number:** 4616002

**Matrix:** Aqueous

Analysis Parameter	Analysis Result	Analysis Units	PQL	Method	Analysis Date & Time	By
Hexavalent Chromium	BQL	mg/l	0.010	3500-CrD	081116/1145	RT

**Sample Identification:** Sample 3 - Background

**Sample Date:** August 10, 2016

**Sample Time:** 1530

**Laboratory Number:** 4616003

**Matrix:** Aqueous

Analysis Parameter	Analysis Result	Analysis Units	PQL	Method	Analysis Date & Time	By
Hexavalent Chromium	BQL	mg/l	0.010	3500-CrD	081116/1145	RT

### Reference:

Standard Methods for the Examination of Water and Wastewater, 20th Edition.

### Quality Assurance/ Quality Control

Parameter	QC Batch ID	Method Blank Result	Spike Added mg/l	LCS Percent Recovered	LCSD Percent Recovered
Hexavalent Chromium	081116	BQL	0.050	102	104

# Chain of Custody

46160



Workorder: 2041030

Workorder Name:

Black Warrior Riverkeeper

Results Requested By: 8/25/2016

Melissa MacNaughton  
Pace Analytical New Orleans  
1000 Riverbend Blvd  
Suite F  
St. Rose, LA 70087  
Phone (504)469-0333  
Email: Melissa.MacNaughton@pacelabs.com

TEST

P.O. 2041030

State of Sample Origin: AL

Transfers	Released By	Date/Time	Received By	Date/Time	Comments	LAB USE ONLY
1	Sample 1 - @ Mooring Cell #5	8/10/2016 12:00	2041030001	Water		
2	Sample 2 - NPDES	8/10/2016 13:45	2041030002	Water		
3	Sample 3 - Background	8/10/2016 15:30	2041030003	Water		
4						
5						

Cooler Temperature on Receipt	°C	Custody Seal	Y or N	Received on Ice	Y or N	Samples Intact	Y or N
1							
2							
3							

Thursday, August 11, 2016 12:11:13 PM

FMT-ALL-C-002rev.00 24March2009

**Report Prepared for:**

Melissa MacNaughton  
PACE New Orleans  
1000 Riverbend Blvd.  
Suite F  
Saint Rose LA 70087

**REPORT OF  
LABORATORY  
ANALYSIS FOR  
PCDD/PCDF**

**Report Prepared Date:**

August 24, 2016

**Report Information:**

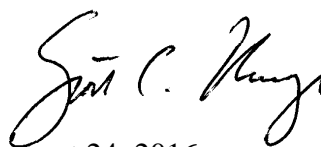
**Pace Project #: 10358854**  
**Sample Receipt Date: 08/12/2016**  
**Client Project #: 2041030**  
**Client Sub PO #: N/A**  
**State Cert #: 40770**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



August 24, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on six samples submitted by a representative of Pace Analytical Services, Inc. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using a modified version of USEPA Method 8290. The reporting limits were set to correspond to the lowest calibration points and nominal 10-gram or 1-Liter sample amounts.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 38-103%. Except for one low value, which was flagged "R" on the results table, the labeled standard recoveries obtained for this project were within the 40-135% target range specified in Method 8290. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

One reported value was obtained from the analysis of a 1:10 dilution of the sample extract and was flagged "D" and "N2". This concentration was also above the calibration range, flagged "E" and should be regarded as an estimate.

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results show the blanks to be free of PCDDs and PCDFs at the reporting limits. These results indicate that the processing steps did not significantly impact the results reported for the field samples.

Laboratory spike samples were also prepared with the sample batch using clean sand or water that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 85-129% with relative percent differences of 0.0-14.5%. These results were within the target ranges for the method. Matrix spikes were prepared with the solid sample batch using sample material from a separate project; results from these analyses will be provided upon request. Matrix spikes were not prepared with the water sample batch.

The responses obtained for the labeled 2,3,4,7,8-PeCDF and PeCDD in calibration standard analysis U160818B\_18 were outside the target ranges. As specified in our procedures, the averages of the daily response factors for these compounds were used in the calculations for the samples from this runshift. The affected values were flagged "Y" on the results tables. It should be noted that the accuracy of the native congener determinations was not impacted by these deviations.

## **REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

Report No.....10358854

Page 94 of 125

## **Appendix A**

### Sample Management

# Chain of Custody

10358854

**Pace Analytical**  
www.pacefab.com

**Workorder:** 2041030      **Workorder Name:** Black Warrior Riverkeeper      **Owner Received Date:** 8/11/2016      **Results Requested By:** 8/25/2016

**Report to:**  
Melissa MacNaughton  
Pace Analytical New Orleans  
1000 Riverbend Blvd  
Suite F  
St. Rose, LA 70087  
Phone (504)469-0333

**Subcontract to:**  
Pace Analytical Minneapolis  
1700 Elm Street SE  
Minneapolis, MN 55414  
Phone (612)607-1700


Item	Sample ID	Sample Type	Collector Date/Time	Lab ID	Matrix	Preserved Containers		Requester/Analysis	LAB USE ONLY
						Unpreserved	Preserved		
1	Sample 1-@ Mooring Cell #5	PS	8/10/2016 12:00	2041030001	Water	1			001
2	Sample 2-NPDES	PS	8/10/2016 13:45	2041030002	Water	1			002
3	Sample 3-Background	PS	8/10/2016 15:30	2041030003	Water	1			003
4	Sample 1-@ Mooring Cell #5	PS	8/10/2016 12:00	2041030004	Solid	1			004
5	Sample 2-NPDES	PS	8/10/2016 13:45	2041030005	Solid	1			005
6	Sample 3-Background	PS	8/10/2016 15:20	2041030006	Solid	1			006


**Transfers**

Released By	Date/Time	Received By	Date/Time
Melissa MacNaughton	8-11-16 1:00 PM	[Signature]	8-12-16 10:00 AM

**Cooler Temperature on Receipt** 1.4 °C      **Custody Seal** Y or N      **Received on Ice** Y or N      **Samples Intact** Y or N

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.  
This chain of custody is considered complete as is since this information is available in the owner laboratory.

	Document Name:	Document Revised: 04Apr2016
	Sample Condition Upon Receipt Form	Page 1 of 1
	Document No.: F-MN-L-213-rev.16	Issuing Authority: Pace Minnesota Quality Office

<b>Sample Condition Upon Receipt</b>	Client Name: <u>Pace NOLA</u>	Project #: <b>WO# : 10358854</b>
	Courier: <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> USPS <input type="checkbox"/> Client <input type="checkbox"/> Commercial <input type="checkbox"/> Pace <input type="checkbox"/> Speedee <input type="checkbox"/> Other:	 10358854
Tracking Number: <u>6344 4051 3070</u>		

Custody Seal on Cooler/Box Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Seals Intact? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Optional: Proj. Due Date: _____ Proj. Name: _____
Packing Material: <input checked="" type="checkbox"/> Bubble Wrap <input type="checkbox"/> Bubble Bags <input type="checkbox"/> None <input type="checkbox"/> Other: _____	Temp Blank? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Thermometer Used: <input type="checkbox"/> 161401163 <input type="checkbox"/> 888A912167504 <input type="checkbox"/> 888A0143310098	Type of Ice: <input checked="" type="checkbox"/> Wet <input type="checkbox"/> Blue <input type="checkbox"/> None	<input type="checkbox"/> Samples on ice, cooling process has begun
Cooler Temp Read (°C): <u>1.4</u>	Cooler Temp Corrected (°C): <u>1.4</u>	Biological Tissue Frozen? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Temp should be above freezing to 6°C	Correction Factor: <u>+0.0</u>	Date and Initials of Person Examining Contents: <u>KAC 8-12-16</u>
USDA Regulated Soil ( <input type="checkbox"/> N/A, water sample) Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.		

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>SLTW</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide)	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

<b>CLIENT NOTIFICATION/RESOLUTION</b>		Field Data Required? <input type="checkbox"/> Yes <input type="checkbox"/> No
Person Contacted: <u>Melissa M</u>	Date/Time: <u>08/12/16</u>	
Comments/Resolution: <u>8290, PCDD/DF</u>		

Project Manager Review: <u>[Signature]</u>	Date: <u>08/12/16</u>
Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e. out of hold, incorrect preservative, out of temp, incorrect containers).	

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

## **Appendix B**

### **Sample Analysis Summary**



## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 1-@ Mooring Cell #5		
Lab Sample ID	2041030001		
Filename	Y160818B_10		
Injected By	BAL		
Total Amount Extracted	950 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 12:00
ICAL ID	Y160816A	Received	08/12/2016 10:00
CCal Filename(s)	Y160818B_01 & Y160818B_17	Extracted	08/15/2016 16:00
Method Blank ID	BLANK-51539	Analyzed	08/19/2016 02:06

Native Isomers	Conc pg/L	EMPC pg/L	RL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	10	2,3,7,8-TCDF-13C	2.00	89
Total TCDF	ND	—	10	2,3,7,8-TCDD-13C	2.00	100
				1,2,3,7,8-PeCDF-13C	2.00	95
2,3,7,8-TCDD	ND	—	10	2,3,4,7,8-PeCDF-13C	2.00	89
Total TCDD	ND	—	10	1,2,3,7,8-PeCDD-13C	2.00	103
				1,2,3,4,7,8-HxCDF-13C	2.00	92
1,2,3,7,8-PeCDF	ND	—	50	1,2,3,6,7,8-HxCDF-13C	2.00	95
2,3,4,7,8-PeCDF	ND	—	50	2,3,4,6,7,8-HxCDF-13C	2.00	99
Total PeCDF	ND	—	50	1,2,3,7,8,9-HxCDF-13C	2.00	93
				1,2,3,4,7,8-HxCDD-13C	2.00	93
1,2,3,7,8-PeCDD	ND	—	50	1,2,3,6,7,8-HxCDD-13C	2.00	85
Total PeCDD	ND	—	50	1,2,3,4,6,7,8-HpCDF-13C	2.00	90
				1,2,3,4,7,8,9-HpCDF-13C	2.00	85
1,2,3,4,7,8-HxCDF	ND	—	50	1,2,3,4,6,7,8-HpCDD-13C	2.00	92
1,2,3,6,7,8-HxCDF	ND	—	50	OCDD-13C	4.00	78
2,3,4,6,7,8-HxCDF	ND	—	50			
1,2,3,7,8,9-HxCDF	ND	—	50	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	50	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	50	2,3,7,8-TCDD-37Cl4	0.20	98
1,2,3,6,7,8-HxCDD	ND	—	50			
1,2,3,7,8,9-HxCDD	ND	—	50			
Total HxCDD	ND	—	50			
1,2,3,4,6,7,8-HpCDF	ND	—	50	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	50	Equivalence: 0.00 pg/L		
Total HpCDF	ND	—	50	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	—	50			
Total HpCDD	ND	—	50			
OCDF	ND	—	100			
OCDD	ND	—	100			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).  
EMPC = Estimated Maximum Possible Concentration  
RL = Reporting Limit

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 2-NPDES		
Lab Sample ID	2041030002		
Filename	Y160818B_11		
Injected By	BAL		
Total Amount Extracted	961 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 13:45
ICAL ID	Y160816A	Received	08/12/2016 10:00
CCal Filename(s)	Y160818B_01 & Y160818B_17	Extracted	08/15/2016 16:00
Method Blank ID	BLANK-51539	Analyzed	08/19/2016 02:49

Native Isomers	Conc pg/L	EMPC pg/L	RL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	10	2,3,7,8-TCDF-13C	2.00	81
Total TCDF	ND	—	10	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	89
2,3,7,8-TCDD	ND	—	10	2,3,4,7,8-PeCDF-13C	2.00	82
Total TCDD	ND	—	10	1,2,3,7,8-PeCDD-13C	2.00	95
				1,2,3,4,7,8-HxCDF-13C	2.00	85
1,2,3,7,8-PeCDF	ND	—	50	1,2,3,6,7,8-HxCDF-13C	2.00	86
2,3,4,7,8-PeCDF	ND	—	50	2,3,4,6,7,8-HxCDF-13C	2.00	92
Total PeCDF	ND	—	50	1,2,3,7,8,9-HxCDF-13C	2.00	87
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	ND	—	50	1,2,3,6,7,8-HxCDD-13C	2.00	83
Total PeCDD	ND	—	50	1,2,3,4,6,7,8-HpCDF-13C	2.00	84
				1,2,3,4,7,8,9-HpCDF-13C	2.00	80
1,2,3,4,7,8-HxCDF	ND	—	50	1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	—	50	OCDD-13C	4.00	71
2,3,4,6,7,8-HxCDF	ND	—	50			
1,2,3,7,8,9-HxCDF	ND	—	50	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	50	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	50	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	—	50			
1,2,3,7,8,9-HxCDD	ND	—	50			
Total HxCDD	ND	—	50			
1,2,3,4,6,7,8-HpCDF	ND	—	50	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	50	Equivalence: 0.00 pg/L		
Total HpCDF	ND	—	50	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	—	50			
Total HpCDD	ND	—	50			
OCDF	ND	—	100			
OCDD	ND	—	100			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).  
EMPC = Estimated Maximum Possible Concentration  
RL = Reporting Limit

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.





## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 3-Background		
Lab Sample ID	2041030003		
Filename	Y160818B_12		
Injected By	BAL		
Total Amount Extracted	941 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 15:30
ICAL ID	Y160816A	Received	08/12/2016 10:00
CCal Filename(s)	Y160818B_01 & Y160818B_17	Extracted	08/15/2016 16:00
Method Blank ID	BLANK-51539	Analyzed	08/19/2016 03:31

Native Isomers	Conc pg/L	EMPC pg/L	RL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	10	2,3,7,8-TCDF-13C	2.00	90
Total TCDF	ND	—	10	2,3,7,8-TCDD-13C	2.00	100
				1,2,3,7,8-PeCDF-13C	2.00	93
2,3,7,8-TCDD	ND	—	10	2,3,4,7,8-PeCDF-13C	2.00	86
Total TCDD	ND	—	10	1,2,3,7,8-PeCDD-13C	2.00	99
				1,2,3,4,7,8-HxCDF-13C	2.00	96
1,2,3,7,8-PeCDF	ND	—	50	1,2,3,6,7,8-HxCDF-13C	2.00	95
2,3,4,7,8-PeCDF	ND	—	50	2,3,4,6,7,8-HxCDF-13C	2.00	100
Total PeCDF	ND	—	50	1,2,3,7,8,9-HxCDF-13C	2.00	93
				1,2,3,4,7,8-HxCDD-13C	2.00	91
1,2,3,7,8-PeCDD	ND	—	50	1,2,3,6,7,8-HxCDD-13C	2.00	87
Total PeCDD	ND	—	50	1,2,3,4,6,7,8-HpCDF-13C	2.00	86
				1,2,3,4,7,8,9-HpCDF-13C	2.00	85
1,2,3,4,7,8-HxCDF	ND	—	50	1,2,3,4,6,7,8-HpCDD-13C	2.00	84
1,2,3,6,7,8-HxCDF	ND	—	50	OCDD-13C	4.00	74
2,3,4,6,7,8-HxCDF	ND	—	50			
1,2,3,7,8,9-HxCDF	ND	—	50	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	50	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	50	2,3,7,8-TCDD-37Cl4	0.20	96
1,2,3,6,7,8-HxCDD	ND	—	50			
1,2,3,7,8,9-HxCDD	ND	—	50			
Total HxCDD	ND	—	50			
1,2,3,4,6,7,8-HpCDF	ND	—	50	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	50	Equivalence: 0.00 pg/L		
Total HpCDF	ND	—	50	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	—	50			
Total HpCDD	ND	—	50			
OCDF	ND	—	100			
OCDD	ND	—	100			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).  
EMPC = Estimated Maximum Possible Concentration  
RL = Reporting Limit

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 1-@ Moorning Cell #5		
Lab Sample ID	2041030004		
Filename	U160822A_14		
Injected By	SMT		
Total Amount Extracted	21.2 g	Matrix	Solid
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 12:00
ICAL ID	U160819	Received	08/12/2016 10:00
CCal Filename(s)	U160822A_07 & U160822A_22	Extracted	08/16/2016 18:45
Method Blank ID	BLANK-51567	Analyzed	08/22/2016 21:07

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	1.0	2,3,7,8-TCDF-13C	2.00	71
Total TCDF	ND	—	1.0	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	84
2,3,7,8-TCDD	ND	—	1.0	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	9.7	—	1.0	1,2,3,7,8-PeCDD-13C	2.00	94
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	—	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	83
2,3,4,7,8-PeCDF	ND	—	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	ND	—	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	ND	—	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	71
Total PeCDD	8.6	—	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	62
				1,2,3,4,7,8,9-HpCDF-13C	2.00	64
1,2,3,4,7,8-HxCDF	ND	—	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	72
1,2,3,6,7,8-HxCDF	ND	—	5.0	OCDD-13C	4.00	70
2,3,4,6,7,8-HxCDF	ND	—	5.0			
1,2,3,7,8,9-HxCDF	ND	—	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	5.0	2,3,7,8-TCDD-37Cl4	0.20	86
1,2,3,6,7,8-HxCDD	5.7	—	5.0			
1,2,3,7,8,9-HxCDD	21.0	—	5.0			
Total HxCDD	170.0	—	5.0			
1,2,3,4,6,7,8-HpCDF	ND	—	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	5.0	Equivalence: 52 ng/Kg		
Total HpCDF	ND	—	5.0	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	480.0	—	5.0			
Total HpCDD	1000.0	—	5.0			
OCDF	ND	—	10.0			
OCDD	44000.0	—	10.0	EDN2		

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a total weight basis and are valid to no more than 2 significant figures.

E = Exceeds calibration range

D = Result obtained from analysis of diluted sample

Nn = Value obtained from additional analysis

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 2-NPDES		
Lab Sample ID	2041030005		
Filename	U160823B_13		
Injected By	SMT		
Total Amount Extracted	21.6 g	Matrix	Solid
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 13:45
ICAL ID	U160819	Received	08/12/2016 10:00
CCal Filename(s)	U160823A_15 & U160823B_16	Extracted	08/16/2016 18:45
Method Blank ID	BLANK-51567	Analyzed	08/24/2016 02:53

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	1.0	2,3,7,8-TCDF-13C	2.00	76
Total TCDF	ND	—	1.0	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	—	1.0	2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	2.9	—	1.0	1,2,3,7,8-PeCDD-13C	2.00	86
				1,2,3,4,7,8-HxCDF-13C	2.00	74
1,2,3,7,8-PeCDF	ND	—	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	81
2,3,4,7,8-PeCDF	ND	—	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	76
Total PeCDF	ND	—	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	73
				1,2,3,4,7,8-HxCDD-13C	2.00	77
1,2,3,7,8-PeCDD	ND	—	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	ND	—	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	68
				1,2,3,4,7,8,9-HpCDF-13C	2.00	63
1,2,3,4,7,8-HxCDF	ND	—	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	70
1,2,3,6,7,8-HxCDF	ND	—	5.0	OCDD-13C	4.00	57
2,3,4,6,7,8-HxCDF	ND	—	5.0			
1,2,3,7,8,9-HxCDF	ND	—	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	5.0	2,3,7,8-TCDD-37Cl4	0.20	85
1,2,3,6,7,8-HxCDD	ND	—	5.0			
1,2,3,7,8,9-HxCDD	ND	—	5.0			
Total HxCDD	12.0	—	5.0			
1,2,3,4,6,7,8-HpCDF	ND	—	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	5.0	Equivalence: 1.7 ng/Kg		
Total HpCDF	ND	—	5.0	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	25.0	—	5.0			
Total HpCDD	71.0	—	5.0			
OCDF	ND	—	10.0			
OCDD	1500.0	—	10.0			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a total weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

## Method 8290 Sample Analysis Results

Client - PACE New Orleans

Client's Sample ID	Sample 3-Background		
Lab Sample ID	2041030006		
Filename	U160822A_16		
Injected By	SMT		
Total Amount Extracted	12.6 g	Matrix	Solid
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	08/10/2016 15:20
ICAL ID	U160819	Received	08/12/2016 10:00
CCal Filename(s)	U160822A_07 & U160822A_22	Extracted	08/16/2016 18:45
Method Blank ID	BLANK-51567	Analyzed	08/22/2016 22:46

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	1.0	2,3,7,8-TCDF-13C	2.00	63
Total TCDF	ND	—	1.0	2,3,7,8-TCDD-13C	2.00	76
				1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	—	1.0	2,3,4,7,8-PeCDF-13C	2.00	66
Total TCDD	ND	—	1.0	1,2,3,7,8-PeCDD-13C	2.00	84
				1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	ND	—	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	73
2,3,4,7,8-PeCDF	ND	—	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	71
Total PeCDF	ND	—	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	64
				1,2,3,4,7,8-HxCDD-13C	2.00	71
1,2,3,7,8-PeCDD	ND	—	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	64
Total PeCDD	ND	—	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	53
				1,2,3,4,7,8,9-HpCDF-13C	2.00	50
1,2,3,4,7,8-HxCDF	ND	—	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	59
1,2,3,6,7,8-HxCDF	ND	—	5.0	OCDD-13C	4.00	38 R
2,3,4,6,7,8-HxCDF	ND	—	5.0			
1,2,3,7,8,9-HxCDF	ND	—	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	5.0	2,3,7,8-TCDD-37Cl4	0.20	74
1,2,3,6,7,8-HxCDD	ND	—	5.0			
1,2,3,7,8,9-HxCDD	ND	—	5.0			
Total HxCDD	ND	—	5.0			
1,2,3,4,6,7,8-HpCDF	ND	—	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	5.0	Equivalence: 0.44 ng/Kg		
Total HpCDF	ND	—	5.0	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	6.0	—	5.0			
Total HpCDD	14.0	—	5.0			
OCDF	ND	—	10.0			
OCDD	380.0	—	10.0			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

ND = Not Detected

NA = Not Applicable

NC = Not Calculated

Results reported on a total weight basis and are valid to no more than 2 significant figures.

R = Recovery outside target range

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

Page 105 of 125



## Method 8290 Blank Analysis Results

Lab Sample ID	BLANK-51539	Matrix	Water
Filename	U160818B_10	Dilution	NA
Total Amount Extracted	1050 mL	Extracted	08/15/2016 16:00
ICAL ID	U160816	Analyzed	08/19/2016 01:16
CCal Filename(s)	U160818B_03 & U160818B_18	Injected By	BAL

Native Isomers	Conc pg/L	EMPC pg/L	RL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	10	2,3,7,8-TCDF-13C	2.00	91
Total TCDF	ND	—	10	2,3,7,8-TCDD-13C	2.00	98
				1,2,3,7,8-PeCDF-13C	2.00	108
2,3,7,8-TCDD	ND	—	10	2,3,4,7,8-PeCDF-13C	2.00	84 Y
Total TCDD	ND	—	10	1,2,3,7,8-PeCDD-13C	2.00	101 Y
				1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	—	50	1,2,3,6,7,8-HxCDF-13C	2.00	83
2,3,4,7,8-PeCDF	ND	—	50	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	ND	—	50	1,2,3,7,8,9-HxCDF-13C	2.00	87
				1,2,3,4,7,8-HxCDD-13C	2.00	68
1,2,3,7,8-PeCDD	ND	—	50	1,2,3,6,7,8-HxCDD-13C	2.00	67
Total PeCDD	ND	—	50	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
				1,2,3,4,7,8,9-HpCDF-13C	2.00	75
1,2,3,4,7,8-HxCDF	ND	—	50	1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	—	50	OCDD-13C	4.00	84
2,3,4,6,7,8-HxCDF	ND	—	50			
1,2,3,7,8,9-HxCDF	ND	—	50	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	50	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	50	2,3,7,8-TCDD-37Cl4	0.20	106
1,2,3,6,7,8-HxCDD	ND	—	50			
1,2,3,7,8,9-HxCDD	ND	—	50			
Total HxCDD	ND	—	50			
1,2,3,4,6,7,8-HpCDF	ND	—	50	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	50	Equivalence: 0.00 pg/L		
Total HpCDF	ND	—	50	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	—	50			
Total HpCDD	ND	—	50			
OCDF	ND	—	100			
OCDD	ND	—	100			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Y = Calculated using average of daily RFs

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Blank Analysis Results

Lab Sample ID	BLANK-51567	Matrix	Solid
Filename	Y160822B_04	Dilution	NA
Total Amount Extracted	20.0 g	Extracted	08/16/2016 18:45
ICAL ID	Y160816A	Analyzed	08/22/2016 20:02
CCal Filename(s)	Y160822A_08 & Y160822B_18	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	—	1.0	2,3,7,8-TCDF-13C	2.00	76
Total TCDF	ND	—	1.0	2,3,7,8-TCDD-13C	2.00	87
				1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	ND	—	1.0	2,3,4,7,8-PeCDF-13C	2.00	62
Total TCDD	ND	—	1.0	1,2,3,7,8-PeCDD-13C	2.00	70
				1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	—	5.0	1,2,3,6,7,8-HxCDF-13C	2.00	85
2,3,4,7,8-PeCDF	ND	—	5.0	2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	ND	—	5.0	1,2,3,7,8,9-HxCDF-13C	2.00	76
				1,2,3,4,7,8-HxCDD-13C	2.00	79
1,2,3,7,8-PeCDD	ND	—	5.0	1,2,3,6,7,8-HxCDD-13C	2.00	78
Total PeCDD	ND	—	5.0	1,2,3,4,6,7,8-HpCDF-13C	2.00	78
				1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	ND	—	5.0	1,2,3,4,6,7,8-HpCDD-13C	2.00	82
1,2,3,6,7,8-HxCDF	ND	—	5.0	OCDD-13C	4.00	60
2,3,4,6,7,8-HxCDF	ND	—	5.0			
1,2,3,7,8,9-HxCDF	ND	—	5.0	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	—	5.0	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	—	5.0	2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	ND	—	5.0			
1,2,3,7,8,9-HxCDD	ND	—	5.0			
Total HxCDD	ND	—	5.0			
1,2,3,4,6,7,8-HpCDF	ND	—	5.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	—	5.0	Equivalence: 0.00 ng/Kg		
Total HpCDF	ND	—	5.0	(Using ITE Factors)		
1,2,3,4,6,7,8-HpCDD	ND	—	5.0			
Total HpCDD	ND	—	5.0			
OCDF	ND	—	10.0			
OCDD	ND	—	10.0			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

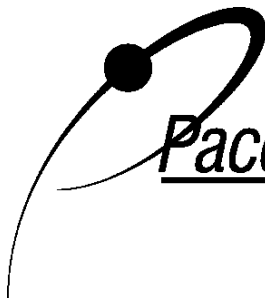
EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Laboratory Control Spike Results

Lab Sample ID	LCS-51568	Matrix	Solid
Filename	U160822A_06	Dilution	NA
Total Amount Extracted	20.4 g	Extracted	08/16/2016 18:45
ICAL ID	U160819	Analyzed	08/22/2016 14:21
CCal Filename(s)	U160822A_04 & U160822A_07	Injected By	SMT
Method Blank ID	BLANK-51567		

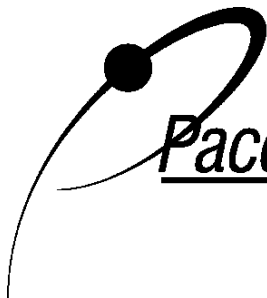
Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.21	105	2,3,7,8-TCDF-13C	2.0	80
Total TCDF				2,3,7,8-TCDD-13C	2.0	90
				1,2,3,7,8-PeCDF-13C	2.0	78
2,3,7,8-TCDD	0.20	0.17	85	2,3,4,7,8-PeCDF-13C	2.0	69
Total TCDD				1,2,3,7,8-PeCDD-13C	2.0	82
				1,2,3,4,7,8-HxCDF-13C	2.0	71
1,2,3,7,8-PeCDF	1.0	1.0	104	1,2,3,6,7,8-HxCDF-13C	2.0	84
2,3,4,7,8-PeCDF	1.0	1.1	106	2,3,4,6,7,8-HxCDF-13C	2.0	77
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.0	74
				1,2,3,4,7,8-HxCDD-13C	2.0	71
1,2,3,7,8-PeCDD	1.0	0.94	94	1,2,3,6,7,8-HxCDD-13C	2.0	77
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.0	68
				1,2,3,4,7,8,9-HpCDF-13C	2.0	62
1,2,3,4,7,8-HxCDF	1.0	1.1	111	1,2,3,4,6,7,8-HpCDD-13C	2.0	71
1,2,3,6,7,8-HxCDF	1.0	1.0	103	OCDD-13C	4.0	53
2,3,4,6,7,8-HxCDF	1.0	0.99	99			
1,2,3,7,8,9-HxCDF	1.0	0.93	93	1,2,3,4-TCDD-13C	2.0	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.0	NA
1,2,3,4,7,8-HxCDD	1.0	1.1	107	2,3,7,8-TCDD-37Cl4	0.20	87
1,2,3,6,7,8-HxCDD	1.0	1.2	119			
1,2,3,7,8,9-HxCDD	1.0	1.1	113			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.0	1.1	112			
1,2,3,4,7,8,9-HpCDF	1.0	1.0	103			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.0	0.97	97			
Total HpCDD						
OCDF	2.0	2.1	105			
OCDD	2.0	2.3	114			

Qs = Quantity Spiked  
Qm = Quantity Measured  
Rec. = Recovery (Expressed as Percent)  
R = Recovery outside of target range

Y = RF averaging used in calculations  
Nn = Value obtained from additional analysis  
NA = Not Applicable  
\* = See Discussion

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.



## Method 8290 Laboratory Control Spike Results

Lab Sample ID	LCS-51540	Matrix	Water
Filename	Y160822B_17	Dilution	NA
Total Amount Extracted	1040 mL	Extracted	08/15/2016 16:00
ICAL ID	Y160816A	Analyzed	08/23/2016 05:19
CCal Filename(s)	Y160822A_08 & Y160822B_18	Injected By	BAL
Method Blank ID	BLANK-51539		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.22	112	2,3,7,8-TCDF-13C	2.0	91
Total TCDF				2,3,7,8-TCDD-13C	2.0	99
				1,2,3,7,8-PeCDF-13C	2.0	85
2,3,7,8-TCDD	0.20	0.18	90	2,3,4,7,8-PeCDF-13C	2.0	81
Total TCDD				1,2,3,7,8-PeCDD-13C	2.0	90
				1,2,3,4,7,8-HxCDF-13C	2.0	86
1,2,3,7,8-PeCDF	1.0	1.1	113	1,2,3,6,7,8-HxCDF-13C	2.0	94
2,3,4,7,8-PeCDF	1.0	1.2	118	2,3,4,6,7,8-HxCDF-13C	2.0	98
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.0	95
				1,2,3,4,7,8-HxCDD-13C	2.0	94
1,2,3,7,8-PeCDD	1.0	1.0	102	1,2,3,6,7,8-HxCDD-13C	2.0	80
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.0	92
				1,2,3,4,7,8,9-HpCDF-13C	2.0	94
1,2,3,4,7,8-HxCDF	1.0	1.1	110	1,2,3,4,6,7,8-HpCDD-13C	2.0	101
1,2,3,6,7,8-HxCDF	1.0	1.1	106	OCDD-13C	4.0	81
2,3,4,6,7,8-HxCDF	1.0	0.99	99			
1,2,3,7,8,9-HxCDF	1.0	1.0	101	1,2,3,4-TCDD-13C	2.0	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.0	NA
1,2,3,4,7,8-HxCDD	1.0	1.0	102	2,3,7,8-TCDD-37Cl4	0.20	97
1,2,3,6,7,8-HxCDD	1.0	1.3	129			
1,2,3,7,8,9-HxCDD	1.0	1.2	117			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.0	1.1	111			
1,2,3,4,7,8,9-HpCDF	1.0	1.0	103			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.0	1.1	106			
Total HpCDD						
OCDF	2.0	2.3	113			
OCDD	2.0	2.2	112			

Qs = Quantity Spiked  
Qm = Quantity Measured  
Rec. = Recovery (Expressed as Percent)  
R = Recovery outside of target range

Y = RF averaging used in calculations  
Nn = Value obtained from additional analysis  
NA = Not Applicable  
\* = See Discussion

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.





## Method 8290 Laboratory Control Spike Results

Lab Sample ID	LCSD-51557	Matrix	Water
Filename	U160818B_07	Dilution	NA
Total Amount Extracted	1050 mL	Extracted	08/15/2016 16:00
ICAL ID	U160816	Analyzed	08/18/2016 22:47
CCal Filename(s)	U160818B_03 & U160818B_18	Injected By	BAL
Method Blank ID	BLANK-51539		

Native Isomers	Qs (ng)	Qm (ng)	% Rec.	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	0.20	0.24	120	2,3,7,8-TCDF-13C	2.0	101
Total TCDF				2,3,7,8-TCDD-13C	2.0	107
				1,2,3,7,8-PeCDF-13C	2.0	126
2,3,7,8-TCDD	0.20	0.19	94	2,3,4,7,8-PeCDF-13C	2.0	96 Y
Total TCDD				1,2,3,7,8-PeCDD-13C	2.0	108 Y
				1,2,3,4,7,8-HxCDF-13C	2.0	87
1,2,3,7,8-PeCDF	1.0	1.1	113	1,2,3,6,7,8-HxCDF-13C	2.0	89
2,3,4,7,8-PeCDF	1.0	1.2	121	2,3,4,6,7,8-HxCDF-13C	2.0	93
Total PeCDF				1,2,3,7,8,9-HxCDF-13C	2.0	97
				1,2,3,4,7,8-HxCDD-13C	2.0	83
1,2,3,7,8-PeCDD	1.0	1.0	102	1,2,3,6,7,8-HxCDD-13C	2.0	78
Total PeCDD				1,2,3,4,6,7,8-HpCDF-13C	2.0	75
				1,2,3,4,7,8,9-HpCDF-13C	2.0	85
1,2,3,4,7,8-HxCDF	1.0	1.2	116	1,2,3,4,6,7,8-HpCDD-13C	2.0	82
1,2,3,6,7,8-HxCDF	1.0	1.2	116	OCDD-13C	4.0	93
2,3,4,6,7,8-HxCDF	1.0	1.1	108			
1,2,3,7,8,9-HxCDF	1.0	1.1	109	1,2,3,4-TCDD-13C	2.0	NA
Total HxCDF				1,2,3,7,8,9-HxCDD-13C	2.0	NA
1,2,3,4,7,8-HxCDD	1.0	1.2	118	2,3,7,8-TCDD-37Cl4	0.20	108
1,2,3,6,7,8-HxCDD	1.0	1.2	124			
1,2,3,7,8,9-HxCDD	1.0	1.3	127			
Total HxCDD						
1,2,3,4,6,7,8-HpCDF	1.0	1.2	119			
1,2,3,4,7,8,9-HpCDF	1.0	1.1	108			
Total HpCDF						
1,2,3,4,6,7,8-HpCDD	1.0	1.1	109			
Total HpCDD						
OCDF	2.0	2.5	123			
OCDD	2.0	2.4	122			

Qs = Quantity Spiked  
Qm = Quantity Measured  
Rec. = Recovery (Expressed as Percent)  
R = Recovery outside of target range

Y = RF averaging used in calculations  
Nn = Value obtained from additional analysis  
NA = Not Applicable  
\* = See Discussion

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

### Method 8290

### Spike Recovery Relative Percent Difference (RPD) Results

Client PACE New Orleans

Spike 1 ID LCS-51540  
Spike 1 Filename Y160822B\_17

Spike 2 ID LCSD-51557  
Spike 2 Filename U160818B\_07

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	112	120	6.9
2,3,7,8-TCDD	90	94	4.3
1,2,3,7,8-PeCDF	113	113	0.0
2,3,4,7,8-PeCDF	118	121	2.5
1,2,3,7,8-PeCDD	102	102	0.0
1,2,3,4,7,8-HxCDF	110	116	5.3
1,2,3,6,7,8-HxCDF	106	116	9.0
2,3,4,6,7,8-HxCDF	99	108	8.7
1,2,3,7,8,9-HxCDF	101	109	7.6
1,2,3,4,7,8-HxCDD	102	118	14.5
1,2,3,6,7,8-HxCDD	129	124	4.0
1,2,3,7,8,9-HxCDD	117	127	8.2
1,2,3,4,6,7,8-HpCDF	111	119	7.0
1,2,3,4,7,8,9-HpCDF	103	108	4.7
1,2,3,4,6,7,8-HpCDD	106	109	2.8
OCDF	113	123	8.5
OCDD	112	122	8.5

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

Page 111 of 125



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

December 15, 2016

Melissa MacNaughton  
Pace Analytical Services, Inc.  
1000 Riverbend Blvd.  
Suite F  
Saint Rose, LA 70087

RE: **BLACK WARRIOR RIVERKEEPER**

*Pace Workorder: 19937*

Dear Melissa MacNaughton:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, August 16, 2016. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. This report was reissued on December 15, 2016 to correct the receipt form.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Ruth Welsh 12/15/2016  
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.  
Please email [PAESfeedback@pacelabs.com](mailto:PAESfeedback@pacelabs.com).

Total Number of Pages 14

Report ID: 19937 - 873841

Page 1 of 11



#### CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.

Page 112 of 125



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## LABORATORY ACCREDITATIONS & CERTIFICATIONS

<b>Accreditor:</b>	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
<b>Accreditation ID:</b>	02-00538
<b>Scope:</b>	NELAP Non-Potable Water and Solid & Hazardous Waste
<b>Accreditor:</b>	West Virginia Department of Environmental Protection, Division of Water and Waste Management
<b>Accreditation ID:</b>	395
<b>Scope:</b>	Non-Potable Water
<b>Accreditor:</b>	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
<b>Accreditation ID:</b>	89009003
<b>Scope:</b>	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
<b>Accreditor:</b>	NELAP: New Jersey, Department of Environmental Protection
<b>Accreditation ID:</b>	PA026
<b>Scope:</b>	Non-Potable Water; Solid and Chemical Materials
<b>Accreditor:</b>	NELAP: New York, Department of Health Wadsworth Center
<b>Accreditation ID:</b>	11815
<b>Scope:</b>	Non-Potable Water; Solid and Hazardous Waste
<b>Accreditor:</b>	State of Connecticut, Department of Public Health, Division of Environmental Health
<b>Accreditation ID:</b>	PH-0263
<b>Scope:</b>	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
<b>Accreditor:</b>	NELAP: Texas, Commission on Environmental Quality
<b>Accreditation ID:</b>	T104704453-09-TX
<b>Scope:</b>	Non-Potable Water
<b>Accreditor:</b>	State of New Hampshire
<b>Accreditation ID:</b>	299409
<b>Scope:</b>	Non-potable water
<b>Accreditor:</b>	State of Georgia
<b>Accreditation ID:</b>	Chapter 391-3-26
<b>Scope:</b>	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, PAES is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).



### CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## SAMPLE SUMMARY

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID	Sample ID	Matrix	Date Collected	Date Received
199370001	SAMPLE 1-@ MOORING CELL #5	Water	8/10/2016 12:00	8/16/2016 12:10
199370002	SAMPLE 2-NPDES	Water	8/10/2016 13:45	8/16/2016 12:10
199370003	SAMPLE 3-BACKGROUND	Water	8/10/2016 15:30	8/16/2016 12:10
199370004	SAMPLE 1-@ MOORING CELL #5	Soil	8/10/2016 12:00	8/16/2016 12:10
199370005	SAMPLE 2-NPDES	Soil	8/10/2016 13:45	8/16/2016 12:10
199370006	SAMPLE 3-BACKGROUND	Soil	8/10/2016 15:20	8/16/2016 12:10

Report ID: 19937 - 873841

Page 3 of 11



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.

Page 114 of 125



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370001 Date Received: 8/16/2016 12:10 Matrix: Water  
Sample ID: SAMPLE 1-@ MOORING CELL #5 Date Collected: 8/10/2016 12:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
<b>Subcontracted Work - SCUP</b>								u
Analysis Desc: D18O Analytical Method: D18O								
Boron 11 Isotope	Complete							s

Report ID: 19937 - 873841

Page 4 of 11



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.

Page 115 of 125



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370002  
Sample ID: SAMPLE 2-NPDES

Date Received: 8/16/2016 12:10 Matrix: Water  
Date Collected: 8/10/2016 13:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
Subcontracted Work - SCUP								u
Analysis Desc: D18O		Analytical Method: D18O						
Boron 11 Isotope	Complete							s



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370003

Date Received: 8/16/2016 12:10 Matrix: Water

Sample ID: SAMPLE 3-BACKGROUND

Date Collected: 8/10/2016 15:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
<b>Subcontracted Work - SCUP</b>								u
Analysis Desc: D18O		Analytical Method: D18O						
Boron 11 Isotope	Complete							s

Report ID: 19937 - 873841

Page 6 of 11



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.

Page 117 of 125





Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370004

Date Received: 8/16/2016 12:10 Matrix: Soil

Sample ID: SAMPLE 1-@ MOORING CELL #5

Date Collected: 8/10/2016 12:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
Subcontracted Work - SCIT								X
Analysis Desc: D18O		Analytical Method: D18O						
Boron 11 Isotope	Complete							S

Report ID: 19937 - 873841

Page 7 of 11



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.

Page 118 of 125



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370005  
Sample ID: SAMPLE 2-NPDES

Date Received: 8/16/2016 12:10 Matrix: Soil  
Date Collected: 8/10/2016 13:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
Subcontracted Work - SCIT								X
Analysis Desc: D18O		Analytical Method: D18O						
Boron 11 Isotope	Complete							S



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID: 199370006

Date Received: 8/16/2016 12:10 Matrix: Soil

Sample ID: SAMPLE 3-BACKGROUND

Date Collected: 8/10/2016 15:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
Subcontracted Work - SCIT								X
Analysis Desc: D18O		Analytical Method: D18O						
Boron 11 Isotope	Complete							S



## CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## ANALYTICAL RESULTS QUALIFIERS

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

---

### DEFINITIONS/QUALIFIERS

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quantitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).
u	Subcontracted to University of Pittsburgh
x	Subcontracted to Isotech
s	Subcontracted; for any related quality nonconformance see additional report(s)



### CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Pace Analytical Energy Services LLC  
220 William Pitt Way  
Pittsburgh, PA 15238  
Phone: (412) 826-5245  
Fax: (412) 826-3433

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 19937 BLACK WARRIOR RIVERKEEPER

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
199370004	SAMPLE 1-@ MOORING CELL #5			D18O	SCIT/1020
	<i>Subcontracted to Isotech</i>				
199370005	SAMPLE 2-NPDES			D18O	SCIT/1020
	<i>Subcontracted to Isotech</i>				
199370006	SAMPLE 3-BACKGROUND			D18O	SCIT/1020
	<i>Subcontracted to Isotech</i>				
199370001	SAMPLE 1-@ MOORING CELL #5			D18O	SCUP/1014
	<i>Subcontracted to University of Pittsburgh</i>				
199370002	SAMPLE 2-NPDES			D18O	SCUP/1014
	<i>Subcontracted to University of Pittsburgh</i>				
199370003	SAMPLE 3-BACKGROUND			D18O	SCUP/1014
	<i>Subcontracted to University of Pittsburgh</i>				



### CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Energy Services LLC.



Client: Pace Analytical New Orleans  
1000 Riverbend Blvd, Suite F  
St. Rose, LA 70087  
Tel: 504-469-0333  
Report to: Melissa MacNaughton  
Project: Black Warrior Riverkeeper  
Project #: 2041030  
Email: [melissa.macnaughton@pacelabs.com](mailto:melissa.macnaughton@pacelabs.com)

CSIA Center of Excellence  
Pace Analytical Energy Services  
220 William Pitt Way  
Pittsburgh  
Pennsylvania 15238  
United States  
CSIA Work Order # 19937  
Tel: 412.826.5245

## REPORT OF FORENSICS ISOTOPIC ANALYTICAL RESULTS

Date Received: 8/16/2016  
Date Reported: 12/14/2016

Samples submitted for  $^{11}\text{B}/^{10}\text{B}$  (‰ NBS) stable isotope ratios of Boron

Pace CSIA Lab ID	Client's Sample ID Description	$\delta^{11}\text{B}$ Boron
19937-1	Sample 1-@Mooring Cell #5	-1.0
19937-2	Sample 2-NPDES	-2.4
19937-3	Sample 3-Background	44.0
19937-4	Sample 1-@Mooring Cell #5	7.3
19937-5	Sample 2-NPDES	0.0
19937-6	Sample 3-Background	27.6

Boron isotopes ( $^{11}\text{B}$ ) by Thermal Ionization Mass Spectrometer (TIMS) reported against NBS SRM 951

	$\delta^{11}\text{B}$ Boron
Quality Control STDs	
QC-1	
QC-2	
Mean	
Analytical Precision ( $1\sigma$ )	<1.00

### Pace CSIA Forensic Isotope Services

Product or Dissolved Organics: Chlorinated Solvents, Oil, Extract, Fraction and Kerogen

2D-CSIA for 1,4-D PCE TCE DCE VC TCA DCA CT CF DCM CA CM MTBE TBA BTEX CH4 and more; Bulk  $^{13}\text{C}$ ,  $^2\text{H}$ ,  $^{18}\text{O}$ ,  $^{34}\text{S}$ , and  $^{15}\text{N}$

Gas Sample

Gas Composition and 2D-CSIA of  $^{13}\text{C}$  and  $^2\text{H}$  of C1 to C5;  $^{13}\text{C}$  of  $\text{CO}_2$ ;  $^{14}\text{C}$  of C1 and  $\text{CO}_2$ ;  $^{34}\text{S}$  of  $\text{H}_2\text{S}$ ;  $^{15}\text{N}$  and  $^{18}\text{O}$  of  $\text{N}_2\text{O}$  gas

Water and Dissolved Inorganics

$^2\text{H}$ ,  $^3\text{H}$  and  $^{18}\text{O}$ ;  $^{34}\text{S}$  and  $^{18}\text{O}$  of dissolved sulfate;  $^{34}\text{S}$  of dissolved  $\text{H}_2\text{S}$

$^{15}\text{N}$  and  $^{18}\text{O}$  of dissolved Nitrate;  $^{15}\text{N}$  of Ammonia;  $^{13}\text{C}$  of dissolved  $\text{CO}_2$  and Carbonate/Bicarbonate

Soil and Minerals

$^{13}\text{C}$ ,  $^{18}\text{O}$ ,  $^{15}\text{N}$ ,  $^{34}\text{S}$ , D/H;  $^{14}\text{C}$  of carbonate or organics

Post-Analysis Forensic Isotope Data Interpretation

# Chain of Custody

19937



Workorder: 2041030

Workorder Name: Black Warrior Riverkeeper

Owner Received Date: 8/11/2016 Results Requested By: 8/25/2016

**Report To**  
 Melissa MacNaughton  
 Pace Analytical New Orleans  
 1000 Riverbend Blvd  
 Suite F  
 St Rose, LA 70087  
 Phone (504)469-0333

**Subcontract To**  
 Pace Analytical Pittsburgh  
 1638 Roseytown Road  
 Suites 2,3, & 4  
 Greensburg, PA 15601  
 Phone (724)850-5600

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers		LAB USE ONLY
						Unpreserved		
1	Sample 1-@ Mooring Cell #5	PS	8/10/2016 12:00	2041030001	Water	1		
2	Sample 2-NPDES	PS	8/10/2016 13:45	2041030002	Water	1		
3	Sample 3-Background	PS	8/10/2016 15:30	2041030003	Water	1		
4	Sample 1-@ Mooring Cell #5	PS	8/10/2016 12:00	2041030004	Solid	1		
5	Sample 2-NPDES	PS	8/10/2016 13:45	2041030005	Solid	1		
6	Sample 3-Background	PS	8/10/2016 15:20	2041030006	Solid	1		

Transfers					Comments				
Released By	Date/Time	Received By	Date/Time						
<i>[Signature]</i>	8/11/16 1700	<i>[Signature]</i>	8/11/16 1700						
<i>[Signature]</i>	8/15/16 1300	<i>[Signature]</i>	8/15/16 0900						
<i>[Signature]</i>	8/16/16 1150	<i>[Signature]</i>	8/16/16 0900						
Cooler Temperature on Receipt 3.4 °C					Received on Ice	Y or N	Samples Intact	Y or N	

\*\*\*In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.

This chain of custody is considered complete as is since this information is available in the owner laboratory.

*DBg Pace 8/16/16 1150* *KASn PAS 8.16.16 1210* *0.90C*

# Cooler Receipt Form

Client Name: Pace Project: Black warrior Lab Work Order: 14937

Rivertkeeper

**A. Shipping/Container Information (circle appropriate response)**

Courier: FedEx UPS USPS Client Other: Pace G Air bill Present: Yes No

Tracking Number: \_\_\_\_\_

Custody Seal on Cooler/Box Present: Yes No Seals Intact: Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent Foam Other: \_\_\_\_\_

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 0.9°C Radiation Screened: Yes No Chain of Custody Present: Yes No

Comments: \_\_\_\_\_

**B. Laboratory Assignment/Log-in (check appropriate response)**

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	<input checked="" type="checkbox"/>			
Chain of Custody relinquished	<input checked="" type="checkbox"/>			
Sampler Name & Signature on COC		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Containers intact	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Were samples in separate bags		<input checked="" type="checkbox"/>		
Sample container labels match COC	<input checked="" type="checkbox"/>			
Sample name/date and time collected	<input checked="" type="checkbox"/>			
Sufficient volume provided	<input checked="" type="checkbox"/>			
PAES containers used			<input checked="" type="checkbox"/>	
Are containers properly preserved for the requested testing? (as labeled)			<input checked="" type="checkbox"/>	
If an unknown preservation state, were containers checked? Exception: VOA's coliform			<input checked="" type="checkbox"/>	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			<input checked="" type="checkbox"/>	

Comments: \_\_\_\_\_

Cooler contents examined/received by: LY Date: 8-16-16

Project Manager Review: RW Date: 8-18-16



September 09, 2016

Mr. Nelson Brooke  
Black Warrior Riverkeeper  
712 37th Street South  
Birmingham, Alabama 35222

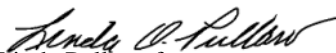
Re: Routine Analytical  
Work Order: 403745

Dear Mr. Brooke:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 12, 2016. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

  
Linda Pullano for  
Hope Taylor  
Project Manager

Purchase Order: PO  
Enclosures

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

BWRK001 Black Warrior Riverkeeper

Client SDG: 403745 GEL Work Order: 403745

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

Reviewed by



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: Behind Mooring Cell #5  
Sample ID: 403745001  
Matrix: Water  
Collect Date: 10-AUG-16 12:00  
Receive Date: 12-AUG-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.040	+/-0.258	0.528	1.00	pCi/L			MXS2	09/08/16	1954	1590564	1
Uranium-235/236	U	0.067	+/-0.251	0.423	1.00	pCi/L							
Uranium-238	U	0.0742	+/-0.254	0.470	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	0.325	+/-19.0	12.0		pCi/L			MJH1	09/04/16	0756	1590477	2
Radium-226	U	2.97	+/-41.1	34.7		pCi/L							
Radium-228	UI	0.00	+/-7.27	6.05		pCi/L							
Thorium-228	U	0.264	+/-3.00	2.65		pCi/L							
Thorium-232	U	-385	+/-960	1010		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			98.7	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: Behind Mooring Cell #5  
Sample ID: 403745002  
Matrix: Soil  
Collect Date: 10-AUG-16 12:00  
Receive Date: 12-AUG-16  
Collector: Client

Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234		1.27	+/-0.412	0.255	1.00	pCi/g			MXS2	09/08/16	1954	1590566	1
Uranium-235/236	U	0.0984	+/-0.190	0.316	1.00	pCi/g							
Uranium-238		0.657	+/-0.298	0.188	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		15.2	+/-0.418	0.151		pCi/g			MXR1	09/06/16	1131	1590435	2
Radium-226		1.25	+/-0.0606	0.0334		pCi/g							
Radium-228		1.49	+/-0.115	0.0648		pCi/g							
Thorium-228		1.54	+/-0.0384	0.0241		pCi/g							
Thorium-232		1.49	+/-0.115	0.0648		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	08/15/16	0422	1590343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			79.9	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor  
DL: Detection Limit  
MDA: Minimum Detectable Activity  
MDC: Minimum Detectable Concentration

Lc/LC: Critical Level  
PF: Prep Factor  
RL: Reporting Limit  
SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South  
  
Birmingham, Alabama 35222  
Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: NPDES Outfall  
Sample ID: 403745003  
Matrix: Water  
Collect Date: 10-AUG-16 13:45  
Receive Date: 12-AUG-16  
Collector: Client  
Project: BWRK00116  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	-0.0595	+/-0.180	0.505	1.00	pCi/L			MXS2	09/08/16	1954	1590564	1
Uranium-235/236	U	-0.0736	+/-0.222	0.624	1.00	pCi/L							
Uranium-238	U	0.106	+/-0.291	0.505	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	UI	0.00	+/-19.7	10.6		pCi/L			MJH1	09/04/16	0757	1590477	2
Radium-226	U	-41.5	+/-28.1	28.9		pCi/L							
Radium-228	U	-4.26	+/-4.73	5.10		pCi/L							
Thorium-228	UI	0.00	+/-2.79	2.53		pCi/L							
Thorium-232	U	499	+/-827	589		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			88.9	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	NPDES Outfall	Project:	BWRK00116
Sample ID:	403745004	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	10-AUG-16 13:45		
Receive Date:	12-AUG-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234		0.972	+/-0.457	0.426	1.00	pCi/g			MXS2	09/08/16	1954	1590566	1
Uranium-235/236	U	-0.057	+/-0.198	0.489	1.00	pCi/g							
Uranium-238		0.430	+/-0.301	0.265	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		8.08	+/-0.416	0.167		pCi/g			MXR1	09/06/16	1131	1590435	2
Radium-226		0.955	+/-0.0738	0.0362		pCi/g							
Radium-228		1.05	+/-0.116	0.0648		pCi/g							
Thorium-228		1.10	+/-0.0438	0.0266		pCi/g							
Thorium-232		1.05	+/-0.116	0.0648		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	08/15/16	0422	1590343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			62.3	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	Background	Project:	BWRK00116
Sample ID:	403745005	Client ID:	BWRK001
Matrix:	Water		
Collect Date:	10-AUG-16 15:20		
Receive Date:	12-AUG-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	-0.102	+/-0.453	1.18	1.00	pCi/L			MXS2	09/08/16	1954	1590564	1
Uranium-235/236	U	-0.0633	+/-0.546	1.26	1.00	pCi/L							
Uranium-238	U	0.273	+/-0.752	1.30	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	-5.74	+/-16.4	20.5		pCi/L			MJH1	09/04/16	0840	1590477	2
Radium-226	U	-8.32	+/-29.0	33.0		pCi/L							
Radium-228	U	3.32	+/-8.18	6.57		pCi/L							
Thorium-228	U	-0.971	+/-2.43	2.81		pCi/L							
Thorium-232	U	338	+/-886	722		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			35.1	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 9, 2016

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	Background	Project:	BWRK00116
Sample ID:	403745006	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	10-AUG-16 15:20		
Receive Date:	12-AUG-16		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234	U	0.278	+/-0.217	0.279	1.00	pCi/g			MXS2	09/08/16	1954	1590566	1
Uranium-235/236	U	-0.0351	+/-0.122	0.301	1.00	pCi/g							
Uranium-238	U	0.153	+/-0.177	0.262	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		1.07	+/-0.211	0.122		pCi/g			MXR1	09/06/16	1131	1590435	2
Radium-226		0.357	+/-0.0415	0.0253		pCi/g							
Radium-228		0.352	+/-0.0827	0.0473		pCi/g							
Thorium-228		0.496	+/-0.0347	0.0177		pCi/g							
Thorium-232		0.352	+/-0.0827	0.0473		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	08/15/16	0422	1590343

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			98.2	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit



# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: September 9, 2016

Page 1 of 4

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 403745

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1590564										
QC1203607116	403745001	DUP									
Uranium-233/234	U	0.040	U	-0.0521	pCi/L	N/A		N/A	MXS2	09/08/16	19:54
	Uncertainty	+/-0.258		+/-0.360							
Uranium-235/236	U	0.067	U	0.146	pCi/L	N/A		N/A			
	Uncertainty	+/-0.251		+/-0.411							
Uranium-238	U	0.0742	U	-0.0568	pCi/L	N/A		N/A			
	Uncertainty	+/-0.254		+/-0.251							
QC1203607117	LCS										
Uranium-233/234				29.5	pCi/L					09/08/16	19:54
	Uncertainty			+/-3.05							
Uranium-235/236				1.27	pCi/L						
	Uncertainty			+/-0.747							
Uranium-238	26.9			30.3	pCi/L		112	(75%-125%)			
	Uncertainty			+/-3.10							
QC1203607115	MB										
Uranium-233/234			U	0.343	pCi/L					09/08/16	19:54
	Uncertainty			+/-0.392							
Uranium-235/236			U	0.0753	pCi/L						
	Uncertainty			+/-0.282							
Uranium-238			U	0.0417	pCi/L						
	Uncertainty			+/-0.232							
Batch	1590566										
QC1203607119	403745002	DUP									
Uranium-233/234		1.27		1.15	pCi/g	9.26		(0% - 100%)	MXS2	09/08/16	19:54
	Uncertainty	+/-0.412		+/-0.591							
Uranium-235/236	U	0.0984	U	0.0415	pCi/g	N/A		N/A			
	Uncertainty	+/-0.190		+/-0.261							
Uranium-238		0.657		0.984	pCi/g	39.9		(0% - 100%)			
	Uncertainty	+/-0.298		+/-0.541							
QC1203607120	LCS										
Uranium-233/234				25.6	pCi/g					09/08/16	19:54
	Uncertainty			+/-2.00							
Uranium-235/236				1.31	pCi/g						
	Uncertainty			+/-0.515							
Uranium-238	25.2			24.3	pCi/g		96.7	(75%-125%)			
	Uncertainty			+/-1.95							
QC1203607118	MB										
Uranium-233/234			U	0.0166	pCi/g					09/08/16	19:54
	Uncertainty			+/-0.185							
Uranium-235/236			U	0.110	pCi/g						
	Uncertainty			+/-0.183							
Uranium-238			U	0.0533	pCi/g						

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 403745

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1590566										
		Uncertainty		+/-0.131							
Rad Gamma Spec											
Batch	1590435										
QC1203606752	403745004	DUP									
Potassium-40		8.08		7.97	pCi/g	1.28		(0%-20%)	MXR1	09/06/16	11:32
		Uncertainty	+/-0.416	+/-0.327							
Radium-226		0.955		0.913	pCi/g	4.47		(0%-20%)			
		Uncertainty	+/-0.0738	+/-0.0595							
Radium-228		1.05		0.943	pCi/g	10.5		(0%-20%)			
		Uncertainty	+/-0.116	+/-0.0993							
Thorium-228		1.10		1.08	pCi/g	2.48		(0%-20%)			
		Uncertainty	+/-0.0438	+/-0.0389							
Thorium-232		1.05		0.943	pCi/g	10.5		(0%-20%)			
		Uncertainty	+/-0.116	+/-0.0993							
QC1203606753	LCS										
Americium-241		489		511	pCi/g		105	(75%-125%)		09/06/16	11:21
		Uncertainty		+/-12.0							
Cesium-137		180		184	pCi/g		102	(75%-125%)			
		Uncertainty		+/-3.51							
Cobalt-60		163		155	pCi/g		94.8	(75%-125%)			
		Uncertainty		+/-3.74							
Potassium-40			U	-2.49	pCi/g						
		Uncertainty		+/-2.55							
Radium-226			U	0.621	pCi/g						
		Uncertainty		+/-1.29							
Radium-228			U	3.03	pCi/g						
		Uncertainty		+/-3.33							
Thorium-228			U	-0.11	pCi/g						
		Uncertainty		+/-0.762							
Thorium-232			U	3.03	pCi/g						
		Uncertainty		+/-3.33							
QC1203606751	MB										
Potassium-40			U	0.0364	pCi/g						09/06/16 11:32
		Uncertainty		+/-0.129							
Radium-226			U	0.00116	pCi/g						
		Uncertainty		+/-0.0263							
Radium-228			U	0.0171	pCi/g						
		Uncertainty		+/-0.0472							
Thorium-228			U	-0.0125	pCi/g						
		Uncertainty		+/-0.0167							
Thorium-232			U	0.0171	pCi/g						
		Uncertainty		+/-0.0472							
Batch	1590477										
QC1203606859	403745001	DUP									

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 403745

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1590477										
Potassium-40	U	0.325	UI	0.00	pCi/L	N/A			N/A MJH1	09/06/16	10:32
	Uncertainty	+/-19.0		+/-28.8							
Radium-226	U	2.97	U	1.18	pCi/L	N/A			N/A		
	Uncertainty	+/-41.1		+/-40.4							
Radium-228	UI	0.00	U	0.895	pCi/L	N/A			N/A		
	Uncertainty	+/-7.27		+/-6.83							
Thorium-228	U	0.264	U	-2.02	pCi/L	N/A			N/A		
	Uncertainty	+/-3.00		+/-3.39							
Thorium-232	U	-385	U	450	pCi/L	N/A			N/A		
	Uncertainty	+/-960		+/-1300							
QC1203606860	LCS										
Americium-241	34400			31900	pCi/L		92.9	(75%-125%)		09/06/16	06:20
	Uncertainty			+/-881							
Cesium-137	13400			14000	pCi/L		104	(75%-125%)			
	Uncertainty			+/-297							
Cobalt-60	13300			13100	pCi/L		98.9	(75%-125%)			
	Uncertainty			+/-323							
Potassium-40			U	-114	pCi/L						
	Uncertainty			+/-191							
Radium-226			U	1520	pCi/L						
	Uncertainty			+/-1020							
Radium-228			U	178	pCi/L						
	Uncertainty			+/-246							
Thorium-228			U	-100	pCi/L						
	Uncertainty			+/-95.5							
Thorium-232			U	-24500	pCi/L						
	Uncertainty			+/-37500							
QC1203606858	MB										
Potassium-40			U	-20.7	pCi/L					09/04/16	08:41
	Uncertainty			+/-15.5							
Radium-226			U	-33.3	pCi/L						
	Uncertainty			+/-35.7							
Radium-228			U	-4.28	pCi/L						
	Uncertainty			+/-4.94							
Thorium-228			U	0.209	pCi/L						
	Uncertainty			+/-2.82							
Thorium-232			U	-414	pCi/L						
	Uncertainty			+/-986							

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 403745

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
>	Result is greater than value reported										
BD	Results are either below the MDC or tracer recovery is low										
FA	Failed analysis.										
H	Analytical holding time was exceeded										
J	Value is estimated										
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.										
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.										
M	M if above MDC and less than LLD										
M	REMP Result > MDC/CL and < RDL										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma Spectroscopy--Uncertain identification										
UJ	Gamma Spectroscopy--Uncertain identification										
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										
h	Preparation or preservation holding time was exceeded										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

## GEL Chain of Custody and Analytical Request

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

GEL Work Order Number: 402745

Sample Analysis Requested <sup>(5)</sup> (Fill in the number of containers for each test)

Phone #: (205) 458-0095

Project/Site Name: Green Co Per Plant Fax #: \_\_\_\_\_

Address: 712 37th St. S. Birmingham, AL 35222

Collected by: Barry Sulkini  
Send Results To: [barry@sulkini.com](mailto:barry@sulkini.com)  
Sulkini Chwages.net

Sample ID

\* For composites - indicate start and stop date/time

[illegible][illegible]

Remarks:	IAI Requested:	IAUHH:	Subject to Contract:	Priority:	Estimated Date:
<p><i>Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards</i></p>					

Eastern  
Central  
Mountain  
Pacific  
Other

### Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time	GEL PM:
1 Barry Sullivan	8/10/16	8:50 pm	1 <i>[Signature]</i>	8/12/16	0805	Method of Shipment: <i>FedEx</i> Date Shipped: <i>8/10/16</i>
2			2			Airbill #:

1) Chain of Custody Number = Client Determined

1.) Chain of Custody Numbers  
2.) CC-2-4-... N = Number of Sample, TR = Trip Blank, ED = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

7.) QC Codes: N = Normal sample, FD = Field duplicate, EQ = Equipment blank, and BL = Blank. For each sample, the first number is the sample number, the second number is the replicate number, and the third number is the QC code. For example, 101-1-N indicates that the sample was field filtered or -N- for sample was not field filtered.

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or a - N - for sample was not field filtered.

4.) Matrix Codes; DW=Drinking Water, GW=Groundwater, W=Water, SW=Surface Water, WW=Waste Water, W-Water, SO-Soil, SS-Sediment, SG-Gravel, SC-Stone

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 2).

WHITE = LABORATORY

**PINK = CLIENT**

For Lab Receiving Use Only	
Custody Seal Intact?	YES NO
Cooler Temp:	°C



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>40347 BWRK</b>		SDG/AR/COC/Work Order: <b>403756</b>
Received By: <b>KS</b>		Date Received: <b>8/12/16</b>
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>CPMD</b>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Ice bags Blue ice Dry ice <u>None</u> Other (describe) *all temperatures are recorded in Celsius <b>24°</b>
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <b>201404351</b> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 Do Low Level Perchlorate samples have headspace as required?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 VOA vials contain acid preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If unknown, select No)
8 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
9 Are Encore containers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
10 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
11 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
12 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
13 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
14 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16 Carrier and tracking number.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: <input checked="" type="checkbox"/> FedEx Air <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <b>7837 9129 9220</b>

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials **HH**Date **08/12/16**Page **1** of **1**

GL-CHL-SR-001 Rev 3

**List of current GEL Certifications as of 09 September 2016**

<b>State</b>	<b>Certification</b>
Alaska	UST-0110
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA160006
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122016-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-16-11
Utah NELAP	SC000122016-20
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

**Radiochemistry  
Technical Case Narrative  
Black Warrior Riverkeeper (BWRK)  
SDG #: 403745**

**Product:** Alphaspec U, Liquid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1590564

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
403745001	Behind Mooring Cell #5
403745003	NPDES Outfall
403745005	Background
1203607115	Method Blank (MB)
1203607116	403745001(Behind Mooring Cell #5) Sample Duplicate (DUP)
1203607117	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Alphaspec U, Solid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1590566

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 20

**Preparation Batch:** 1590343

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
403745002	Behind Mooring Cell #5
403745004	NPDES Outfall
403745006	Background
1203607118	Method Blank (MB)
1203607119	403745002(Behind Mooring Cell #5) Sample Duplicate (DUP)
1203607120	Laboratory Control Sample (LCS)



The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Solid (Short List)

**Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R

**Analytical Procedure:** GL-RAD-A-013 REV# 25

**Analytical Batch:** 1590435

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 20

**Preparation Batch:** 1590343

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
403745002	Behind Mooring Cell #5
403745004	NPDES Outfall
403745006	Background
1203606751	Method Blank (MB)
1203606752	403745004(NPDES Outfall) Sample Duplicate (DUP)
1203606753	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Liquid (Short List)

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 25

**Analytical Batch:** 1590477

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
403745001	Behind Mooring Cell #5
403745003	NPDES Outfall

403745005	Background
1203606858	Method Blank (MB)
1203606859	403745001(Behind Mooring Cell #5) Sample Duplicate (DUP)
1203606860	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

#### **Qualifier Information**

<b>Qualifier</b>	<b>Reason</b>	<b>Analyte</b>	<b>Sample</b>	<b>Client Sample</b>
UI	Data rejected due to high counting uncertainty.	Potassium-40	403745003	NPDES Outfall
			1203606859	Behind Mooring Cell #5(403745001DUP)
UI	Data rejected due to low abundance.	Radium-228	403745001	Behind Mooring Cell #5
		Thorium-228	403745003	NPDES Outfall

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



## **FINAL REPORT OF ANALYSES**

**Analyses performed by:**

**Tetra Tech, Inc.**

**Boron Isotope Laboratory**

**3801 Automation Way, Ste. 100**

**Fort Collins, CO 80525**

**(970) 223-9600**

**[www.tetrattech.com](http://www.tetrattech.com)**

**December 13, 2016**

**Client**

**Pace Analytical Energy Services, LLC**

**220 William Pitt Way,**

**Pittsburgh, PA 15238**



December 13, 2016

Dr. Yi Wang  
Pace Analytical Energy Services, LLC  
220 William Pitt Way,  
Pittsburgh, PA 15238

RE: Boron Isotope Analyses for Pace Analytical, Lab Project #021855

Dear Dr. Wang:

Please find enclosed the Final Report of Results for 12 of 13 samples submitted to us for boron isotopic analysis. The attached documents contain results for all samples analyzed and other explanatory information. Also included are the analytical report for analysis of boron concentration provided by Tetra Tech. This report supersedes the preliminary report submitted to PACE on December 9, 2016. A final invoice for the project will be submitted separately.

Samples 19937-1 through 19937-6, as well as sample 20548-1, analyzed routinely for boron isotopes and no analysis problems were encountered. Initial analysis of samples 20387-1 through 20387-6 were unsuccessful, and additional processing, including boron extraction, was performed. Subsequently, all samples except 20387-4 were analyzed and no analysis problems were encountered. No stable signal was obtained for 20387-4 and no analysis completed for that sample. The difference in the reported machine bias correction factor (MBCF) accounts for the different processing methods. The standard deviation from analysis of the NBS SRM 951 standard was less than  $\pm 1.00\text{‰ } \delta^{11}\text{B}$ .

Please notify us if there are questions or if you need additional information. Unless you inform us otherwise, it is our policy to discard samples 30 days after the report of analysis. If you want us to return the shipping container, please contact us with the appropriate address and carrier.

The data contained in the following report have been reviewed and approved by the personnel listed on each Certificate of Analysis. In addition, Tetra Tech represents that the analyses reported herein are true, complete, and correct within the limits of the methods employed.

In addition to isotopic geochemistry, Tetra Tech provides a wide range of geochemical consulting services, including, but not limited to, forensic geochemistry, flow and transport modeling, environmental geochemistry, water source assessment, applied experimental, and litigation support. Please let us know if we can be of further assistance in providing any geochemical consulting services.

Thank you for selecting our lab for your boron isotopic requirements.

Sincerely,

*Edward Muller*  
E.R. Muller, P.G.  
Project Scientist



Tetra Tech

3801 Automation Way, Suite 100

Fort Collins, CO 80525

Tel 970.223.9600

Fax 970.223.7171

[www.tetrattech.com](http://www.tetrattech.com)

## **RESULTS OF ANALYSIS FOR BORON ISOTOPIC COMPOSITION**



## Tetra Tech, Inc.

3801 Automation Way, Ste; 100, Fort Collins, Colorado 80525

Ph: 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

**Client:** PACE Analytical Energy Services LLC

**Project:** 114-021855

**Report Date:** 12/13/2016

**Contact:** Yi Wang

### Summary of Boron Isotopic Results-Page 1

Client's ID#	Lab ID#		Receipt Date		B mg/L <sup>(1)</sup>		Date Analyzed
19937-1	21855_ 1		09/27/16		1.7		11/21/16
19937-2	21855_ 2		09/27/16		0.35		11/21/16
19937-3	21855_ 3		09/27/16		0.008		12/09/16
19937-4	21855_ 4		09/27/16		0.11		11/21/16
19937-5	21855_ 5		09/27/16		0.094		11/28/16
19937-6	21855_ 6		09/27/16		0.0097		11/23/16
20387-1	21855_ 7		09/28/16		0.13		12/08/16
20387-2	21855_ 8		09/28/16		0.017		11/23/16
20387-3	21855_ 9		09/28/16		0.046		12/12/16
20387-4	21855_ 10		09/28/16		0.055		No analysis
20387-5	21855_ 11		09/28/16		0.021		12/12/16
20387-6	21855_ 12		09/28/16		0.029		12/09/16
20548-1	21855_ 13		10/13/16		0.18		11/28/16

#### NOTES:

1. B Concentration Provided by TetraTech

**Client:** PACE Analytical Energy Services LLC

**Project:** 114-021855

**Report Date:** 12/13/2016

**Contact:** Yi Wang

### Summary of Boron Isotopic Results <sup>(1,2,3)</sup> -Page 2

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-1	4.0064004	1.2497	2.2491	-1.0	4.0026560	0.31389	2.2491	-1.9	-1.0
19937-2	3.9986248	-0.6936	2.2491	-2.9					-2.4
19937-3	4.1863897	46.2312	2.2491	44.0					44.0
19937-4	4.0396422	9.5572	2.2491	7.3					7.3
19937-5	4.0107980	2.3487	2.3154	0.0					0.0
19937-6	4.1209363	29.8736	2.2491	27.6					27.6
20387-1	4.0878826	21.6131	3.0696	18.5					18.5
20387-2	4.0811481	19.9300	3.0696	16.9					16.9
20387-3	4.1120501	27.6528	3.0696	24.6					24.6
20387-4	No result obtained								
20387-5	4.0751400	18.4286	3.0696	15.4	4.0782231	19.1991	3.0696	16.1	15.7
20387-6	4.1032549	25.4548	3.0696	22.4					22.4
20548-1	4.0393122	9.4747	2.3154	7.2	4.0402658	9.71305	2.3154	7.4	7.3

**NOTES:**

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 1  
**Client ID#** 19937-1  
**Tt B (mg/L)** 1.7

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/21/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-1	4.0064004	1.24966	2.2491	-1.0					-1.0

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF





## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 2  
**Client ID#** 19937-2  
**Tt B (mg/L)** 0.35

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/21/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-2	3.9986248	-0.69356	2.2491	-2.9	4.0026560	0.31389	2.2491	-1.9	-2.4

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 3  
**Client ID#** 19937-3  
**Tt B (mg/L)** 0.008

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 12/09/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-3	4.1863897	46.23124	2.2491	44.0					44.0

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 4  
**Client ID#** 19937-4  
**Tt B (mg/L)** 0.11

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/21/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-4	4.0396422	9.55720	2.2491	7.3					7.3

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 5  
**Client ID#** 19937-5  
**Tt B (mg/L)** 0.094

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/28/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-5	4.0107980	2.34868	2.3154	0.0					0.0

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 6  
**Client ID#** 19937-6  
**Tt B (mg/L)** 0.0097

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/23/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
19937-6	4.1209363	29.87362	2.2491	27.6					27.6

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 7  
**Client ID#** 20387-1  
**Tt B (mg/L)** 0.13

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 12/08/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20387-1	4.0878826	21.61309	3.0696	18.5					18.5

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 8  
**Client ID#** 20387-2  
**Tt B (mg/L)** 0.017

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 11/23/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20387-2	4.0811481	19.93005	3.0696	16.9					16.9

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 9  
**Client ID#** 20387-3  
**Tt B (mg/L)** 0.046

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 12/12/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

Replicate 1					Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20387-3	4.1120501	27.65285	3.0696	24.6					24.6

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF





## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 11  
**Client ID#** 20387-5  
**Tt B (mg/L)** 0.021

**Report Date:** 12/13/16  
**Date Received:** 09/27/16  
**Date Analyzed:** 12/12/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20387-5	4.0751400	18.42855	3.0696	15.4	4.0782231	19.19906	3.0696	16.1	15.7

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 12  
**Client ID#** 20387-6  
**Tt B (mg/L)** 0.029

**Report Date:** 12/13/16  
**Date Received:** 09/28/16  
**Date Analyzed:** 12/09/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20387-6	4.1032549	25.45482	3.0696	22.4					22.4

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF



## Tetra Tech, Inc

3801 Automation Way, Ste 100, Fort Collins, Colorado 80525

Ph 970-223-9600

Fax: 970-223-7171

www.tetrattech.com

### Certificate of Analysis

**Client:** PACE Analytical Energy Sevices LLC  
**Project:** 114-021855  
**Contact:** Yi Wang

**Lab ID#** 21855\_ 13  
**Client ID#** 20548-1  
**Tt B (mg/L)** 0.18

**Report Date:** 12/13/16  
**Date Received:** 10/13/16  
**Date Analyzed:** 11/28/16

### Individual Boron Isotopic Results<sup>(1,2,3)</sup>

	Replicate 1				Replicate 2				Average
Client's ID#	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	<sup>11</sup> B/ <sup>10</sup> B	δ <sup>11</sup> B ‰	MBCF <sup>(4)</sup> (δ <sup>11</sup> B ‰)	Corr. δ <sup>11</sup> B ‰ <sup>(5)</sup>	δ <sup>11</sup> B ‰
20548-1	4.0393122	9.47472	2.3154	7.2	4.0402658	9.71305	2.3154	7.4	7.3

Edward Muller

Edward Muller, Project Scientist  
Approved

#### NOTES:

1. δ<sup>11</sup>B computed using NBS SRM 951

2. Correction is made for machine bias using results of NBS Standard analysis.

3. Precision is given by the Standard Deviation from analysis of NBS standard < +/- 1.0 ‰ δ<sup>11</sup>B (1σ).

4. MBCF: Machine bias correction factor

5. Corr. δ<sup>11</sup>B ‰. Corrected δ<sup>11</sup>B ‰ using MBCF

## REPORT DEFINITIONS

<b>BDL</b>	Below detection limit, in this context it means that the mass available for analysis was too small to produce a reliable signal when analyzed in the mass spectrometer.
<b>delta <sup>11</sup>B (‰)</b>	<p>Comparison of the ratio for <sup>11</sup>B/<sup>10</sup>B in a sample with the NBS standard reported as a permil amount:</p> $\delta^{11}\text{B} (\text{‰}) = \frac{(\text{}^{11}\text{B}/\text{}^{10}\text{B})_{\text{sample}} - (\text{}^{11}\text{B}/\text{}^{10}\text{B})_{\text{standard}}}{(\text{}^{11}\text{B}/\text{}^{10}\text{B})_{\text{standard}}} \times 1000.$
<b>NIST SRM 951</b>	National Institute of Standards and Technology Standard Reference Material 951. The internationally accepted boric acid standard with an isotopic ratio for <sup>11</sup> B/ <sup>10</sup> B of 4.04362 +/- 0.00137 (2σ) (Cantanzaro et al., 1970) in positive ion mode or <sup>11</sup> B/ <sup>10</sup> B of 4.0014 +/- 0.0027 (2σ) (Hemming and Hanson., 1994) in negative ion mode.
<b>permil (‰)</b>	part per thousand
<b>precision</b>	The average value for the NIST SRM 951 standards analyzed with each batch of samples is normalized to the accepted isotopic ratio; this correction is applied to the measurement for each sample in a given batch analyzed in the mass spectrometer. Subsequently, the standard deviation is computed and reported as the long-term precision of the isotopic measurement to 1σ .
<b>replicate</b>	Repeated mass spectrometric analyses on different aliquots of the same chemically processed material.
<b>TIMS</b>	Thermal Ionization Mass Spectrometer. The instrument used in the Tetra Tech laboratory is a TIMS VG 336, built by VG Isotopes Limited, Cheshire, England. It uses an 18 cm, 60° extended geometry magnetic sector analyzer, with dual Faraday bucket collectors.

**ISOTOPE LABORATORY  
SAMPLE RECEIPT AND ACKNOWLEDGEMENT FORM**

Client and Contact: Pace Analytical and Energy Services (Yi Wang)  
Sender's Co. and Contact: PAES-CSIA (Jianwu Tang)  
  
Date/Time Received: September 27, 2016 10:00  
Received By: Elissa Palmer  
No. of Shipping Containers: 1  
Carrier: FedEx

Samples:

Shipping Container Seal Intact: Yes  
Sample Seals Intact: NA  
No. Samples Received: 6 (bottles)  
Samples in Good Condition: Yes  
Chain of Custody Form or Inventory Included: Yes  
Samples Labels Agree w/C of C: Yes  
Tetra Tech Laboratory Numbers: not assigned

Date this form sent to client: September 27, 2016

*Edward Muller*

**Edward Muller, P.G.**

Phone: 970.223.9600 | Fax: 970.223.7171 | Mobile: 970.443.7065

[ed.muller@tetrattech.com](mailto:ed.muller@tetrattech.com)

**ISOTOPE LABORATORY  
SAMPLE RECEIPT AND ACKNOWLEDGEMENT FORM**

Client and Contact: Pace Analytical and Energy Services (Yi Wang)  
Sender's Co. and Contact: PAES-CSIA (Jianwu Tang)  
  
Date/Time Received: September 28, 2016 10:00  
Received By: Elissa Palmer  
No. of Shipping Containers: 1  
Carrier: FedEx

Samples:

Shipping Container Seal Intact: Yes  
Sample Seals Intact: NA  
No. Samples Received: 6 (bottles)  
Samples in Good Condition: Yes  
Chain of Custody Form or Inventory Included: Yes  
Samples Labels Agree w/C of C: Yes  
Tetra Tech Laboratory Numbers: 021855\_1 through 021855\_6

Date this form sent to client: September 28, 2016

*Edward Muller*

**Edward Muller, P.G.**

Phone: 970.223.9600 | Fax: 970.223.7171 | Mobile: 970.443.7065

[ed.muller@tetrattech.com](mailto:ed.muller@tetrattech.com)

**Fax: (412) 826-3433**

**Results to:** [yi.wang@pacelabs.com](mailto:yi.wang@pacelabs.com)  
[ruth.welsh@pacelabs.com](mailto:ruth.welsh@pacelabs.com)

SEND TO: Tetra Tech DUE DATE: STD TAT

Lab Proj. # **20387** Invoice to: [yi.wang@pacelabs.com](mailto:yi.wang@pacelabs.com) [ruth.welsh@pacelabs.com](mailto:ruth.welsh@pacelabs.com)

**Company:** Pace Analytical Energy Services, LLC  
**Co. Address:** 220 William Pitt Way, Pittsburgh, PA 15238  
**Phone #:** 412-826-5245  
**Fax #:** 412-826-3433

State of Origin LA

[illegible][illegible]

Remarks:

**Please provide Boron concentration.**

## Preservatives

1- Unpreserved 4-HCL  
2- H<sub>2</sub>SO<sub>4</sub> 5-NaOH+Zn Ace.  
3- HNO<sub>3</sub>

Relinquished by: Jianwu Tang	Company: PAES-CSIA	Date: 09/26/16	Time: 4:08 pm	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

**Fax: (412) 826-3433**

[vi.wang@pacelabs.com](mailto:vi.wang@pacelabs.com)

DUE DATE: STD TAT

**Tetra Tech**

**SEND TO:**

[vi.wang@pacelabs.com](mailto:vi.wang@pacelabs.com)

Lab Proj. #

19937

**Company:** Pace Analytical Energy Services, LLC  
**Co. Address:** 220 William Pitt Way, Pittsburgh, PA 15238  
**Phone #:** 412-826-5245  
**Fax #:** 412-826-3433

Pace Analytical Energy Services, LLC  
220 William Pitt Way, Pittsburgh, PA 15238

412-826-5245

412-826-3433  
StatLA  
State of Origin

Sample Type
-------------

[illegible]

Please provide Boron concentration.

Preservatives	
1- Unpreserved	4-HCL
2- H2SO4	5- NaOH+Zn Ace.
3- HNO3	

Relinquished by: Jianwu Tang	Company: PAES-CSIA	Date: 09/27/16	Time: 4:08 pm	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:



# Total Recoverable BORON

## Method SW6010B

### Sample Results

Lab Name: ALS -- Fort Collins  
Client Name: Tetra Tech MM, Inc.  
Client Project ID: Boron Isotope 114-021855  
Work Order Number: 1609519  
Reporting Basis: As Received  
Analyst: Steve Workman

Final Volume: 5 ml  
Matrix: WATER  
Result Units: MG/L

Client Sample ID	Lab ID	Date Collected	Date Prepared	Date Analyzed	Percent Moisture	Dilution Factor	Result	RptLimit/ LOQ/LOD	MDL/DL	Flag	Sample Aliquot
20387-1	1609519-1	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.13	0.1	0.0064		5 ml
20387-2	1609519-2	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.017	0.1	0.0064	J	5 ml
20387-3	1609519-3	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.046	0.1	0.0064	J	5 ml
20387-4	1609519-4	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.055	0.1	0.0064	J	5 ml
20387-5	1609519-5	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.021	0.1	0.0064	J	5 ml
20387-6	1609519-6	9/20/2016	10/6/2016	10/06/2016	N/A	1	0.029	0.1	0.0064	J	5 ml
19937-1	1609519-7	8/10/2016	10/6/2016	10/06/2016	N/A	1	1.7	0.1	0.0064		5 ml
19937-2	1609519-8	8/10/2016	10/6/2016	10/06/2016	N/A	1	0.35	0.1	0.0064		5 ml
19937-3	1609519-9	8/10/2016	10/6/2016	10/06/2016	N/A	1	0.008	0.1	0.0064	J	5 ml
19937-4	1609519-10	8/10/2016	10/6/2016	10/06/2016	N/A	1	0.11	0.1	0.0064		5 ml
19937-5	1609519-11	8/10/2016	10/6/2016	10/06/2016	N/A	1	0.094	0.1	0.0064	J	5 ml
19937-6	1609519-12	8/10/2016	10/6/2016	10/06/2016	N/A	1	0.0097	0.1	0.0064	J	5 ml

#### Comments:

1. ND or U = Not Detected at or above the client requested detection limit.

Data Package ID: *it1609519-1*

Date Printed: Friday, October 07, 2016

ALS -- Fort Collins

LIMS Version: 6.829

Page 1 of 1

# Total Recoverable ICP Metals

Method SW6010B

## Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1610300

Client Name: Tetra Tech MM, Inc.

ClientProject ID: Boron Isotope 114-021855

Field ID: 20548-1

Lab ID: 1610300-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 06-Oct-16

Date Extracted: 21-Oct-16

Date Analyzed: 21-Oct-16

Prep Method: SW3005 Rev A

Prep Batch: IP161021-2

QC Batch ID: IP161021-2-1

Run ID: IT161021-1A8

Cleanup: NONE

Basis: As Received

File Name: 161021A.

Analyst: Steve Workman

Sample Aliquot: 5 ml

Final Volume: 5 ml

Result Units: MG/L

Clean DF: 1

Analysis ReqCode: B - Screen

CASNO	Target Analyte	Dilution Factor	Result	RptLimit/LOQ/LOD	MDL/DL	Result Qualifier	EPA Qualifier
7440-42-8	BORON	1	0.18	0.1	0.0064		

Data Package ID: *it1610300-1*

Date Printed: Monday, October 24, 2016

ALS -- Fort Collins

LIMS Version: 6.832

Page 1 of 1

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pensacola

3355 McLemore Drive

Pensacola, FL 32514

Tel: (850)474-1001

TestAmerica Job ID: 400-163980-1

Client Project/Site: Greene County Steam Plant

For:

Black Warrior Riverkeeper

712 37th St S

Birmingham,, Alabama 35222

Attn: Nelson Brooke



Authorized for release by:

1/23/2019 1:29:11 PM

Jason Wilson, Project Manager I

(251)706-3217

[jason.wilson@testamericainc.com](mailto:jason.wilson@testamericainc.com)

### LINKS

Review your project  
results through

**TotalAccess**

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Client Sample Results . . . . .	5
Definitions . . . . .	17
QC Sample Results . . . . .	18
Chronicle . . . . .	40
Chain of Custody . . . . .	60

# Case Narrative

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Job ID: 400-163980-1**

**Laboratory: TestAmerica Pensacola**

## Narrative

### Job Narrative 400-163980-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 12/22/2018 8:46 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.2° C and 4.9° C.

#### GC/MS Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### HPLC/IC

Method(s) 300.0: The following samples were diluted to bring the concentration of target analytes within the calibration range: 1 NPDES OUTFALL (400-163980-1), 2 SEEP (400-163980-2), and 3 SEEP (400-163980-3). Elevated reporting limits (RLs) are provided.

Method(s) 9056: The following samples were diluted to bring the concentration of target analytes within the calibration range: 1 NPDES OUTFALL (400-163980-1), 2 SEEP (400-163980-2) and 3 SEEP (400-163980-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Dioxin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

Method(s) 6010C: The following sample produced a slight negative result - the absolute value exceeded the reporting limit (RL): 3 SEEP (400-163980-5). The data are reported as qualified.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method(s) 353.2: The following samples were diluted due to the nature of the sample matrix: 2 SEEP (400-163980-4) and 3 SEEP (400-163980-5). Elevated reporting limits (RLs) are provided.

Method(s) SM 2310B: The following samples were analyzed outside of analytical holding time: 1 NPDES OUTFALL (400-163980-1), 2 SEEP (400-163980-2) and 3 SEEP (400-163980-3).

Method(s) 351.2: The following sample was diluted to bring the concentration of target analytes within the calibration range for Nitrogen, Kjeldahl: 2 SEEP (400-163980-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Lab Admin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Sample Summary

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
400-163980-1	1 NPDES OUTFALL	Water	12/20/18 12:34	12/22/18 08:46
400-163980-2	2 SEEP	Water	12/20/18 12:50	12/22/18 08:46
400-163980-3	3 SEEP	Water	12/20/18 14:46	12/22/18 08:46
400-163980-4	2 SEEP	Solid	12/20/18 12:50	12/22/18 08:46
400-163980-5	3 SEEP	Solid	12/20/18 14:46	12/22/18 08:46

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 1 NPDES OUTFALL**

**Lab Sample ID: 400-163980-1**

**Date Collected: 12/20/18 12:34**

**Matrix: Water**

**Date Received: 12/22/18 08:46**

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			12/28/18 20:52	1

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14		1.0		mg/L			01/01/19 05:11	1
Fluoride	<0.20		0.20		mg/L			01/01/19 05:11	1

## Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	95		5.0		mg/L			01/02/19 22:57	5

## Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	32		5.0		mg/L			01/02/19 22:57	5

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.18	^	0.10		mg/L		12/27/18 18:32	01/02/19 13:30	1
Titanium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:30	1

## Method: 6010C - Metals (ICP) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.050		0.050		mg/L			12/31/18 19:11	1
Arsenic	0.011		0.010		mg/L			12/31/18 19:11	1
Barium	0.11		0.010		mg/L			12/31/18 19:11	1
Beryllium	<0.0030		0.0030		mg/L			12/31/18 19:11	1
Boron	0.26		0.10		mg/L			12/31/18 19:11	1
Cadmium	<0.0050		0.0050		mg/L			12/31/18 19:11	1
Calcium	31		0.50		mg/L			12/31/18 19:11	1
Chromium	<0.010		0.010		mg/L			12/31/18 19:11	1
Cobalt	<0.010		0.010		mg/L			12/31/18 19:11	1
Copper	<0.020		0.020		mg/L			12/31/18 19:11	1
Iron	0.40		0.10		mg/L			12/31/18 19:11	1
Lead	<0.010		0.010		mg/L			12/31/18 19:11	1
Lithium	0.071		0.050		mg/L			12/31/18 19:11	1
Magnesium	12		0.50		mg/L			12/31/18 19:11	1
Manganese	0.056		0.010		mg/L			12/31/18 19:11	1
Molybdenum	0.039		0.010		mg/L			12/31/18 19:11	1
Nickel	<0.0050		0.0050		mg/L			12/31/18 19:11	1
Potassium	4.4		1.0		mg/L			12/31/18 19:11	1
Selenium	<0.020		0.020		mg/L			12/31/18 19:11	1
Silver	<0.0050		0.0050		mg/L			12/31/18 19:11	1
Sodium	22		1.0		mg/L			12/31/18 19:11	1
Thallium	<0.010		0.010		mg/L			12/31/18 19:11	1
Strontium	0.37		0.0050		mg/L			12/31/18 19:11	1
Zinc	<0.020		0.020		mg/L			12/31/18 19:11	1
Vanadium	<0.020		0.020		mg/L			12/31/18 19:11	1
Silicon	2.4	B	0.050		mg/L			12/31/18 19:11	1
Tin	<0.010		0.010		mg/L			12/31/18 19:11	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 1 NPDES OUTFALL**

**Lab Sample ID: 400-163980-1**

**Date Collected: 12/20/18 12:34**

**Matrix: Water**

**Date Received: 12/22/18 08:46**

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20		ug/L		12/26/18 10:58	12/28/18 13:03	1

## Method: SM 2340B - Total Hardness (as CaCO3) by calculation - RA

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	130		3.3		mg/L			12/31/18 19:11	1
Calcium hardness as calcium carbonate	78		1.2		mg/L			12/31/18 19:11	1
Magnesium hardness as calcium carbonate	48		2.1		mg/L			12/31/18 19:11	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		01/02/19 09:53	01/03/19 09:11	1
Ammonia	<0.050		0.050		mg/L			12/26/18 12:00	1
Nitrogen, Kjeldahl	<0.50		0.50		mg/L		12/26/18 15:48	12/27/18 14:16	1
Nitrate Nitrite as N	<0.050		0.050		mg/L			12/27/18 15:57	1
Phosphorus, Total	<0.10		0.10		mg/L		12/26/18 15:48	12/27/18 18:23	1
Cr (III)	<0.010		0.010		mg/L			01/08/19 10:46	1
Acidity	<10	H	10		mg/L			01/08/19 10:43	1
Alkalinity, Total	66		1.0		mg/L			12/27/18 11:46	1
Total Dissolved Solids	86		5.0		mg/L			12/24/18 10:45	1
Total Suspended Solids	8.0		5.0		mg/L			12/26/18 09:27	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	380		5.0		umhos/cm			12/28/18 16:36	1

TestAmerica Pensacola



# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-2**

**Matrix: Water**

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			12/28/18 21:39	1

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.4		1.0		mg/L			01/01/19 05:34	1
Fluoride	<0.20		0.20		mg/L			01/01/19 05:34	1

## Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	93		5.0		mg/L			01/02/19 23:20	5

## Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	31		5.0		mg/L			01/02/19 23:20	5

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2.6	^	0.10		mg/L		12/27/18 18:32	01/02/19 13:40	1
Titanium	0.032		0.010		mg/L		12/27/18 18:32	01/02/19 13:40	1

## Method: 6010C - Metals (ICP) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.050		0.050		mg/L			12/31/18 19:15	1
Arsenic	0.015		0.010		mg/L			12/31/18 19:15	1
Barium	0.11		0.010		mg/L			12/31/18 19:15	1
Beryllium	<0.0030		0.0030		mg/L			12/31/18 19:15	1
Boron	<0.10		0.10		mg/L			12/31/18 19:15	1
Cadmium	<0.0050		0.0050		mg/L			12/31/18 19:15	1
Calcium	24		0.50		mg/L			12/31/18 19:15	1
Chromium	<0.010		0.010		mg/L			12/31/18 19:15	1
Cobalt	<0.010		0.010		mg/L			12/31/18 19:15	1
Copper	<0.020		0.020		mg/L			12/31/18 19:15	1
Iron	5.2		0.10		mg/L			12/31/18 19:15	1
Lead	<0.010		0.010		mg/L			12/31/18 19:15	1
Lithium	<0.050		0.050		mg/L			12/31/18 19:15	1
Magnesium	6.9		0.50		mg/L			12/31/18 19:15	1
Manganese	1.8		0.010		mg/L			12/31/18 19:15	1
Molybdenum	<0.010		0.010		mg/L			12/31/18 19:15	1
Nickel	0.013		0.0050		mg/L			12/31/18 19:15	1
Potassium	7.0		1.0		mg/L			12/31/18 19:15	1
Selenium	<0.020		0.020		mg/L			12/31/18 19:15	1
Silver	<0.0050		0.0050		mg/L			12/31/18 19:15	1
Sodium	9.1		1.0		mg/L			12/31/18 19:15	1
Thallium	<0.010		0.010		mg/L			12/31/18 19:15	1
Strontium	0.21		0.0050		mg/L			12/31/18 19:15	1
Zinc	0.041		0.020		mg/L			12/31/18 19:15	1
Vanadium	<0.020		0.020		mg/L			12/31/18 19:15	1
Silicon	6.5	B	0.050		mg/L			12/31/18 19:15	1
Tin	<0.010		0.010		mg/L			12/31/18 19:15	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-2**

**Matrix: Water**

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20		ug/L		12/26/18 10:58	12/28/18 13:05	1

## Method: SM 2340B - Total Hardness (as CaCO3) by calculation - RA

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	89		3.3		mg/L			12/31/18 19:15	1
Calcium hardness as calcium carbonate	61		1.2		mg/L			12/31/18 19:15	1
Magnesium hardness as calcium carbonate	29		2.1		mg/L			12/31/18 19:15	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		01/02/19 09:53	01/03/19 09:11	1
Ammonia	0.39		0.050		mg/L			12/26/18 12:03	1
Nitrogen, Kjeldahl	1.3		0.50		mg/L		12/26/18 15:48	12/27/18 14:17	1
Nitrate Nitrite as N	<0.050		0.050		mg/L			12/27/18 15:58	1
Phosphorus, Total	0.14		0.10		mg/L		12/26/18 15:48	12/27/18 18:24	1
Cr (III)	<0.010		0.010		mg/L			01/08/19 10:46	1
Acidity	<10	H	10		mg/L			01/08/19 10:43	1
Alkalinity, Total	8.2		1.0		mg/L			12/27/18 11:52	1
Total Dissolved Solids	170		5.0		mg/L			12/24/18 10:45	1
Total Suspended Solids	160		5.0		mg/L			12/26/18 09:27	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	270		5.0		umhos/cm			12/28/18 16:36	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-3**

**Matrix: Water**

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			12/28/18 21:54	1

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.28		0.20		mg/L			01/02/19 23:43	1

## Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		5.0		mg/L			01/01/19 06:20	5

## Method: 300.0 - Anions, Ion Chromatography - DL2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	290		10		mg/L			01/03/19 00:06	10

## Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	96		10		mg/L			01/03/19 00:06	10

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.14	^	0.10		mg/L		12/27/18 18:32	01/02/19 13:26	1
Titanium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:26	1

## Method: 6010C - Metals (ICP) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.050		0.050		mg/L			12/31/18 19:18	1
Arsenic	0.30		0.010		mg/L			12/31/18 19:18	1
Barium	0.032		0.010		mg/L			12/31/18 19:18	1
Beryllium	<0.0030		0.0030		mg/L			12/31/18 19:18	1
Boron	0.46		0.10		mg/L			12/31/18 19:18	1
Cadmium	<0.0050		0.0050		mg/L			12/31/18 19:18	1
Calcium	100		0.50		mg/L			12/31/18 19:18	1
Chromium	<0.010		0.010		mg/L			12/31/18 19:18	1
Cobalt	0.010		0.010		mg/L			12/31/18 19:18	1
Copper	<0.020		0.020		mg/L			12/31/18 19:18	1
Iron	36		0.10		mg/L			12/31/18 19:18	1
Lead	<0.010		0.010		mg/L			12/31/18 19:18	1
Lithium	0.14		0.050		mg/L			12/31/18 19:18	1
Magnesium	18		0.50		mg/L			12/31/18 19:18	1
Manganese	1.6		0.010		mg/L			12/31/18 19:18	1
Molybdenum	<0.010		0.010		mg/L			12/31/18 19:18	1
Nickel	<0.0050		0.0050		mg/L			12/31/18 19:18	1
Potassium	7.1		1.0		mg/L			12/31/18 19:18	1
Selenium	0.024		0.020		mg/L			12/31/18 19:18	1
Silver	<0.0050		0.0050		mg/L			12/31/18 19:18	1
Sodium	20		1.0		mg/L			12/31/18 19:18	1
Thallium	<0.010		0.010		mg/L			12/31/18 19:18	1
Strontium	0.96		0.0050		mg/L			12/31/18 19:18	1
Zinc	<0.020		0.020		mg/L			12/31/18 19:18	1
Vanadium	<0.020		0.020		mg/L			12/31/18 19:18	1
Silicon	7.2	B	0.050		mg/L			12/31/18 19:18	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-3**

**Matrix: Water**

## Method: 6010C - Metals (ICP) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tin	<0.010		0.010		mg/L			12/31/18 19:18	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20		ug/L		12/26/18 10:58	12/28/18 13:13	1

## Method: SM 2340B - Total Hardness (as CaCO3) by calculation - RA

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	330		3.3		mg/L			12/31/18 19:18	1
Calcium hardness as calcium carbonate	250		1.2		mg/L			12/31/18 19:18	1
Magnesium hardness as calcium carbonate	73		2.1		mg/L			12/31/18 19:18	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		01/02/19 09:53	01/03/19 09:11	1
Ammonia	0.33		0.050		mg/L			12/26/18 12:04	1
Nitrogen, Kjeldahl	<0.50		0.50		mg/L		12/26/18 15:48	12/27/18 14:18	1
Nitrate Nitrite as N	<0.050		0.050		mg/L			12/27/18 15:59	1
Phosphorus, Total	<0.10		0.10		mg/L		12/26/18 15:48	12/27/18 18:25	1
Cr (III)	<0.010		0.010		mg/L			01/08/19 10:46	1
Acidity	11	H	10		mg/L			01/08/19 10:43	1
Alkalinity, Total	95		1.0		mg/L			12/27/18 11:58	1
Total Dissolved Solids	500		5.0		mg/L			12/24/18 10:45	1
Total Suspended Solids	48		5.0		mg/L			12/26/18 09:27	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	760		5.0		umhos/cm			12/28/18 16:36	1

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-4**

**Matrix: Solid**

**Percent Solids: 54.8**

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Acenaphthylene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Anthracene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Benzo[a]anthracene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Benzo[a]pyrene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Benzo[b]fluoranthene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Benzo[g,h,i]perylene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Benzo[k]fluoranthene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Chrysene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Dibenz(a,h)anthracene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Fluoranthene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Fluorene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Indeno[1,2,3-cd]pyrene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Naphthalene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Phenanthrene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
Pyrene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
1-Methylnaphthalene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1
2-Methylnaphthalene	<600		600		ug/Kg	☼	12/26/18 08:23	12/27/18 13:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	61		27 - 127	12/26/18 08:23	12/27/18 13:34	1
Nitrobenzene-d5 (Surr)	55		15 - 136	12/26/18 08:23	12/27/18 13:34	1
Terphenyl-d14 (Surr)	43		24 - 146	12/26/18 08:23	12/27/18 13:34	1

## Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<37		37		mg/Kg	☼		12/31/18 21:35	1
Fluoride	<7.4		7.4		mg/Kg	☼		12/31/18 21:35	1
Sulfate	66		37		mg/Kg	☼		12/31/18 21:35	1

## Method: 8290A - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	<1.8		1.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,7,8-PeCDD	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,4,7,8-HxCDD	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,6,7,8-HxCDD	<8.8	I	8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,7,8,9-HxCDD	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,4,6,7,8-HpCDD	76		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
OCDD	9100	E	18		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
2,3,7,8-TCDF	<1.8		1.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,7,8-PeCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
2,3,4,7,8-PeCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,4,7,8-HxCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,6,7,8-HxCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
2,3,4,6,7,8-HxCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,7,8,9-HxCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,4,6,7,8-HpCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
1,2,3,4,7,8,9-HpCDF	<8.8		8.8		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1
OCDF	30	I	18		pg/g	☼	01/02/19 10:10	01/10/19 17:58	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-4**

**Matrix: Solid**

**Percent Solids: 54.8**

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	53		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,7,8-PeCDD	63		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,4,7,8-HxCDD	59		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,6,7,8-HxCDD	69		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,4,6,7,8-HpCDD	63		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-OCDD	77		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-2,3,7,8-TCDF	51		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,7,8-PeCDF	54		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-2,3,4,7,8-PeCDF	55		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,4,7,8-HxCDF	51		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,6,7,8-HxCDF	57		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-2,3,4,6,7,8-HxCDF	56		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,7,8,9-HxCDF	53		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,4,6,7,8-HpCDF	52		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-1,2,3,4,7,8,9-HpCDF	53		40 - 135	01/02/19 10:10	01/10/19 17:58	1
13C-OCDF	69		40 - 135	01/02/19 10:10	01/10/19 17:58	1

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	<0.83		0.83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Arsenic	56		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Boron	<17		17		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Barium	110		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Beryllium	1.3		0.50		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Calcium	1600		83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Cadmium	<0.83		0.83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Cobalt	19		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Chromium	16		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Copper	22		3.3		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Iron	17000		17		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Potassium	980		170		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Lithium	29		8.3		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Magnesium	1000		83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Manganese	750		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Molybdenum	7.0		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Sodium	<170		170		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Nickel	21		0.83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Lead	15		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Antimony	<8.3		8.3		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Selenium	<3.3		3.3		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Strontium	28		0.83		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Titanium	86		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Thallium	<1.7		1.7		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Zinc	58		3.3		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1
Tin	<5.0		5.0		mg/Kg	☼	01/03/19 11:01	01/03/19 23:36	1

## Method: 6010C - Metals (ICP) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		17		mg/Kg	☼	01/03/19 11:01	01/04/19 13:11	1
Vanadium	33		3.3		mg/Kg	☼	01/03/19 11:01	01/04/19 13:11	1
Silicon	930 *		8.3		mg/Kg	☼	01/03/19 11:01	01/04/19 13:11	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.029		0.024		mg/Kg	☼	01/03/19 09:11	01/08/19 13:42	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	1300		150		mg/Kg	☼	01/08/19 16:09	01/09/19 15:10	2
Phosphorus, Total	380		3.8		mg/Kg	☼	01/08/19 16:09	01/09/19 18:09	1
Cr (VI)	<8.4		8.4		mg/Kg	☼	12/23/18 18:09	12/23/18 21:31	1
Cr (III)	29		9.1		mg/Kg	☼		01/08/19 10:46	1
Cyanide, Total	<0.46		0.46		mg/Kg	☼	01/02/19 12:23	01/03/19 09:43	1
Sulfide	<110		110		mg/Kg	☼	01/02/19 03:30	01/02/19 03:47	1
Percent Solids	54.8		0.01		%			12/26/18 11:16	1
Percent Moisture	45.2		0.01		%			12/26/18 11:16	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	<220		220		mg/Kg	☼	12/27/18 09:41	12/28/18 09:04	1

## General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	2.8	F1 F2	1.8		mg/Kg	☼		12/26/18 17:19	1
Nitrate Nitrite as N	<18		18		mg/Kg	☼		12/31/18 11:36	10
Specific Conductance	490		100		umhos/cm			01/03/19 15:10	1

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-5**

**Matrix: Solid**

**Percent Solids: 62.4**

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Acenaphthylene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Anthracene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Benzo[a]anthracene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Benzo[a]pyrene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Benzo[b]fluoranthene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Benzo[g,h,i]perylene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Benzo[k]fluoranthene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Chrysene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Dibenz(a,h)anthracene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Fluoranthene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Fluorene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Indeno[1,2,3-cd]pyrene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Naphthalene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Phenanthrene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
Pyrene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
1-Methylnaphthalene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1
2-Methylnaphthalene	<520		520		ug/Kg	☼	12/26/18 08:23	12/27/18 14:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	62		27 - 127	12/26/18 08:23	12/27/18 14:03	1
Nitrobenzene-d5 (Surr)	55		15 - 136	12/26/18 08:23	12/27/18 14:03	1
Terphenyl-d14 (Surr)	48		24 - 146	12/26/18 08:23	12/27/18 14:03	1

## Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<31		31		mg/Kg	☼		12/31/18 21:58	1
Fluoride	6.4		6.2		mg/Kg	☼		12/31/18 21:58	1
Sulfate	400		31		mg/Kg	☼		12/31/18 21:58	1

## Method: 8290A - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	<1.5		1.5		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,7,8-PeCDD	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,4,7,8-HxCDD	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,6,7,8-HxCDD	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,7,8,9-HxCDD	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,4,6,7,8-HpCDD	44		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
OCDD	3600		15		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
2,3,7,8-TCDF	<1.5		1.5		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,7,8-PeCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
2,3,4,7,8-PeCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,4,7,8-HxCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,6,7,8-HxCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
2,3,4,6,7,8-HxCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,7,8,9-HxCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,4,6,7,8-HpCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
1,2,3,4,7,8,9-HpCDF	<7.7		7.7		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1
OCDF	<15		15		pg/g	☼	01/02/19 10:10	01/10/19 18:59	1

TestAmerica Pensacola



# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-5**

**Matrix: Solid**

**Percent Solids: 62.4**

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	55		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,7,8-PeCDD	65		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,4,7,8-HxCDD	66		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,6,7,8-HxCDD	67		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,4,6,7,8-HpCDD	62		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-OCDD	76		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-2,3,7,8-TCDF	54		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,7,8-PeCDF	56		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-2,3,4,7,8-PeCDF	57		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,4,7,8-HxCDF	53		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,6,7,8-HxCDF	59		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-2,3,4,6,7,8-HxCDF	59		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,7,8,9-HxCDF	55		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,4,6,7,8-HpCDF	54		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-1,2,3,4,7,8,9-HpCDF	52		40 - 135	01/02/19 10:10	01/10/19 18:59	1
13C-OCDF	67		40 - 135	01/02/19 10:10	01/10/19 18:59	1

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	<0.75		0.75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Arsenic	350		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Boron	<15		15		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Barium	63		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Beryllium	0.83		0.45		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Calcium	1800		75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Cadmium	<0.75		0.75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Cobalt	17		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Chromium	10		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Copper	7.5		3.0		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Iron	38000		15		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Potassium	940		150		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Lithium	15		7.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Magnesium	590		75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Manganese	120		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Molybdenum	2.5		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Sodium	<150		150		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Nickel	15		0.75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Lead	9.3		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Antimony	<7.5		7.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Selenium	9.7		3.0		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Strontium	30		0.75		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Titanium	48		1.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Zinc	48		3.0		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1
Tin	<4.5		4.5		mg/Kg	☼	01/03/19 11:01	01/03/19 23:39	1

## Method: 6010C - Metals (ICP) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9800		15		mg/Kg	☼	01/03/19 11:01	01/04/19 13:15	1
Thallium	<1.5	L ^	1.5		mg/Kg	☼	01/03/19 11:01	01/04/19 13:15	1
Vanadium	16		3.0		mg/Kg	☼	01/03/19 11:01	01/04/19 13:15	1
Silicon	870	*	7.5		mg/Kg	☼	01/03/19 11:01	01/04/19 13:15	1

TestAmerica Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.021		0.021		mg/Kg	☼	01/03/19 09:11	01/08/19 13:44	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	460		76		mg/Kg	☼	01/08/19 16:09	01/09/19 15:14	1
Phosphorus, Total	200		3.8		mg/Kg	☼	01/08/19 16:09	01/09/19 18:12	1
Cr (VI)	<7.5		7.5		mg/Kg	☼	12/23/18 18:09	12/23/18 21:32	1
Cr (III)	16		8.0		mg/Kg	☼		01/08/19 10:46	1
Cyanide, Total	<0.40		0.40		mg/Kg	☼	01/02/19 12:23	01/03/19 09:43	1
Sulfide	<93		93		mg/Kg	☼	01/02/19 03:30	01/02/19 03:47	1
Percent Solids	62.4		0.01		%			12/26/18 11:16	1
Percent Moisture	37.6		0.01		%			12/26/18 11:16	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	490		160		mg/Kg	☼	12/27/18 10:03	12/28/18 09:26	1

## General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	3.5		1.6		mg/Kg	☼		12/26/18 17:22	1
Nitrate Nitrite as N	<16		16		mg/Kg	☼		12/31/18 11:39	10
Specific Conductance	1300		100		umhos/cm			01/03/19 15:10	1

## Definitions/Glossary

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

### Qualifiers

#### Dioxin

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
E	Result exceeded calibration range.

#### Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
*	LCS or LCSD is outside acceptance limits.
L	A negative instrument reading had an absolute value greater than the reporting limit

#### General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 400-424620/1-A

Matrix: Solid

Analysis Batch: 424679

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424620

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Acenaphthylene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Anthracene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Benzo[a]anthracene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Benzo[a]pyrene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Benzo[b]fluoranthene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Benzo[g,h,i]perylene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Benzo[k]fluoranthene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Chrysene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Dibenz(a,h)anthracene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Fluoranthene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Fluorene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Indeno[1,2,3-cd]pyrene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Naphthalene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Phenanthrene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
Pyrene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
1-Methylnaphthalene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1
2-Methylnaphthalene	<330		330		ug/Kg		12/26/18 08:23	12/26/18 19:27	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	75		27 - 127	12/26/18 08:23	12/26/18 19:27	1
Nitrobenzene-d5 (Surr)	57		15 - 136	12/26/18 08:23	12/26/18 19:27	1
Terphenyl-d14 (Surr)	82		24 - 146	12/26/18 08:23	12/26/18 19:27	1

Lab Sample ID: LCS 400-424620/2-A

Matrix: Solid

Analysis Batch: 424679

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424620

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	2000	1620		ug/Kg		81	57 - 120
Acenaphthylene	2000	1590		ug/Kg		79	59 - 120
Anthracene	2000	1680		ug/Kg		84	61 - 120
Benzo[a]anthracene	2000	1520		ug/Kg		76	61 - 120
Benzo[a]pyrene	2000	1640		ug/Kg		82	54 - 127
Benzo[b]fluoranthene	2000	1540		ug/Kg		77	35 - 146
Benzo[g,h,i]perylene	2000	1750		ug/Kg		88	36 - 150
Benzo[k]fluoranthene	2000	1590		ug/Kg		80	53 - 139
Chrysene	2000	1660		ug/Kg		83	60 - 120
Dibenz(a,h)anthracene	2000	1750		ug/Kg		87	39 - 150
Fluoranthene	2000	1810		ug/Kg		90	61 - 121
Fluorene	2000	1680		ug/Kg		84	60 - 120
Indeno[1,2,3-cd]pyrene	2000	1680		ug/Kg		84	40 - 150
Naphthalene	2000	1440		ug/Kg		72	51 - 120
Phenanthrene	2000	1610		ug/Kg		81	59 - 120
Pyrene	2000	1700		ug/Kg		85	53 - 122
1-Methylnaphthalene	2000	1570		ug/Kg		78	46 - 120
2-Methylnaphthalene	2000	1540		ug/Kg		77	46 - 120

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 400-424620/2-A  
Matrix: Solid  
Analysis Batch: 424679

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 424620

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	78		27 - 127
Nitrobenzene-d5 (Surr)	69		15 - 136
Terphenyl-d14 (Surr)	87		24 - 146

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Lab Sample ID: MB 400-425209/13  
Matrix: Water  
Analysis Batch: 425209

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			12/28/18 20:06	1

Lab Sample ID: LCS 400-425209/14  
Matrix: Water  
Analysis Batch: 425209

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.0100	0.0107		mg/L		107	85 - 115

Lab Sample ID: LCSD 400-425209/15  
Matrix: Water  
Analysis Batch: 425209

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	0.0100	0.0107		mg/L		107	85 - 115	0	15

Lab Sample ID: 400-163980-1 MS  
Matrix: Water  
Analysis Batch: 425209

Client Sample ID: 1 NPDES OUTFALL  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	<0.0010		0.00500	0.00548		mg/L		102	85 - 115

Lab Sample ID: 400-163980-1 MSD  
Matrix: Water  
Analysis Batch: 425209

Client Sample ID: 1 NPDES OUTFALL  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	<0.0010		0.00500	0.00548		mg/L		102	85 - 115	0	15

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 400-425399/19  
Matrix: Water  
Analysis Batch: 425399

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.0		1.0		mg/L			12/31/18 23:06	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 400-425399/19

Matrix: Water

Analysis Batch: 425399

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.20		0.20		mg/L			12/31/18 23:06	1
Sulfate	<1.0		1.0		mg/L			12/31/18 23:06	1

Lab Sample ID: LCS 400-425399/20

Matrix: Water

Analysis Batch: 425399

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.65		mg/L		97	90 - 110
Fluoride	10.0	10.8		mg/L		108	90 - 110
Sulfate	10.0	10.0		mg/L		100	90 - 110

Lab Sample ID: LCSD 400-425399/21

Matrix: Water

Analysis Batch: 425399

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.67		mg/L		97	90 - 110	0	15
Fluoride	10.0	10.8		mg/L		108	90 - 110	0	15
Sulfate	10.0	10.2		mg/L		102	90 - 110	2	15

Lab Sample ID: MB 400-425438/4

Matrix: Water

Analysis Batch: 425438

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.0		1.0		mg/L			01/02/19 18:00	1
Fluoride	<0.20		0.20		mg/L			01/02/19 18:00	1
Sulfate	<1.0		1.0		mg/L			01/02/19 18:00	1

Lab Sample ID: LCS 400-425438/5

Matrix: Water

Analysis Batch: 425438

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.61		mg/L		96	90 - 110
Fluoride	10.0	10.8		mg/L		108	90 - 110
Sulfate	10.0	9.88		mg/L		99	90 - 110

Lab Sample ID: LCSD 400-425438/6

Matrix: Water

Analysis Batch: 425438

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.62		mg/L		96	90 - 110	0	15
Fluoride	10.0	11.0		mg/L		110	90 - 110	2	15
Sulfate	10.0	9.94		mg/L		99	90 - 110	1	15

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 400-425437/4

Matrix: Water

Analysis Batch: 425437

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	<1.0		1.0		mg/L			01/02/19 18:00	1

Lab Sample ID: LCS 400-425437/5

Matrix: Water

Analysis Batch: 425437

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Sulfur	3.33	3.29		mg/L		99	90 - 110

Lab Sample ID: LCSD 400-425437/6

Matrix: Water

Analysis Batch: 425437

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Sulfur	3.33	3.31		mg/L		99	90 - 110	1	15

Lab Sample ID: MB 400-425263/1-A

Matrix: Solid

Analysis Batch: 425394

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<20		20		mg/Kg			12/31/18 17:24	1
Fluoride	<4.1		4.1		mg/Kg			12/31/18 17:24	1
Sulfate	<20		20		mg/Kg			12/31/18 17:24	1

Lab Sample ID: LCS 400-425263/2-A

Matrix: Solid

Analysis Batch: 425394

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	103	97.9		mg/Kg		95	80 - 120
Fluoride	103	119		mg/Kg		115	80 - 120
Sulfate	103	102		mg/Kg		99	80 - 120

Lab Sample ID: LCSD 400-425263/3-A

Matrix: Solid

Analysis Batch: 425394

Client Sample ID: Lab Control Sample Dup

Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	102	96.9		mg/Kg		95	80 - 120	1	15
Fluoride	102	116		mg/Kg		114	80 - 120	3	15
Sulfate	102	102		mg/Kg		101	80 - 120	0	15

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 8290A - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 140-26639/5-A

Matrix: Solid

Analysis Batch: 26812

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 26639

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	<1.0		1.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,7,8-PeCDD	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,4,7,8-HxCDD	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,6,7,8-HxCDD	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,7,8,9-HxCDD	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,4,6,7,8-HpCDD	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
OCDD	<10		10		pg/g		01/02/19 10:10	01/10/19 14:58	1
2,3,7,8-TCDF	<1.0		1.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,7,8-PeCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
2,3,4,7,8-PeCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,4,7,8-HxCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,6,7,8-HxCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
2,3,4,6,7,8-HxCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,7,8,9-HxCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,4,6,7,8-HpCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
1,2,3,4,7,8,9-HpCDF	<5.0		5.0		pg/g		01/02/19 10:10	01/10/19 14:58	1
OCDF	<10		10		pg/g		01/02/19 10:10	01/10/19 14:58	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	56		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,7,8-PeCDD	68		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,4,7,8-HxCDD	70		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,6,7,8-HxCDD	74		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,4,6,7,8-HpCDD	71		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-OCDD	68		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-2,3,7,8-TCDF	52		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,7,8-PeCDF	60		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-2,3,4,7,8-PeCDF	59		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,4,7,8-HxCDF	57		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,6,7,8-HxCDF	63		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-2,3,4,6,7,8-HxCDF	63		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,7,8,9-HxCDF	59		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,4,6,7,8-HpCDF	62		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-1,2,3,4,7,8,9-HpCDF	60		40 - 135	01/02/19 10:10	01/10/19 14:58	1
13C-OCDF	68		40 - 135	01/02/19 10:10	01/10/19 14:58	1

Lab Sample ID: LCS 140-26639/6-A

Matrix: Solid

Analysis Batch: 26812

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 26639

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDD	20.0	18.8		pg/g		94	79 - 129
1,2,3,7,8-PeCDD	100	97.5		pg/g		97	79 - 129
1,2,3,4,7,8-HxCDD	100	94.0		pg/g		94	73 - 123
1,2,3,6,7,8-HxCDD	100	93.0		pg/g		93	74 - 124
1,2,3,7,8,9-HxCDD	100	93.5		pg/g		93	70 - 124
1,2,3,4,6,7,8-HpCDD	100	89.5		pg/g		90	73 - 123
OCDD	200	175		pg/g		87	75 - 125

TestAmerica Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 8290A - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 140-26639/6-A

Matrix: Solid

Analysis Batch: 26812

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 26639

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDF	20.0	19.3		pg/g		96	75 - 125
1,2,3,7,8-PeCDF	100	86.7		pg/g		87	74 - 124
2,3,4,7,8-PeCDF	100	93.0		pg/g		93	75 - 125
1,2,3,4,7,8-HxCDF	100	92.2		pg/g		92	75 - 125
1,2,3,6,7,8-HxCDF	100	93.9		pg/g		94	76 - 126
2,3,4,6,7,8-HxCDF	100	94.1		pg/g		94	76 - 126
1,2,3,7,8,9-HxCDF	100	89.4		pg/g		89	77 - 127
1,2,3,4,6,7,8-HpCDF	100	92.6		pg/g		93	77 - 127
1,2,3,4,7,8,9-HpCDF	100	94.3		pg/g		94	73 - 123
OCDF	200	166		pg/g		83	49 - 128

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C-2,3,7,8-TCDD	60		40 - 135
13C-1,2,3,7,8-PeCDD	72		40 - 135
13C-1,2,3,4,7,8-HxCDD	70		40 - 135
13C-1,2,3,6,7,8-HxCDD	72		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	74		40 - 135
13C-OCDD	78		40 - 135
13C-2,3,7,8-TCDF	52		40 - 135
13C-1,2,3,7,8-PeCDF	61		40 - 135
13C-2,3,4,7,8-PeCDF	62		40 - 135
13C-1,2,3,4,7,8-HxCDF	58		40 - 135
13C-1,2,3,6,7,8-HxCDF	59		40 - 135
13C-2,3,4,6,7,8-HxCDF	60		40 - 135
13C-1,2,3,7,8,9-HxCDF	60		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	62		40 - 135
13C-1,2,3,4,7,8,9-HpCDF	60		40 - 135
13C-OCDF	75		40 - 135

## Method: 6010C - Metals (ICP)

Lab Sample ID: MB 400-424891/1-A

Matrix: Water

Analysis Batch: 425421

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424891

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.10	^	0.10		mg/L		12/27/18 18:32	01/02/19 13:33	1
Arsenic	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Barium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Beryllium	<0.0030		0.0030		mg/L		12/27/18 18:32	01/02/19 13:33	1
Boron	<0.10		0.10		mg/L		12/27/18 18:32	01/02/19 13:33	1
Cadmium	<0.0050		0.0050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Calcium	<0.50		0.50		mg/L		12/27/18 18:32	01/02/19 13:33	1
Chromium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Cobalt	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Copper	<0.020		0.020		mg/L		12/27/18 18:32	01/02/19 13:33	1
Iron	<0.10		0.10		mg/L		12/27/18 18:32	01/02/19 13:33	1
Lithium	<0.050		0.050		mg/L		12/27/18 18:32	01/02/19 13:33	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 400-424891/1-A

Matrix: Water

Analysis Batch: 425421

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424891

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	<0.50		0.50		mg/L		12/27/18 18:32	01/02/19 13:33	1
Manganese	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Nickel	<0.0050		0.0050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Potassium	<1.0		1.0		mg/L		12/27/18 18:32	01/02/19 13:33	1
Lead	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Antimony	<0.050		0.050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Silver	<0.0050		0.0050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Selenium	<0.020		0.020		mg/L		12/27/18 18:32	01/02/19 13:33	1
Sodium	<1.0		1.0		mg/L		12/27/18 18:32	01/02/19 13:33	1
Strontium	<0.0050		0.0050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Thallium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Titanium	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1
Vanadium	<0.020		0.020		mg/L		12/27/18 18:32	01/02/19 13:33	1
Zinc	<0.020		0.020		mg/L		12/27/18 18:32	01/02/19 13:33	1
Silicon	<0.050		0.050		mg/L		12/27/18 18:32	01/02/19 13:33	1
Tin	<0.010		0.010		mg/L		12/27/18 18:32	01/02/19 13:33	1

Lab Sample ID: LCS 400-424891/2-A

Matrix: Water

Analysis Batch: 425421

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424891

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	10.0	10.6	^	mg/L		106	80 - 120
Arsenic	1.00	1.01		mg/L		101	80 - 120
Barium	1.00	1.05		mg/L		105	80 - 120
Beryllium	0.500	0.515		mg/L		103	80 - 120
Boron	1.00	0.989		mg/L		99	80 - 120
Cadmium	0.500	0.509		mg/L		102	80 - 120
Calcium	10.0	10.4		mg/L		104	80 - 120
Chromium	1.00	1.05		mg/L		105	80 - 120
Cobalt	1.00	1.04		mg/L		104	80 - 120
Copper	1.00	1.05		mg/L		105	80 - 120
Iron	10.0	10.4		mg/L		104	80 - 120
Lithium	1.00	1.04		mg/L		104	80 - 120
Magnesium	10.0	10.3		mg/L		103	80 - 120
Manganese	1.00	1.04		mg/L		104	80 - 120
Nickel	1.00	1.03		mg/L		103	80 - 120
Potassium	10.0	10.4		mg/L		104	80 - 120
Lead	1.00	1.01		mg/L		101	80 - 120
Antimony	1.00	1.03		mg/L		103	80 - 120
Silver	0.500	0.505		mg/L		101	80 - 120
Selenium	1.00	0.909		mg/L		91	80 - 120
Sodium	10.0	10.6		mg/L		106	80 - 120
Strontium	1.00	1.05		mg/L		105	80 - 120
Thallium	1.00	1.01		mg/L		101	80 - 120
Titanium	1.00	1.03		mg/L		103	80 - 120
Vanadium	1.00	1.06		mg/L		106	80 - 120
Zinc	1.00	1.04		mg/L		104	80 - 120

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 400-424891/2-A

Matrix: Water

Analysis Batch: 425421

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424891

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silicon	1.00	1.05		mg/L		105	80 - 120
Tin	1.00	1.02		mg/L		102	80 - 120

Lab Sample ID: MB 400-425434/1-A

Matrix: Solid

Analysis Batch: 425522

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 425434

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Barium	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Beryllium	<0.30		0.30		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Boron	<10		10		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Cadmium	<0.50		0.50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Calcium	<50		50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Chromium	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Cobalt	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Copper	<2.0		2.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Iron	<10		10		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Lithium	<5.0		5.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Magnesium	<50		50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Manganese	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Molybdenum	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Nickel	<0.50		0.50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Potassium	<100		100		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Lead	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Antimony	<5.0		5.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Silver	<0.50		0.50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Selenium	<2.0		2.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Sodium	<100		100		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Strontium	<0.50		0.50		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Thallium	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Titanium	<1.0		1.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Vanadium	<2.0		2.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Zinc	<2.0		2.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1
Tin	<3.0		3.0		mg/Kg		01/03/19 11:01	01/03/19 21:42	1

Lab Sample ID: LCS 400-425434/2-A

Matrix: Solid

Analysis Batch: 425522

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 425434

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	99.1	96.3		mg/Kg		97	80 - 120
Barium	99.1	101		mg/Kg		102	80 - 120
Beryllium	49.6	50.0		mg/Kg		101	80 - 120
Boron	99.1	92.6		mg/Kg		93	80 - 120
Cadmium	49.6	49.0		mg/Kg		99	80 - 120
Calcium	99.1	1010		mg/Kg		102	80 - 120
Chromium	99.1	103		mg/Kg		104	80 - 120
Cobalt	99.1	101		mg/Kg		102	80 - 120

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 400-425434/2-A

Matrix: Solid

Analysis Batch: 425522

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 425434

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Copper	99.1	101		mg/Kg		102	80 - 120
Iron	99.1	998		mg/Kg		101	80 - 120
Lithium	99.1	99.9		mg/Kg		101	80 - 120
Magnesium	99.1	975		mg/Kg		98	80 - 120
Manganese	99.1	100		mg/Kg		101	80 - 120
Molybdenum	99.1	98.2		mg/Kg		99	80 - 120
Nickel	99.1	97.6		mg/Kg		98	80 - 120
Potassium	99.1	992		mg/Kg		100	80 - 120
Lead	99.1	96.4		mg/Kg		97	80 - 120
Antimony	99.1	96.9		mg/Kg		98	80 - 120
Silver	49.6	48.7		mg/Kg		98	80 - 120
Selenium	99.1	85.5		mg/Kg		86	80 - 120
Sodium	99.1	1030		mg/Kg		104	80 - 120
Strontium	99.1	101		mg/Kg		102	80 - 120
Thallium	99.1	98.8		mg/Kg		100	80 - 120
Titanium	99.1	98.6		mg/Kg		99	80 - 120
Vanadium	99.1	102		mg/Kg		103	80 - 120
Zinc	99.1	100		mg/Kg		101	80 - 120
Tin	99.1	96.1		mg/Kg		97	80 - 120

## Method: 6010C - Metals (ICP) - RA

Lab Sample ID: MB 400-424891/1-A

Matrix: Water

Analysis Batch: 425326

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424891

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Barium - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Beryllium - RA	<0.0030		0.0030		mg/L		12/27/18 18:32	12/31/18 18:25	1
Boron - RA	<0.10		0.10		mg/L		12/27/18 18:32	12/31/18 18:25	1
Cadmium - RA	<0.0050		0.0050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Calcium - RA	<0.50		0.50		mg/L		12/27/18 18:32	12/31/18 18:25	1
Chromium - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Cobalt - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Copper - RA	<0.020		0.020		mg/L		12/27/18 18:32	12/31/18 18:25	1
Iron - RA	<0.10		0.10		mg/L		12/27/18 18:32	12/31/18 18:25	1
Lithium - RA	<0.050		0.050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Magnesium - RA	<0.50		0.50		mg/L		12/27/18 18:32	12/31/18 18:25	1
Manganese - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Molybdenum - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Nickel - RA	<0.0050		0.0050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Potassium - RA	<1.0		1.0		mg/L		12/27/18 18:32	12/31/18 18:25	1
Lead - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Antimony - RA	<0.050		0.050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Silver - RA	<0.0050		0.0050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Selenium - RA	<0.020		0.020		mg/L		12/27/18 18:32	12/31/18 18:25	1
Sodium - RA	<1.0		1.0		mg/L		12/27/18 18:32	12/31/18 18:25	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) - RA (Continued)

Lab Sample ID: MB 400-424891/1-A

Matrix: Water

Analysis Batch: 425326

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424891

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Strontium - RA	<0.0050		0.0050		mg/L		12/27/18 18:32	12/31/18 18:25	1
Thallium - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Titanium - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1
Vanadium - RA	<0.020		0.020		mg/L		12/27/18 18:32	12/31/18 18:25	1
Zinc - RA	<0.020		0.020		mg/L		12/27/18 18:32	12/31/18 18:25	1
Tin - RA	<0.010		0.010		mg/L		12/27/18 18:32	12/31/18 18:25	1

Lab Sample ID: LCS 400-424891/2-A

Matrix: Water

Analysis Batch: 425326

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424891

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic - RA	1.00	0.997		mg/L		100	80 - 120
Barium - RA	1.00	1.04		mg/L		104	80 - 120
Beryllium - RA	0.500	0.509		mg/L		102	80 - 120
Boron - RA	1.00	0.969		mg/L		97	80 - 120
Cadmium - RA	0.500	0.498		mg/L		100	80 - 120
Calcium - RA	10.0	10.2		mg/L		102	80 - 120
Chromium - RA	1.00	1.02		mg/L		102	80 - 120
Cobalt - RA	1.00	1.02		mg/L		102	80 - 120
Copper - RA	1.00	1.03		mg/L		103	80 - 120
Iron - RA	10.0	10.4		mg/L		104	80 - 120
Lithium - RA	1.00	1.03		mg/L		103	80 - 120
Magnesium - RA	10.0	10.1		mg/L		101	80 - 120
Manganese - RA	1.00	1.02		mg/L		102	80 - 120
Molybdenum - RA	1.00	1.05		mg/L		105	80 - 120
Nickel - RA	1.00	1.01		mg/L		101	80 - 120
Potassium - RA	10.0	10.2		mg/L		102	80 - 120
Lead - RA	1.00	0.999		mg/L		100	80 - 120
Antimony - RA	1.00	1.01		mg/L		101	80 - 120
Silver - RA	0.500	0.493		mg/L		99	80 - 120
Selenium - RA	1.00	0.896		mg/L		90	80 - 120
Sodium - RA	10.0	10.5		mg/L		105	80 - 120
Strontium - RA	1.00	1.04		mg/L		104	80 - 120
Thallium - RA	1.00	0.987		mg/L		99	80 - 120
Titanium - RA	1.00	1.04		mg/L		104	80 - 120
Vanadium - RA	1.00	1.04		mg/L		104	80 - 120
Zinc - RA	1.00	1.03		mg/L		103	80 - 120
Tin - RA	1.00	1.01		mg/L		101	80 - 120

Lab Sample ID: MB 400-425434/1-A

Matrix: Solid

Analysis Batch: 425619

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 425434

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum - RA	<10		10		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Arsenic - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Barium - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Beryllium - RA	<0.30		0.30		mg/Kg		01/03/19 11:01	01/04/19 13:04	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) - RA (Continued)

Lab Sample ID: MB 400-425434/1-A

Matrix: Solid

Analysis Batch: 425619

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 425434

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron - RA	<10		10		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Cadmium - RA	<0.50		0.50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Calcium - RA	<50		50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Chromium - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Cobalt - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Copper - RA	<2.0		2.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Iron - RA	<10		10		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Lithium - RA	<5.0		5.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Magnesium - RA	<50		50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Manganese - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Molybdenum - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Nickel - RA	<0.50		0.50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Potassium - RA	<100		100		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Lead - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Antimony - RA	<5.0		5.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Silver - RA	<0.50		0.50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Selenium - RA	<2.0		2.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Sodium - RA	<100		100		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Strontium - RA	<0.50		0.50		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Thallium - RA	<1.0 ^		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Titanium - RA	<1.0		1.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Vanadium - RA	<2.0		2.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Zinc - RA	<2.0		2.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Silicon - RA	<5.0		5.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1
Tin - RA	<3.0		3.0		mg/Kg		01/03/19 11:01	01/04/19 13:04	1

Lab Sample ID: LCS 400-425434/2-A

Matrix: Solid

Analysis Batch: 425619

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 425434

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Aluminum - RA	991	999		mg/Kg		101	80 - 120
Arsenic - RA	99.1	97.0		mg/Kg		98	80 - 120
Barium - RA	99.1	99.8		mg/Kg		101	80 - 120
Beryllium - RA	49.6	49.2		mg/Kg		99	80 - 120
Boron - RA	99.1	94.4		mg/Kg		95	80 - 120
Cadmium - RA	49.6	48.5		mg/Kg		98	80 - 120
Calcium - RA	991	991		mg/Kg		100	80 - 120
Chromium - RA	99.1	98.4		mg/Kg		99	80 - 120
Cobalt - RA	99.1	98.4		mg/Kg		99	80 - 120
Copper - RA	99.1	100		mg/Kg		101	80 - 120
Iron - RA	991	1000		mg/Kg		101	80 - 120
Lithium - RA	99.1	99.4		mg/Kg		100	80 - 120
Magnesium - RA	991	978		mg/Kg		99	80 - 120
Manganese - RA	99.1	99.2		mg/Kg		100	80 - 120
Molybdenum - RA	99.1	103		mg/Kg		104	80 - 120
Nickel - RA	99.1	97.5		mg/Kg		98	80 - 120
Potassium - RA	991	986		mg/Kg		99	80 - 120

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 6010C - Metals (ICP) - RA (Continued)

Lab Sample ID: LCS 400-425434/2-A  
Matrix: Solid  
Analysis Batch: 425619

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 425434

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead - RA	99.1	96.7		mg/Kg		98	80 - 120
Antimony - RA	99.1	97.9		mg/Kg		99	80 - 120
Silver - RA	49.6	47.7		mg/Kg		96	80 - 120
Selenium - RA	99.1	88.1		mg/Kg		89	80 - 120
Sodium - RA	99.1	1000		mg/Kg		101	80 - 120
Strontium - RA	99.1	99.7		mg/Kg		101	80 - 120
Thallium - RA	99.1	96.0	^	mg/Kg		97	80 - 120
Titanium - RA	99.1	98.6		mg/Kg		99	80 - 120
Vanadium - RA	99.1	101		mg/Kg		101	80 - 120
Zinc - RA	99.1	99.1		mg/Kg		100	80 - 120
Silicon - RA	99.1	15.5	*	mg/Kg		16	80 - 120
Tin - RA	99.1	96.4		mg/Kg		97	80 - 120

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-424648/14-A  
Matrix: Water  
Analysis Batch: 424985

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 424648

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.20		0.20		ug/L		12/26/18 10:50	12/28/18 12:32	1

Lab Sample ID: LCS 400-424648/15-A  
Matrix: Water  
Analysis Batch: 424985

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 424648

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.01	0.938		ug/L		93	80 - 120

## Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 400-425427/14-A  
Matrix: Solid  
Analysis Batch: 425868

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 425427

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.013		0.013		mg/Kg		01/03/19 09:11	01/08/19 13:38	1

Lab Sample ID: LCS 400-425427/15-A  
Matrix: Solid  
Analysis Batch: 425868

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 425427

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.0636	0.0643		mg/Kg		101	80 - 120

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 335.2 - Cyanide, Total

Lab Sample ID: MB 400-425452/1-A  
Matrix: Water  
Analysis Batch: 425433

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 425452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		01/02/19 09:53	01/03/19 09:11	1

Lab Sample ID: LCS 400-425452/3-A  
Matrix: Water  
Analysis Batch: 425433

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 425452

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.798	0.827		mg/L		104	75 - 125

Lab Sample ID: 400-163980-3 MS  
Matrix: Water  
Analysis Batch: 425433

Client Sample ID: 3 SEEP  
Prep Type: Total/NA  
Prep Batch: 425452

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	<0.0050		0.200	0.189		mg/L		95	68 - 133

Lab Sample ID: 400-163980-3 MSD  
Matrix: Water  
Analysis Batch: 425433

Client Sample ID: 3 SEEP  
Prep Type: Total/NA  
Prep Batch: 425452

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	<0.0050		0.200	0.204		mg/L		102	68 - 133	8	36

## Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 400-424674/6  
Matrix: Water  
Analysis Batch: 424674

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	<0.050		0.050		mg/L			12/26/18 11:58	1

Lab Sample ID: LCS 400-424674/7  
Matrix: Water  
Analysis Batch: 424674

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	2.01		mg/L		101	90 - 110

Lab Sample ID: MRL 400-424674/5  
Matrix: Water  
Analysis Batch: 424674

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	0.0500	<0.050		mg/L		86	50 - 150

TestAmerica Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: 400-163980-1 MS

Matrix: Water

Analysis Batch: 424674

Client Sample ID: 1 NPDES OUTFALL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	<0.050		2.00	1.92		mg/L		96	90 - 110

Lab Sample ID: 400-163980-1 MSD

Matrix: Water

Analysis Batch: 424674

Client Sample ID: 1 NPDES OUTFALL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	<0.050		2.00	1.92		mg/L		96	90 - 110	0	11

Lab Sample ID: MRL 400-424750/5

Matrix: Solid

Analysis Batch: 424750

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	0.0500	<0.050		mg/L		90	50 - 150

Lab Sample ID: MB 400-424734/1-A

Matrix: Solid

Analysis Batch: 424750

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	<1.0		1.0		mg/Kg			12/26/18 17:16	1

Lab Sample ID: LCS 400-424734/2-A

Matrix: Solid

Analysis Batch: 424750

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	40.0	41.0		mg/Kg		103	90 - 110

Lab Sample ID: 400-163980-4 MS

Matrix: Solid

Analysis Batch: 424750

Client Sample ID: 2 SEEP

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.8	F1 F2	7.30	8.03	F1	mg/Kg	☼	71	90 - 110

Lab Sample ID: 400-163980-4 MSD

Matrix: Solid

Analysis Batch: 424750

Client Sample ID: 2 SEEP

Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	2.8	F1 F2	7.30	9.23	F1 F2	mg/Kg	☼	87	90 - 110	14	11

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 400-424727/2-A  
Matrix: Water  
Analysis Batch: 424847

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 424727

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.50		0.50		mg/L		12/26/18 15:48	12/27/18 13:57	1

Lab Sample ID: LCS 400-424727/3-A  
Matrix: Water  
Analysis Batch: 424847

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 424727

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	10.0	10.3		mg/L		103	90 - 110

Lab Sample ID: MRL 400-424847/11  
Matrix: Water  
Analysis Batch: 424847

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	0.500	<0.50		mg/L		70	50 - 150

Lab Sample ID: MB 400-425877/2-A  
Matrix: Solid  
Analysis Batch: 425991

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 425877

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<50		50		mg/Kg		01/08/19 16:09	01/09/19 14:45	1

Lab Sample ID: LCS 400-425877/3-A  
Matrix: Solid  
Analysis Batch: 425991

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 425877

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	250	247		mg/Kg		99	75 - 125

Lab Sample ID: 400-163980-4 MS  
Matrix: Solid  
Analysis Batch: 425991

Client Sample ID: 2 SEEP  
Prep Type: Total/NA  
Prep Batch: 425877

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	1300		271	1570	4	mg/Kg	✖	86	90 - 110

Lab Sample ID: 400-163980-4 MSD  
Matrix: Solid  
Analysis Batch: 425991

Client Sample ID: 2 SEEP  
Prep Type: Total/NA  
Prep Batch: 425877

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Kjeldahl	1300		283	1470	4	mg/Kg	✖	44	90 - 110	7	20

Lab Sample ID: MRL 400-425991/11  
Matrix: Solid  
Analysis Batch: 425991

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	0.500	<2.0		mg/Kg		82	

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 400-424868/7

Matrix: Water

Analysis Batch: 424868

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.050		0.050		mg/L			12/27/18 15:35	1

Lab Sample ID: LCS 400-424868/8

Matrix: Water

Analysis Batch: 424868

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.500	0.506		mg/L		101	90 - 110

Lab Sample ID: MRL 400-424868/6

Matrix: Water

Analysis Batch: 424868

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.0500	<0.050		mg/L		88	50 - 150

Lab Sample ID: MRL 400-425239/6

Matrix: Solid

Analysis Batch: 425239

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.0500	0.0540		mg/Kg		108	50 - 150

Lab Sample ID: MB 400-424735/1-A

Matrix: Solid

Analysis Batch: 425239

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<1.0		1.0		mg/Kg			12/31/18 11:34	1

Lab Sample ID: MB 400-424999/1-A

Matrix: Solid

Analysis Batch: 425239

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<1.0		1.0		mg/Kg			12/31/18 11:43	1

Lab Sample ID: LCS 400-424735/2-A

Matrix: Solid

Analysis Batch: 425239

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	10.0	10.3		mg/Kg		103	90 - 110

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCS 400-424735/2-A  
Matrix: Solid  
Analysis Batch: 425239

Client Sample ID: Lab Control Sample  
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	10.0	10.0		mg/Kg		100	90 - 110

Lab Sample ID: LCS 400-424999/2-A  
Matrix: Solid  
Analysis Batch: 425239

Client Sample ID: Lab Control Sample  
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	10.0	10.2		mg/Kg		102	90 - 110

Lab Sample ID: 400-163980-4 MS  
Matrix: Solid  
Analysis Batch: 425239

Client Sample ID: 2 SEEP  
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	<18		3.65	<18		mg/Kg	✱	NC	90 - 110

Lab Sample ID: 400-163980-4 MSD  
Matrix: Solid  
Analysis Batch: 425239

Client Sample ID: 2 SEEP  
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite as N	<18		3.65	<18		mg/Kg	✱	NC	90 - 110	NC	6

## Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 400-424728/2-A  
Matrix: Water  
Analysis Batch: 424893

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 424728

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<0.10		0.10		mg/L		12/26/18 15:48	12/27/18 18:02	1

Lab Sample ID: LCS 400-424728/3-A  
Matrix: Water  
Analysis Batch: 424893

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 424728

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	2.60	2.74		mg/L		105	75 - 113

Lab Sample ID: MRL 400-424893/13  
Matrix: Water  
Analysis Batch: 424893

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.100	<0.10		mg/L		64	50 - 150

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 365.4 - Phosphorus, Total (Continued)

Lab Sample ID: MB 400-425879/2-A

Matrix: Solid

Analysis Batch: 426006

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 425879

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<2.5		2.5		mg/Kg		01/08/19 16:09	01/09/19 17:52	1

Lab Sample ID: LCS 400-425879/3-A

Matrix: Solid

Analysis Batch: 426006

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 425879

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	65.0	67.8		mg/Kg		104	75 - 113

Lab Sample ID: 400-163980-4 MS

Matrix: Solid

Analysis Batch: 426006

Client Sample ID: 2 SEEP

Prep Type: Total/NA

Prep Batch: 425879

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	380		27.1	371	4	mg/Kg	✱	-18	72 - 120

Lab Sample ID: 400-163980-4 MSD

Matrix: Solid

Analysis Batch: 426006

Client Sample ID: 2 SEEP

Prep Type: Total/NA

Prep Batch: 425879

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	380		28.3	343	4	mg/Kg	✱	-116	72 - 120	8	27

Lab Sample ID: MRL 400-426006/13

Matrix: Solid

Analysis Batch: 426006

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.100	0.112		mg/L		112	

## Method: 7196A - Chromium, Hexavalent

Lab Sample ID: MRL 400-424456/5-A

Matrix: Solid

Analysis Batch: 424459

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424456

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Cr (VI)	0.0500	0.0357		mg/L		71	50 - 150

Lab Sample ID: MB 400-424457/8-A

Matrix: Solid

Analysis Batch: 424459

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424457

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cr (VI)	<4.8		4.8		mg/Kg		12/23/18 18:09	12/23/18 21:27	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 7196A - Chromium, Hexavalent (Continued)

Lab Sample ID: LCS 400-424457/9-A

Matrix: Solid

Analysis Batch: 424459

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424457

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cr (VI)	97.5	103		mg/Kg		106	80 - 120

## Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 400-425449/1-A

Matrix: Solid

Analysis Batch: 425447

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 425449

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.25		0.25		mg/Kg		01/02/19 12:23	01/03/19 09:43	1

Lab Sample ID: LCS 400-425449/3-A

Matrix: Solid

Analysis Batch: 425447

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 425449

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	39.9	45.7		mg/Kg		114	75 - 125

Lab Sample ID: 400-163980-4 MS

Matrix: Solid

Analysis Batch: 425447

Client Sample ID: 2 SEEP

Prep Type: Total/NA

Prep Batch: 425449

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	<0.46		18.2	17.9		mg/Kg	✱	98	57 - 136

Lab Sample ID: 400-163980-4 MSD

Matrix: Solid

Analysis Batch: 425447

Client Sample ID: 2 SEEP

Prep Type: Total/NA

Prep Batch: 425449

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Cyanide, Total	<0.46		18.2	18.6		mg/Kg	✱	102	57 - 136	4	20

## Method: 9034 - Sulfide, Acid Soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 680-553875/1-A

Matrix: Solid

Analysis Batch: 553876

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 553875

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	<60		60		mg/Kg		01/02/19 03:30	01/02/19 03:47	1

Lab Sample ID: LCS 680-553875/2-A

Matrix: Solid

Analysis Batch: 553876

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 553875

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	1250	1080		mg/Kg		86	50 - 150

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: 9034 - Sulfide, Acid Soluble and Insoluble (Titrimetric) (Continued)

Lab Sample ID: LCSD 680-553875/3-A

Matrix: Solid

Analysis Batch: 553876

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 553875

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Sulfide	1250	1080		mg/Kg		86	50 - 150	0	50

## Method: 9050A - Specific Conductance

Lab Sample ID: MB 400-425409/3-A

Matrix: Solid

Analysis Batch: 425498

Client Sample ID: Method Blank

Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<100		100		umhos/cm			01/03/19 15:10	1

Lab Sample ID: LCS 400-425409/4-A

Matrix: Solid

Analysis Batch: 425498

Client Sample ID: Lab Control Sample

Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance	200	201		umhos/cm		101	98 - 102		

## Method: 9056 - Total Halogens(Bomb Calorimeter followed by IC)

Lab Sample ID: MB 400-424733/1-A

Matrix: Solid

Analysis Batch: 424931

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 424733

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	<200		200		mg/Kg		12/26/18 12:13	12/28/18 02:12	1

Lab Sample ID: LCS 400-424733/2-A

Matrix: Solid

Analysis Batch: 424931

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 424733

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Sulfur	329	335		mg/Kg		102	60 - 140		

## Method: SM 2310B - Acidity

Lab Sample ID: MB 400-425830/1

Matrix: Water

Analysis Batch: 425830

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acidity	<10		10		mg/L			01/08/19 10:43	1

TestAmerica Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: SM 2310B - Acidity (Continued)

Lab Sample ID: LCS 400-425830/2

Matrix: Water

Analysis Batch: 425830

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acidity	1020	933		mg/L		91	80 - 120

Lab Sample ID: 400-163980-1 DU

Matrix: Water

Analysis Batch: 425830

Client Sample ID: 1 NPDES OUTFALL

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Acidity	<10	H	<10		mg/L		NC	

## Method: SM 2320B - Alkalinity

Lab Sample ID: MB 400-424829/4

Matrix: Water

Analysis Batch: 424829

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	<1.0		1.0		mg/L			12/27/18 10:56	1

Lab Sample ID: LCS 400-424829/5

Matrix: Water

Analysis Batch: 424829

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	100	105		mg/L		105	80 - 120

## Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 400-425041/1

Matrix: Water

Analysis Batch: 425041

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<5.0		5.0		umhos/cm			12/28/18 16:36	1

Lab Sample ID: LCS 400-425041/2

Matrix: Water

Analysis Batch: 425041

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	10.0	10.0		umhos/cm		100	98 - 102

TestAmerica Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 400-424520/1

Matrix: Water

Analysis Batch: 424520

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<5.0		5.0		mg/L			12/24/18 10:45	1

Lab Sample ID: LCS 400-424520/2

Matrix: Water

Analysis Batch: 424520

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	293	238		mg/L		81	78 - 122

Lab Sample ID: 400-163980-3 DU

Matrix: Water

Analysis Batch: 424520

Client Sample ID: 3 SEEP

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	500		496		mg/L		0	5

## Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 400-424634/1

Matrix: Water

Analysis Batch: 424634

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<5.0		5.0		mg/L			12/26/18 09:27	1

Lab Sample ID: LCS 400-424634/2

Matrix: Water

Analysis Batch: 424634

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	252	253		mg/L		100	82 - 118

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 1 NPDES OUTFALL**

**Date Collected: 12/20/18 12:34**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 20:52	BAW	TAL PEN
Total/NA	Analysis	300.0		1	10 mL	1.0 mL	425399	01/01/19 05:11	JAW	TAL PEN
Total/NA	Analysis	300.0	DL	5	10 mL	1.0 mL	425438	01/02/19 22:57	BAW	TAL PEN
Total/NA	Analysis	9056		5	10 mL	1.0 mL	425437	01/02/19 22:57	BAW	TAL PEN
Total/NA	Analysis	6010C	RA	1			425326	12/31/18 19:11	GESP	TAL PEN
Total/NA	Prep	200.7			50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425421	01/02/19 13:30	GESP	TAL PEN
Total/NA	Prep	7470A			40 mL	40 mL	424648	12/26/18 10:58	JAP	TAL PEN
Total/NA	Analysis	7470A		1			424985	12/28/18 13:03	JAP	TAL PEN
Total/NA	Analysis	SM 2340B	RA	1			425326	12/31/18 19:11	GESP	TAL PEN
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 12:00	KJR	TAL PEN
Total/NA	Prep	351.2			25 mL	25 mL	424727	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	351.2		1			424847	12/27/18 14:16	JAT	TAL PEN
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:57	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	424728	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 18:23	JAT	TAL PEN
Total/NA	Analysis	7196A		1			425817	01/08/19 10:46	RRC	TAL PEN
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN
Total/NA	Analysis	SM 2320B		1			424829	12/27/18 11:46	BAB	TAL PEN
Total/NA	Analysis	SM 2510B		1			425041	12/28/18 16:36	VLS	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	424634	12/26/18 09:27	CLB	TAL PEN

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 21:39	BAW	TAL PEN
Total/NA	Analysis	300.0		1	10 mL	1.0 mL	425399	01/01/19 05:34	JAW	TAL PEN
Total/NA	Analysis	300.0	DL	5	10 mL	1.0 mL	425438	01/02/19 23:20	BAW	TAL PEN
Total/NA	Analysis	9056		5	10 mL	1.0 mL	425437	01/02/19 23:20	BAW	TAL PEN
Total/NA	Analysis	6010C	RA	1			425326	12/31/18 19:15	GESP	TAL PEN
Total/NA	Prep	200.7			50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425421	01/02/19 13:40	GESP	TAL PEN
Total/NA	Prep	7470A			40 mL	40 mL	424648	12/26/18 10:58	JAP	TAL PEN
Total/NA	Analysis	7470A		1			424985	12/28/18 13:05	JAP	TAL PEN
Total/NA	Analysis	SM 2340B	RA	1			425326	12/31/18 19:15	GESP	TAL PEN
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 12:03	KJR	TAL PEN
Total/NA	Prep	351.2			25 mL	25 mL	424727	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	351.2		1			424847	12/27/18 14:17	JAT	TAL PEN
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:58	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	424728	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 18:24	JAT	TAL PEN
Total/NA	Analysis	7196A		1			425817	01/08/19 10:46	RRC	TAL PEN
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN
Total/NA	Analysis	SM 2320B		1			424829	12/27/18 11:52	BAB	TAL PEN
Total/NA	Analysis	SM 2510B		1			425041	12/28/18 16:36	VLS	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	424634	12/26/18 09:27	CLB	TAL PEN

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 21:54	BAW	TAL PEN
Total/NA	Analysis	300.0	DL	5	10 mL	1.0 mL	425399	01/01/19 06:20	JAW	TAL PEN
Total/NA	Analysis	300.0		1	10 mL	1.0 mL	425438	01/02/19 23:43	BAW	TAL PEN
Total/NA	Analysis	300.0	DL2	10	10 mL	1.0 mL	425438	01/03/19 00:06	BAW	TAL PEN
Total/NA	Analysis	9056		10	10 mL	1.0 mL	425437	01/03/19 00:06	BAW	TAL PEN
Total/NA	Analysis	6010C	RA	1			425326	12/31/18 19:18	GESP	TAL PEN
Total/NA	Prep	200.7			50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425421	01/02/19 13:26	GESP	TAL PEN
Total/NA	Prep	7470A			40 mL	40 mL	424648	12/26/18 10:58	JAP	TAL PEN
Total/NA	Analysis	7470A		1			424985	12/28/18 13:13	JAP	TAL PEN
Total/NA	Analysis	SM 2340B	RA	1			425326	12/31/18 19:18	GESP	TAL PEN
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 12:04	KJR	TAL PEN
Total/NA	Prep	351.2			25 mL	25 mL	424727	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	351.2		1			424847	12/27/18 14:18	JAT	TAL PEN
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:59	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	424728	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 18:25	JAT	TAL PEN
Total/NA	Analysis	7196A		1			425817	01/08/19 10:46	RRC	TAL PEN
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN
Total/NA	Analysis	SM 2320B		1			424829	12/27/18 11:58	BAB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Client Sample ID: 3 SEEP

Date Collected: 12/20/18 14:46

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2510B		1			425041	12/28/18 16:36	VLS	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	424634	12/26/18 09:27	CLB	TAL PEN

## Client Sample ID: 2 SEEP

Date Collected: 12/20/18 12:50

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	425409	01/02/19 16:55	DEK	TAL PEN
Soluble	Analysis	9050A		1			425498	01/03/19 15:10	DEK	TAL PEN
Total/NA	Analysis	Moisture		1			424657	12/26/18 11:16	NB	TAL PEN

## Client Sample ID: 2 SEEP

Date Collected: 12/20/18 12:50

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-4

Matrix: Solid

Percent Solids: 54.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.00 g	1.0 mL	424620	12/26/18 08:23	KLR	TAL PEN
Total/NA	Analysis	8270D		1			424792	12/27/18 13:34	VC1	TAL PEN
Soluble	Leach	DI Leach			2.468 g	50 mL	425263	12/31/18 13:46	BAW	TAL PEN
Soluble	Analysis	9056		1	10 mL	1.0 mL	425394	12/31/18 21:35	JAW	TAL PEN
Total/NA	Prep	8290			10.320 g	20 uL	26639	01/02/19 10:10	SSS	TAL KNX
Total/NA	Analysis	8290A		1			26812	01/10/19 17:58	MSD	TAL KNX
Total/NA	Prep	3050B			000.5479 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425522	01/03/19 23:36	GESP	TAL PEN
Total/NA	Prep	3050B	RA		000.5479 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425619	01/04/19 13:11	AC	TAL PEN
Total/NA	Prep	7471A			0.6180 g	40 mL	425427	01/03/19 09:11	JAP	TAL PEN
Total/NA	Analysis	7471A		1			425868	01/08/19 13:42	JAP	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:19	KJR	TAL PEN
Total/NA	Prep	351.2			1.2109 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		2			425991	01/09/19 15:10	JAT	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		10	10 mL	10 mL	425239	12/31/18 11:36	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			1.2109 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 18:09	JAT	TAL PEN
Total/NA	Prep	3060A			0.5449 g	50 mL	424457	12/23/18 18:09	DN1	TAL PEN
Total/NA	Analysis	7196A		1			424459	12/23/18 21:31	DN1	TAL PEN
Total/NA	Analysis	7196A		1			425817	01/08/19 10:46	RRC	TAL PEN
Total/NA	Prep	9012B			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Client Sample ID: 2 SEEP

Date Collected: 12/20/18 12:50

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-4

Matrix: Solid

Percent Solids: 54.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			1.02 mL	6 mL	553875	01/02/19 03:30	DAM	TAL SAV
Total/NA	Analysis	9034		1	6 mL	6 mL	553876	01/02/19 03:47	DAM	TAL SAV
Total/NA	Prep	5050			0.8132 g	100 mL	424733	12/27/18 09:41	KJR	TAL PEN
Total/NA	Analysis	9056		1			424931	12/28/18 09:04	BAW	TAL PEN

## Client Sample ID: 3 SEEP

Date Collected: 12/20/18 14:46

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-5

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	425409	01/02/19 16:55	DEK	TAL PEN
Soluble	Analysis	9050A		1			425498	01/03/19 15:10	DEK	TAL PEN
Total/NA	Analysis	Moisture		1			424657	12/26/18 11:16	NB	TAL PEN

## Client Sample ID: 3 SEEP

Date Collected: 12/20/18 14:46

Date Received: 12/22/18 08:46

## Lab Sample ID: 400-163980-5

Matrix: Solid

Percent Solids: 62.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.33 g	1.0 mL	424620	12/26/18 08:23	KLR	TAL PEN
Total/NA	Analysis	8270D		1			424792	12/27/18 14:03	VC1	TAL PEN
Soluble	Leach	DI Leach			2.590 g	50 mL	425263	12/31/18 13:46	BAW	TAL PEN
Soluble	Analysis	9056		1	10 mL	1.0 mL	425394	12/31/18 21:58	JAW	TAL PEN
Total/NA	Prep	8290			10.421 g	20 uL	26639	01/02/19 10:10	SSS	TAL KNX
Total/NA	Analysis	8290A		1			26812	01/10/19 18:59	MSD	TAL KNX
Total/NA	Prep	3050B			000.5366 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425522	01/03/19 23:39	GESP	TAL PEN
Total/NA	Prep	3050B	RA		000.5366 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425619	01/04/19 13:15	AC	TAL PEN
Total/NA	Prep	7471A			0.6132 g	40 mL	425427	01/03/19 09:11	JAP	TAL PEN
Total/NA	Analysis	7471A		1			425868	01/08/19 13:44	JAP	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:22	KJR	TAL PEN
Total/NA	Prep	351.2			1.0491 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		1			425991	01/09/19 15:14	JAT	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		10	10 mL	10 mL	425239	12/31/18 11:39	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			1.0491 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 18:12	JAT	TAL PEN
Total/NA	Prep	3060A			0.5338 g	50 mL	424457	12/23/18 18:09	DN1	TAL PEN
Total/NA	Analysis	7196A		1			424459	12/23/18 21:32	DN1	TAL PEN
Total/NA	Analysis	7196A		1			425817	01/08/19 10:46	RRC	TAL PEN
Total/NA	Prep	9012B			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-5**

**Matrix: Solid**

**Percent Solids: 62.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN
Total/NA	Prep	9030B			1.03 mL	6 mL	553875	01/02/19 03:30	DAM	TAL SAV
Total/NA	Analysis	9034		1	6 mL	6 mL	553876	01/02/19 03:47	DAM	TAL SAV
Total/NA	Prep	5050			0.9878 g	100 mL	424733	12/27/18 10:03	KJR	TAL PEN
Total/NA	Analysis	9056		1			424931	12/28/18 09:26	BAW	TAL PEN

**Client Sample ID: Method Blank**

**Date Collected: N/A**

**Date Received: N/A**

**Lab Sample ID: MB 140-26639/5-A**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			10 g	20 uL	26639	01/02/19 10:10	SSS	TAL KNX
Total/NA	Analysis	8290A		1			26812	01/10/19 14:58	MSD	TAL KNX

**Client Sample ID: Method Blank**

**Date Collected: N/A**

**Date Received: N/A**

**Lab Sample ID: MB 400-424457/8-A**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3060A			0.5177 g	50 mL	424457	12/23/18 18:09	DN1	TAL PEN
Total/NA	Analysis	7196A		1			424459	12/23/18 21:27	DN1	TAL PEN

**Client Sample ID: Method Blank**

**Date Collected: N/A**

**Date Received: N/A**

**Lab Sample ID: MB 400-424520/1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN

**Client Sample ID: Method Blank**

**Date Collected: N/A**

**Date Received: N/A**

**Lab Sample ID: MB 400-424620/1-A**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.00 g	1.0 mL	424620	12/26/18 08:23	KLR	TAL PEN
Total/NA	Analysis	8270D		1			424679	12/26/18 19:27	KJA	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424634/1**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	424634	12/26/18 09:27	CLB	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424648/14-A**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			40 mL	40 mL	424648	12/26/18 10:50	JAP	TAL PEN
Total/NA	Analysis	7470A		1			424985	12/28/18 12:32	JAP	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424674/6**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 11:58	KJR	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424727/2-A**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			25 mL	25 mL	424727	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	351.2		1			424847	12/27/18 13:57	JAT	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424728/2-A**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	424728	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 18:02	JAT	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-424733/1-A**

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5050			0.5055 g	100 mL	424733	12/26/18 12:13	KJR	TAL PEN
Total/NA	Analysis	9056		1			424931	12/28/18 02:12	BAW	TAL PEN

TestAmerica Pensacola



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424734/1-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:16	KJR	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424735/1-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:34	KJR	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424829/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			424829	12/27/18 10:56	BAB	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424868/7**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:35	KJR	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424891/1-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7	RA		50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425326	12/31/18 18:25	GESP	TAL PEN
Total/NA	Prep	200.7			50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425421	01/02/19 13:33	GESP	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-424999/1-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424999	12/28/18 13:30	KJR	TAL PEN
Soluble	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:43	KJR	TAL PEN

TestAmerica Pensacola



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425041/1**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2510B		1			425041	12/28/18 16:36	VLS	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425209/13**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 20:06	BAW	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425263/1-A**

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.465 g	50 mL	425263	12/31/18 13:46	BAW	TAL PEN
Soluble	Analysis	9056		1			425394	12/31/18 17:24	JAW	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425399/19**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425399	12/31/18 23:06	JAW	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425409/3-A**

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	425409	01/02/19 16:55	DEK	TAL PEN
Soluble	Analysis	9050A		1			425498	01/03/19 15:10	DEK	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-425427/14-A**

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7471A			0.6211 g	40 mL	425427	01/03/19 09:11	JAP	TAL PEN
Total/NA	Analysis	7471A		1			425868	01/08/19 13:38	JAP	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425434/1-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			000.5015 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425522	01/03/19 21:42	GESP	TAL PEN
Total/NA	Prep	3050B	RA		000.5015 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425619	01/04/19 13:04	AC	TAL PEN

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425437/4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			425437	01/02/19 18:00	BAW	TAL PEN

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425438/4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425438	01/02/19 18:00	BAW	TAL PEN

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425449/1-A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425452/1-A

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN

## Client Sample ID: Method Blank

Date Collected: N/A

Date Received: N/A

## Lab Sample ID: MB 400-425830/1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-425877/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			1.0 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		1			425991	01/09/19 14:45	JAT	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-425879/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			1.0 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 17:52	JAT	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 680-553875/1-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			1.0 mL	6 mL	553875	01/02/19 03:30	DAM	TAL SAV
Total/NA	Analysis	9034		1	6 mL	6 mL	553876	01/02/19 03:47	DAM	TAL SAV

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-26639/6-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			10 g	20 uL	26639	01/02/19 10:10	SSS	TAL KNX
Total/NA	Analysis	8290A		1			26812	01/10/19 13:14	MSD	TAL KNX

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424457/9-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3060A			0.5130 g	50 mL	424457	12/23/18 18:09	DN1	TAL PEN
Total/NA	Analysis	7196A		1			424459	12/23/18 21:30	DN1	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424520/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424620/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.00 g	1.0 mL	424620	12/26/18 08:23	KLR	TAL PEN
Total/NA	Analysis	8270D		1			424679	12/26/18 19:52	KJA	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424634/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	424634	12/26/18 09:27	CLB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424648/15-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			40 mL	40 mL	424648	12/26/18 10:50	JAP	TAL PEN
Total/NA	Analysis	7470A		1			424985	12/28/18 12:34	JAP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424674/7**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 11:59	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424727/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			25 mL	25 mL	424727	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	351.2		1			424847	12/27/18 14:00	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424728/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	424728	12/26/18 15:48	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 18:05	JAT	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424733/2-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5050			0.5066 g	100 mL	424733	12/26/18 14:45	KJR	TAL PEN
Total/NA	Analysis	9056		1			424931	12/28/18 02:35	BAW	TAL PEN

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424734/2-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:18	KJR	TAL PEN

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424735/2-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:35	KJR	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:40	KJR	TAL PEN

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424829/5

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			424829	12/27/18 11:03	BAB	TAL PEN

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424868/8

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:36	KJR	TAL PEN

## Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 400-424891/2-A

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7	RA		50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425326	12/31/18 18:29	GESP	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424891/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	424891	12/27/18 18:32	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425421	01/02/19 13:37	GESP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-424999/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424999	12/28/18 13:30	KJR	TAL PEN
Soluble	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:44	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425041/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2510B		1			425041	12/28/18 16:36	VLS	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425209/14**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 20:21	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425263/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.423 g	50 mL	425263	12/31/18 13:46	BAW	TAL PEN
Soluble	Analysis	9056		1			425394	12/31/18 17:46	JAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425399/20**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425399	12/31/18 23:29	JAW	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425409/4-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	425409	01/02/19 16:55	DEK	TAL PEN
Soluble	Analysis	9050A		1			425498	01/03/19 15:10	DEK	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425427/15-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7471A			0.6329 g	40 mL	425427	01/03/19 09:11	JAP	TAL PEN
Total/NA	Analysis	7471A		1			425868	01/08/19 13:40	JAP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425434/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			000.5043 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C		1			425522	01/03/19 21:46	GESP	TAL PEN
Total/NA	Prep	3050B	RA		000.5043 g	50 mL	425434	01/03/19 11:01	KWN	TAL PEN
Total/NA	Analysis	6010C	RA	1			425619	01/04/19 13:08	AC	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425437/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			425437	01/02/19 18:23	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425438/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425438	01/02/19 18:23	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425449/3-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN

TestAmerica Pensacola



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425452/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425830/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425877/3-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			1.0 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		1			425991	01/09/19 14:48	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-425879/3-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			1.0 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 17:55	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 680-553875/2-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			1.0 mL	6 mL	553875	01/02/19 03:30	DAM	TAL SAV
Total/NA	Analysis	9034		1	6 mL	6 mL	553876	01/02/19 03:47	DAM	TAL SAV

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-425209/15**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 20:37	BAW	TAL PEN

TestAmerica Pensacola



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-425263/3-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			2.463 g	50 mL	425263	12/31/18 13:46	BAW	TAL PEN
Soluble	Analysis	9056		1			425394	12/31/18 18:09	JAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-425399/21**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425399	12/31/18 23:52	JAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-425437/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			425437	01/02/19 18:46	BAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-425438/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			425438	01/02/19 18:46	BAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 680-553875/3-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	9030B			1.0 mL	6 mL	553875	01/02/19 03:30	DAM	TAL SAV
Total/NA	Analysis	9034		1	6 mL	6 mL	553876	01/02/19 03:47	DAM	TAL SAV

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424456/5-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3060A			50 mL	50 mL	424456	12/23/18 18:09	DN1	TAL PEN
Total/NA	Analysis	7196A		1			424459	12/23/18 21:19	DN1	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424674/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 11:57	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424750/5**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:15	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424847/11**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	351.2		1			424847	12/27/18 13:14	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424868/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	424868	12/27/18 15:34	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-424893/13**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	365.4		1	10 mL	10 mL	424893	12/27/18 17:05	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-425239/6**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	425239	12/31/18 11:34	KJR	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-425991/11**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	351.2		1			425991	01/09/19 12:41	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-426006/13**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 16:58	JAT	TAL PEN

**Client Sample ID: 1 NPDES OUTFALL**

**Lab Sample ID: 400-163980-1 MS**

Date Collected: 12/20/18 12:34

Matrix: Water

Date Received: 12/22/18 08:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 21:08	BAW	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 12:01	KJR	TAL PEN

**Client Sample ID: 1 NPDES OUTFALL**

**Lab Sample ID: 400-163980-1 MSD**

Date Collected: 12/20/18 12:34

Matrix: Water

Date Received: 12/22/18 08:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			425209	12/28/18 21:23	BAW	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	424674	12/26/18 12:02	KJR	TAL PEN

**Client Sample ID: 3 SEEP**

**Lab Sample ID: 400-163980-3 MS**

Date Collected: 12/20/18 14:46

Matrix: Water

Date Received: 12/22/18 08:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN

**Client Sample ID: 3 SEEP**

**Lab Sample ID: 400-163980-3 MSD**

Date Collected: 12/20/18 14:46

Matrix: Water

Date Received: 12/22/18 08:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	425452	01/02/19 09:53	CLB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	425433	01/03/19 09:11	BAB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-4 MS**

**Matrix: Solid**

**Percent Solids: 54.8**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:20	KJR	TAL PEN
Total/NA	Prep	351.2			1.3473 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		2			425991	01/09/19 15:12	JAT	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		10	10 mL	10 mL	425239	12/31/18 11:37	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			1.3473 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 18:10	JAT	TAL PEN
Total/NA	Prep	9012B			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN

**Client Sample ID: 2 SEEP**

**Date Collected: 12/20/18 12:50**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-4 MSD**

**Matrix: Solid**

**Percent Solids: 54.8**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			5 g	100 mL	424734	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	350.1		1	10 mL	10 mL	424750	12/26/18 17:21	KJR	TAL PEN
Total/NA	Prep	351.2			1.2916 g	25 mL	425877	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	351.2		2			425991	01/09/19 15:13	JAT	TAL PEN
Soluble	Leach	DI Leach			5 g	100 mL	424735	12/26/18 16:32	KJR	TAL PEN
Soluble	Analysis	353.2		10	10 mL	10 mL	425239	12/31/18 11:38	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			1.2916 g	25 mL	425879	01/08/19 16:09	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	426006	01/09/19 18:11	JAT	TAL PEN
Total/NA	Prep	9012B			1.00 g	50 mL	425449	01/02/19 12:23	CLB	TAL PEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	425447	01/03/19 09:43	BAB	TAL PEN

**Client Sample ID: 1 NPDES OUTFALL**

**Date Collected: 12/20/18 12:34**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-1 DU**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			425830	01/08/19 10:43	BAB	TAL PEN

**Client Sample ID: 3 SEEP**

**Date Collected: 12/20/18 14:46**

**Date Received: 12/22/18 08:46**

**Lab Sample ID: 400-163980-3 DU**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	424520	12/24/18 10:45	CLB	TAL PEN

TestAmerica Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Greene County Steam Plant

TestAmerica Job ID: 400-163980-1

**Laboratory References:**

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000  
TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001  
TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858





## Chain of Custody Record

<b>Client Information</b> Client Contact: Nelson Brooke Nelson Brooke Company: Black Warrior Riverkeeper Address: 712 37th St S City: Birmingham, State, Zip: AL, 35222 Phone: 205-458-0095(Tel) Email: nbrooke@blackwarrior.org Project Name: Black Warrior Riverkeeper Site: Greene County Steam Plant		Sampler: Nelson Brooke Lab PM: Wilson, Jason A Phone: (205) 458-0095 E-Mail: jason.wilson@testamericainc.com		Carrier Tracking No(s): COC No: 400-79735-30755.1 Page: Page 1 of 2 Job #:	
<b>Analysis Requested</b> Due Date Requested: TAT Requested (days): PO #: Purchase Order not required WO #: 40010274 Project #: 40010274 SSOW#:		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Anchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
<b>Sample Identification</b> ① NPDES outfall ② seep ③ seep		Sample Date 12/20/18 12/20/18 12/20/18		Sample Time 12:34pm 12:50pm 2:46pm	
Sample Type (C=comp, G=grab) G G G		Matrix (W=water, S=solid, O=waste/oil, BT=tissue, A=air) Water Water Water		Preservation Code: N N N	
Field Filtered Sample (Yes or No) N N N		Perform MS/MSD (Yes or No) N N N		8290A - Dioxin and Furans N N N	
350.1, 351.2, 353.2, Pres, 365.4 300_ORGFM_28D, 9056_ORGFM_28D 6010C, 7470A, SM2340B 2540C - Solids, Total Suspended (TSS) 2540C - Solids, Total Dissolved (TDS) 335.2 - Cyanide, Total 2320B, 2510B, SM2310B 218.7 - Chromium, Hexavalent (Ion Chromatography) 7196A_CR3 - Trivalent Chromium		Total Number of Containers 7 7 7		Special Instructions/Note: 400-163980 COC	
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify) please include values in report					
<b>Empty Kit Relinquished by:</b> Relinquished by: Nelson Brooke Date/Time: 12/21/18 5:42pm Relinquished by: Date/Time: Relinquished by: Date/Time:					
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input checked="" type="checkbox"/> Archive For 1 Months Special Instructions/QC Requirements:					
<b>Custody Seals Intact:</b> Δ Yes Δ No Custody Seal No.: Cooler Temperature(s) °C and Other Remarks: 4.9°C, 1.2°C IR58					

## Chain of Custody Record

<b>Client Information</b> Client Contact: Nelson Brooke Nelson Brooke Company: Black Warrior Riverkeeper Address: 712 37th St S City: Birmingham, State, Zip: AL, 35222 Phone: 205-458-0095(Tel) Email: nbrooke@blackwarrior.org Project Name: Black Warrior Riverkeeper Site: Greene County Steam Plant		Sampler: Nelson Brooke Lab PM: Wilson, Jason A E-Mail: jason.wilson@testamericainc.com Phone: (205) 458-0095 Due Date Requested: TAT Requested (days): PO #: Purchase Order not required WO #: 40010274 Project #: 40010274 SSOW#:		Carrier Tracking No(s): COC No: 400-79735-30755.2 Page: Page 2 of 2 Job #:	
<b>Analysis Requested</b> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 350.1, 351.2, 353.2, Pres, 365.4, 9050A 9012B, 9056_ORGFM_28D 9034 - Sulfide 8290A - Dioxins and Furans 8270D - PAHs 6010C, 7196A, 7471A 7196A_CR3 - Trivalent Chromium 9056_Total_Halo - Total Sulfur		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
<b>Sample Identification</b> ② seep ③ seep		Sample Date 12/20/18 12/20/18		Sample Time 12:50pm 2:46pm	
Sample Type (C=Comp, G=grab) G		Matrix (W=water, S=solid, O=waste/soil, BT=tissue, A=air) Solid Solid		Preservation Code: N N	
Total Number of containers 3 3		Special Instructions/Note: 9056_Total_Halo - Total Sulfur 7196A_CR3 - Trivalent Chromium 6010C, 7196A, 7471A 8270D - PAHs 8290A - Dioxins and Furans 9034 - Sulfide 9012B, 9056_ORGFM_28D 350.1, 351.2, 353.2, Pres, 365.4, 9050A		Special Instructions/Note: 9056_Total_Halo - Total Sulfur 7196A_CR3 - Trivalent Chromium 6010C, 7196A, 7471A 8270D - PAHs 8290A - Dioxins and Furans 9034 - Sulfide 9012B, 9056_ORGFM_28D 350.1, 351.2, 353.2, Pres, 365.4, 9050A	
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify) please include values in report		<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For 1 Months			
<b>Empty Kit Relinquished by:</b> Nelson Brooke Date/Time: 12/21/18 5:42pm Company: Black Warrior Riverkeeper		<b>Special Instructions/QC Requirements:</b> Method of Shipment:			
<b>Relinquished by:</b> Nelson Brooke Date/Time: 12/21/18 5:42pm Company: Black Warrior Riverkeeper		<b>Relinquished by:</b> Nelson Brooke Date/Time: 12/21/18 5:42pm Company: Black Warrior Riverkeeper			
<b>Relinquished by:</b> Nelson Brooke Date/Time: 12/21/18 5:42pm Company: Black Warrior Riverkeeper		<b>Relinquished by:</b> Nelson Brooke Date/Time: 12/21/18 5:42pm Company: Black Warrior Riverkeeper			
<b>Custody Seals Intact:</b> Yes No		<b>Custody Seal No.:</b>			



January 21, 2019

Mr. Nelson Brooke  
Black Warrior Riverkeeper  
712 37th Street South  
Birmingham, Alabama 35222

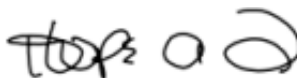
Re: Routine Analytical  
Work Order: 467581

Dear Mr. Brooke:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 22, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,



Hope Taylor  
Project Manager

Purchase Order: Paid Check #2704  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

BWRK001 Black Warrior Riverkeeper

Client SDG: 467581 GEL Work Order: 467581

**The Qualifiers in this report are defined as follows:**

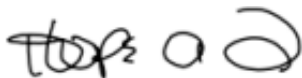
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

Reviewed by



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South  
  
Birmingham, Alabama 35222  
Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: NPDES Outfall  
Sample ID: 467581001  
Matrix: Waste Water  
Collect Date: 20-DEC-18 12:36  
Receive Date: 22-DEC-18  
Collector: Client

Project: BWRK00118  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.233	+/-0.321	0.504	1.00	pCi/L			JJP2	12/28/18	0820	1835018	1
Uranium-235/236	U	0.109	+/-0.286	0.515	1.00	pCi/L							
Uranium-238	U	0.128	+/-0.227	0.344	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	0.567	+/-16.6	11.6		pCi/L			MXR1	01/03/19	1135	1835280	2
Radium-226	U	-16.9	+/-35.5	36.9		pCi/L							
Radium-228	U	1.29	+/-6.41	6.04		pCi/L							
Thorium-228	U	0.0586	+/-2.85	2.85		pCi/L							
Thorium-232	U	312	+/-955	721		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			103	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South  
  
Birmingham, Alabama 35222  
Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: SEEP  
Sample ID: 467581002  
Matrix: Surface Water  
Collect Date: 20-DEC-18 13:12  
Receive Date: 22-DEC-18  
Collector: Client

Project: BWRK00118  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	-0.00309	+/-0.450	1.02	1.00	pCi/L			JJP2	12/29/18	1133	1835018	1
Uranium-235/236	U	-0.0471	+/-0.393	0.924	1.00	pCi/L							
Uranium-238	U	0.260	+/-0.544	0.808	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	0.810	+/-27.5	16.0		pCi/L			MXR1	01/03/19	1136	1835280	2
Radium-226	U	-14.8	+/-34.9	40.7		pCi/L							
Radium-228	U	0.228	+/-5.29	6.87		pCi/L							
Thorium-228	U	1.89	+/-4.14	3.07		pCi/L							
Thorium-232	U	1270	+/-1930	1440		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			95.6	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	SEEP	Project:	BWRK00118
Sample ID:	467581003	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	20-DEC-18 13:12		
Receive Date:	22-DEC-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234		0.988	+/-0.541	0.445	1.00	pCi/g			JJP2	12/28/18	0856	1835021	1
Uranium-235/236	U	0.00	+/-0.166	0.247	1.00	pCi/g							
Uranium-238		1.55	+/-0.657	0.407	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		8.10	+/-0.456	0.207		pCi/g			MXR1	01/15/19	1156	1834687	2
Radium-226		1.09	+/-0.0743	0.0395		pCi/g							
Radium-228		1.16	+/-0.139	0.0774		pCi/g							
Thorium-228		1.28	+/-0.0515	0.0287		pCi/g							
Thorium-232		1.16	+/-0.139	0.0774		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MPK1	12/24/18	0813	1834682

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			87.1	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: January 21, 2019

Page 1 of 5

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 467581

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1835018										
QC1204187414	467581001	DUP									
Uranium-233/234	U	0.233	U	0.424	pCi/L	N/A		N/A	JJP2	12/28/18	08:20
	Uncertainty	+/-0.321		+/-0.440							
Uranium-235/236	U	0.109	U	0.130	pCi/L	N/A		N/A			
	Uncertainty	+/-0.286		+/-0.299							
Uranium-238	U	0.128		0.607	pCi/L	55.3		(0% - 100%)			
	Uncertainty	+/-0.227		+/-0.432							
QC1204187415	LCS										
Uranium-233/234				25.1	pCi/L					12/28/18	08:20
	Uncertainty			+/-2.59							
Uranium-235/236				1.56	pCi/L						
	Uncertainty			+/-0.751							
Uranium-238	27.3			24.2	pCi/L		88.9	(75%-125%)			
	Uncertainty			+/-2.54							
QC1204187413	MB										
Uranium-233/234			U	0.339	pCi/L					12/28/18	08:20
	Uncertainty			+/-0.379							
Uranium-235/236			U	0.189	pCi/L						
	Uncertainty			+/-0.335							
Uranium-238			U	0.427	pCi/L						
	Uncertainty			+/-0.431							
Batch	1835021										
QC1204187428	467581003	DUP									
Uranium-233/234		0.988		1.09	pCi/g	9.61		(0% - 100%)	JJP2	12/28/18	08:56
	Uncertainty	+/-0.541		+/-0.565							
Uranium-235/236	U	0.00	U	0.148	pCi/g	N/A		N/A			
	Uncertainty	+/-0.166		+/-0.290							
Uranium-238		1.55		1.16	pCi/g	29.3		(0% - 100%)			
	Uncertainty	+/-0.657		+/-0.584							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1835021										
QC1204187429	LCS			25.3	pCi/g				JJP2	12/28/18	08:56
Uranium-233/234	Uncertainty			+/-2.72							
Uranium-235/236				1.49	pCi/g						
	Uncertainty			+/-0.756							
Uranium-238	26.0			27.2	pCi/g		105	(75%-125%)			
	Uncertainty			+/-2.82							
QC1204187427	MB										
Uranium-233/234		U		-0.0443	pCi/g					12/28/18	08:56
	Uncertainty			+/-0.200							
Uranium-235/236		U		0.0642	pCi/g						
	Uncertainty			+/-0.241							
Uranium-238		U		-0.0492	pCi/g						
	Uncertainty			+/-0.149							
<b>Rad Gamma Spec</b>											
Batch	1834687										
QC1204186610	467581003	DUP									
Potassium-40		8.10		9.28	pCi/g	13.5		(0%-20%)	MXR1	01/16/19	11:40
	Uncertainty	+/-0.456		+/-0.307							
Radium-226		1.09		1.03	pCi/g	5.49		(0%-20%)			
	Uncertainty	+/-0.0743		+/-0.0462							
Radium-228		1.16		1.20	pCi/g	3.38		(0%-20%)			
	Uncertainty	+/-0.139		+/-0.0836							
Thorium-228		1.28		1.29	pCi/g	0.776		(0%-20%)			
	Uncertainty	+/-0.0515		+/-0.0379							
Thorium-232		1.16		1.20	pCi/g	3.38		(0%-20%)			
	Uncertainty	+/-0.139		+/-0.0836							
QC1204186611	LCS										
Americium-241	487			518	pCi/g		106	(75%-125%)		01/15/19	05:43
	Uncertainty			+/-7.61							
Cesium-137	170			164	pCi/g		96.2	(75%-125%)			
	Uncertainty			+/-2.92							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1834687										
Cobalt-60	120			111	pCi/g		92.8	(75%-125%)	MXR1	01/15/19	05:43
	Uncertainty			+/-2.86							
Potassium-40			U	0.196	pCi/g						
	Uncertainty			+/-1.83							
Radium-226			U	-0.444	pCi/g						
	Uncertainty			+/-0.779							
Radium-228			U	-0.889	pCi/g						
	Uncertainty			+/-2.11							
Thorium-228			U	-0.00688	pCi/g						
	Uncertainty			+/-0.625							
Thorium-232			U	-0.889	pCi/g						
	Uncertainty			+/-2.11							
QC1204186609	MB										
Potassium-40			U	0.0916	pCi/g					01/15/19	09:17
	Uncertainty			+/-0.196							
Radium-226			UI	0.00	pCi/g						
	Uncertainty			+/-0.0331							
Radium-228			U	-0.0284	pCi/g						
	Uncertainty			+/-0.0452							
Thorium-228			UI	0.00	pCi/g						
	Uncertainty			+/-0.0223							
Thorium-232			U	-0.0284	pCi/g						
	Uncertainty			+/-0.0452							
Batch	1835280										
QC1204187994	467581001 DUP										
Potassium-40	U	0.567	U	-21.2	pCi/L	N/A			N/A	MXR1	01/04/19 13:39
	Uncertainty	+/-16.6		+/-22.9							
Radium-226	U	-16.9	U	16.8	pCi/L	N/A			N/A		
	Uncertainty	+/-35.5		+/-43.9							
Radium-228	U	1.29	U	4.67	pCi/L	N/A			N/A		
	Uncertainty	+/-6.41		+/-9.46							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1835280										
Thorium-228	U	0.0586	UI	0.00	pCi/L	N/A			N/A MXR1	01/04/19	13:39
	Uncertainty	+/-2.85		+/-3.79							
Thorium-232	U	312	UI	0.00	pCi/L	N/A			N/A		
	Uncertainty	+/-955		+/-1280							
QC1204187995	LCS										
Americium-241	34200			36100	pCi/L		106	(75%-125%)		01/05/19	13:08
	Uncertainty			+/-1320							
Cesium-137	12700			12800	pCi/L		101	(75%-125%)			
	Uncertainty			+/-338							
Cobalt-60	9690			10500	pCi/L		108	(75%-125%)			
	Uncertainty			+/-352							
Potassium-40			U	18.9	pCi/L						
	Uncertainty			+/-182							
Radium-226			U	-31.4	pCi/L						
	Uncertainty			+/-1140							
Radium-228			U	-20	pCi/L						
	Uncertainty			+/-292							
Thorium-228			U	-48	pCi/L						
	Uncertainty			+/-109							
Thorium-232			U	7320	pCi/L						
	Uncertainty			+/-51200							
QC1204187993	MB										
Potassium-40			U	-11.2	pCi/L					01/03/19	11:37
	Uncertainty			+/-19.0							
Radium-226			U	7.24	pCi/L						
	Uncertainty			+/-38.9							
Radium-228			U	1.54	pCi/L						
	Uncertainty			+/-6.52							
Thorium-228			U	-0.43	pCi/L						
	Uncertainty			+/-2.86							
Thorium-232			U	-771	pCi/L						
	Uncertainty			+/-820							



# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

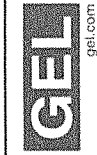
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Page: 1 of 1  
Project # GELP18-1438  
GEL Quote #: GELP18-1438  
POC Number (1):  
PO Number:



Laboratories LLC

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

## Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager: Hope Taylor

Client Name: Black Warrior Riverkeeper

Phone # (205) 458-0095

Fax #

Project/Site Name: Greene County Steam PlantAddress: 712 37th St S, Birmingham, AL 35222Collected By: Nelson Brooke Send Results To: nbrooke@blackwarriorriver.org  
jkinney@blackwarriorriver.org

Sample Analysis Requested (6) (Fill in the number of containers for each test)

Should this sample be considered:

Yes, please supply isotopic info.

Radioactive (if Yes, please supply isotopic info.)

(7) Known or possible Hazards

Total number of containers

Comments

Note: extra sample is required for sample specific QC

&lt;- Preservative Type (6)

\* For composites - indicate start and stop date/time

Sample ID

① NPDES outfall

② seep

"

Date Collected (mm-dd-yy)

Time Collected (Military) (hhmm)

QC Code (1)

Field Filtered (1)

Sample Matrix (1)

TAT Requested: Normal: ☒ Rush: ☐ Specify: (Subject to Surcharge)Fax Results: ☐ Yes ☒ NoSelect Deliverable: ☐ C of A ☐ QC Summary ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? ☐ Yes ☐ No Cooler Temp: °CSample Collection Time Zone: ☐ Eastern ☒ Pacific ☐ Mountain ☐ Other:

Chain of Custody Signatures

Relinquished By (Signed)

Date

Time

Received by (signed)

Date

Time

1 Nelson Brooke 12/21/18 5:42 pm

2

3

For sample shipping and delivery details, see Sample Receipt &amp; Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

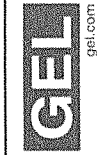
7.) KNOWN OR POSSIBLE HAZARDS

Characteristic Hazards

Listed Waste

Other

Page: 1 of 1  
Project # GELP18-1438  
GEL Quote #: GELP18-1438  
POC Number (1):  
PO Number:



Laboratories LLC

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

## Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager: Hope Taylor

Client Name: Black Warrior Riverkeeper

Phone # (205) 458-0095

Fax #

Project/Site Name: Greene County Steam PlantAddress: 712 37th St S, Birmingham, AL 35222Collected By: Nelson Brooke Send Results To: nbrooke@blackwarriorriver.org  
jkinney@blackwarriorriver.org

Sample Analysis Requested (6) (Fill in the number of containers for each test)

Should this sample be considered:

Yes, please supply isotopic info.

Radioactive (if Yes, please supply isotopic info.)

(7) Known or possible Hazards

Total number of containers

Comments

Note: extra sample is required for sample specific QC

&lt;- Preservative Type (6)

\* For composites - indicate start and stop date/time

Sample ID

① NPDES outfall

② seep

"

Date Collected (mm-dd-yy)

Time Collected (Military) (hhmm)

QC Code (1)

Field Filtered (1)

Sample Matrix (1)

TAT Requested: Normal: ☒ Rush: ☐ Specify: (Subject to Surcharge)Fax Results: ☐ Yes ☒ NoSelect Deliverable: ☐ C of A ☐ QC Summary ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? ☐ Yes ☐ No Cooler Temp: °CSample Collection Time Zone: ☐ Eastern ☒ Pacific ☐ Mountain ☐ Other:

Chain of Custody Signatures

Relinquished By (Signed)

Date

Time

Received by (signed)

Date

Time

1 Nelson Brooke 12/21/18 5:42 pm

2

3

For sample shipping and delivery details, see Sample Receipt &amp; Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

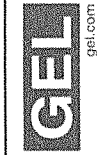
7.) KNOWN OR POSSIBLE HAZARDS

Characteristic Hazards

Listed Waste

Other

Page: 1 of 1  
Project # GELP18-1438  
GEL Quote #: GELP18-1438  
POC Number (1):  
PO Number:



Laboratories LLC

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

## Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager: Hope Taylor

Client Name: Black Warrior Riverkeeper

Phone # (205) 458-0095

Fax #

Project/Site Name: Greene County Steam PlantAddress: 712 37th St S, Birmingham, AL 35222Collected By: Nelson Brooke Send Results To: nbrooke@blackwarriorriver.org  
jkinney@blackwarriorriver.org

Sample Analysis Requested (6) (Fill in the number of containers for each test)

Should this sample be considered:

Yes, please supply isotopic info.

Radioactive (if Yes, please supply isotopic info.)

(7) Known or possible Hazards

Total number of containers

Comments

Note: extra sample is required for sample specific QC

&lt;- Preservative Type (6)

\* For composites - indicate start and stop date/time

Sample ID

① NPDES outfall

② seep

"

Date Collected (mm-dd-yy)

Time Collected (Military) (hhmm)

QC Code (1)

Field Filtered (1)

Sample Matrix (1)

TAT Requested: Normal: ☒ Rush: ☐ Specify: (Subject to Surcharge)Fax Results: ☐ Yes ☒ NoSelect Deliverable: ☐ C of A ☐ QC Summary ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? ☐ Yes ☐ No Cooler Temp: °CSample Collection Time Zone: ☐ Eastern ☒ Pacific ☐ Mountain ☐ Other:

Chain of Custody Signatures

Relinquished By (Signed)

Date

Time

Received by (signed)

Date

Time

1 Nelson Brooke 12/21/18 5:42 pm

2

3

For sample shipping and delivery details, see Sample Receipt &amp; Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

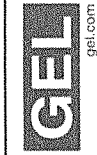
7.) KNOWN OR POSSIBLE HAZARDS

Characteristic Hazards

Listed Waste

Other

Page: 1 of 1  
Project # GELP18-1438  
GEL Quote #: GELP18-1438  
POC Number (1):  
PO Number:



Laboratories LLC

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

## Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager: Hope Taylor

Client Name: Black Warrior Riverkeeper

Phone # (205) 458-0095

Fax #

Project/Site Name: Greene County Steam PlantAddress: 712 37th St S, Birmingham, AL 35222Collected By: Nelson Brooke Send Results To: nbrooke@blackwarriorriver.org  
jkinney@blackwarriorriver.org

Sample Analysis Requested (6) (Fill in the number of containers for each test)

Should this sample be considered:

Yes, please supply isotopic info.

Radioactive (if Yes, please supply isotopic info.)

(7) Known or possible Hazards

Total number of containers

Comments

Note: extra sample is required for sample specific QC

&lt;- Preservative Type (6)

\* For composites - indicate start and stop date/time

Sample ID

① NPDES outfall

② seep

"

Date Collected (mm-dd-yy)

Time Collected (Military) (hhmm)

QC Code (1)

Field Filtered (1)

Sample Matrix (1)

TAT Requested: Normal: ☒ Rush: ☐ Specify: (Subject to Surcharge)Fax Results: ☐ Yes ☒ NoSelect Deliverable: ☐ C of A ☐ QC Summary ☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

Additional Remarks:

For Lab Receiving Use Only: Custody Seal Intact? ☐ Yes ☐ No Cooler Temp: °CSample Collection Time Zone: ☐ Eastern ☒ Pacific ☐ Mountain ☐ Other:

Chain of Custody Signatures

Relinquished By (Signed)

Date

Time

Received by (signed)

Date

Time

1 Nelson Brooke 12/21/18 5:42 pm

2

3

For sample shipping and delivery details, see Sample Receipt &amp; Review form (SRR.)

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

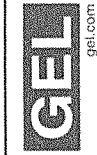
7.) KNOWN OR POSSIBLE HAZARDS

Characteristic Hazards

Listed Waste

Other

Page: 1 of 1  
Project # GELP18-1438  
GEL Quote #: GELP18-1438  
POC Number (1):  
PO Number:



Laboratories LLC

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Chemistry | Radiochemistry | Radiobiology | Specialty Analytics

## Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Project Manager: Hope Taylor

Client Name: Black Warrior Riverkeeper

Phone # (205) 458-0095

Fax #

Project/Site Name: Greene County Steam PlantAddress: 712 37th St S, Birmingham, AL 35222Collected By: Nelson Brooke Send Results To: nbrooke@blackwarriorriver.org  
jkinney@blackwarriorriver.org

Sample Analysis Requested (6) (Fill in the number of containers for each test)

Should this sample be considered:

Yes, please supply isotopic info.

Radioactive (if Yes, please supply isotopic info.)

(7) Known or possible Hazards

Total number of containers

Comments

Note: extra sample is required for sample specific QC

&lt;- Preservative Type (6)

\* For composites - indicate start and stop date/time

Sample ID

① NPDES outfall

② seep

"

Date Collected (mm-dd-yy)

Time Collected (Military) (hhmm)

QC Code (1)

Field Filtered (1)

Sample Matrix (1)

TAT Requested: Normal: ☒ Rush: ☐ Specify: (Subject to Surcharge)Fax Results: ☐ Yes ☒ No



Laboratories, LLC

HT

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <b>DWRK</b>	SDG/AR/COC/Work Order: <b>467581</b>
Received By: <b>LM</b>	Date Received: <b>12/22/18</b>
Carrier and Tracking Number	Circle Applicable: FedEx Express   FedEx Ground   UPS   Field Services   Courier   Other <b>7846 1381 9395</b>
Suspected Hazard Information	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?	Hazard Class Shipped:   UN#:
COC/Samples marked or classified as radioactive?	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <b>00</b> CPM / mR/hr Classified as: Rad 1   Rad 2   Rad 3
Is package, COC, and/or Samples marked HAZ?	If yes, select Hazards below, and contact the GEL Safety Group. PCB's   Flammable   Foreign Soil   RCRA   Asbestos   Beryllium   Other:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None   Other: *all temperatures are recorded in Celsius <b>TEMP: 10C</b>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <b>IR4-P7</b> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken   Damaged container   Leaking container   Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes   No   (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes   No   N/A   (If unknown, select No) VOA vials free of headspace? Yes   No   N/A Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials **TMC** Date **12/24/18** Page **1** of **1**

GL-CHL-SR-001 Rev 5

**List of current GEL Certifications as of 21 January 2019**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018-27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

**Radiochemistry  
Technical Case Narrative  
Black Warrior Riverkeeper (BWRK)  
SDG #: 467581**

**Product:** Alphaspec U, Liquid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1835018

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
467581001	NPDES Outfall
467581002	SEEP
1204187413	Method Blank (MB)
1204187414	467581001(NPDES Outfall) Sample Duplicate (DUP)
1204187415	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Recounts**

Sample 467581002 (SEEP) was recounted due to a suspected false positive. The recount is reported.

**Product:** Alphaspec U, Solid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 26

**Analytical Batch:** 1835021

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 23

**Preparation Batch:** 1834682

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
467581003	SEEP
1204187427	Method Blank (MB)
1204187428	467581003(SEEP) Sample Duplicate (DUP)
1204187429	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Dry Weight**

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 23

**Preparation Batch:** 1834682

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
467581003	SEEP

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Gammaspec, Gamma, Solid (Short List)**

**Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1834687

**Preparation Method:** Dry Soil Prep

**Preparation Procedure:** GL-RAD-A-021 REV# 23

**Preparation Batch:** 1834682

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
467581003	SEEP
1204186609	Method Blank (MB)
1204186610	467581003(SEEP) Sample Duplicate (DUP)
1204186611	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Radium-226	1204186609	MB for batch 1834687
		Thorium-228	1204186609	MB for batch 1834687

**Product: Gammaspec, Gamma, Liquid (Short List)**

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1835280

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
467581001	NPDES Outfall
467581002	SEEP
1204187993	Method Blank (MB)
1204187994	467581001(NPDES Outfall) Sample Duplicate (DUP)
1204187995	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to interference.	Thorium-232	1204187994	NPDES Outfall(467581001DUP)
UI	Results are considered a false positive due to low abundance.	Thorium-228	1204187994	NPDES Outfall(467581001DUP)

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: NPDES Outfall  
Sample ID: 467581001  
Matrix: Waste Water  
Collect Date: 20-DEC-18 12:36  
Receive Date: 22-DEC-18  
Collector: Client

Project: BWRK00118  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	ND	+/-0.321	0.504	1.00	pCi/L			JJP2	12/28/18	0820	1835018	1
Uranium-235/236	U	ND	+/-0.286	0.515	1.00	pCi/L							
Uranium-238	U	ND	+/-0.227	0.344	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	ND	+/-16.6	11.6		pCi/L			MXR1	01/03/19	1135	1835280	2
Radium-226	U	ND	+/-35.5	36.9		pCi/L							
Radium-228	U	ND	+/-6.41	6.04		pCi/L							
Thorium-228	U	ND	+/-2.85	2.85		pCi/L							
Thorium-232	U	ND	+/-955	721		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			103	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South  
  
Birmingham, Alabama 35222  
Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID: SEEP  
Sample ID: 467581002  
Matrix: Surface Water  
Collect Date: 20-DEC-18 13:12  
Receive Date: 22-DEC-18  
Collector: Client

Project: BWRK00118  
Client ID: BWRK001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	ND	+/-0.450	1.02	1.00	pCi/L			JJP2	12/29/18	1133	1835018	1
Uranium-235/236	U	ND	+/-0.393	0.924	1.00	pCi/L							
Uranium-238	U	ND	+/-0.544	0.808	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	ND	+/-27.5	16.0		pCi/L			MXR1	01/03/19	1136	1835280	2
Radium-226	U	ND	+/-34.9	40.7		pCi/L							
Radium-228	U	ND	+/-5.29	6.87		pCi/L							
Thorium-228	U	ND	+/-4.14	3.07		pCi/L							
Thorium-232	U	ND	+/-1930	1440		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			95.6	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: January 21, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	SEEP	Project:	BWRK00118
Sample ID:	467581003	Client ID:	BWRK001
Matrix:	Soil		
Collect Date:	20-DEC-18 13:12		
Receive Date:	22-DEC-18		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Solid "Dry Weight Corrected"													
Uranium-233/234		0.988	+/-0.541	0.445	1.00	pCi/g			JJP2	12/28/18	0856	1835021	1
Uranium-235/236	U	ND	+/-0.166	0.247	1.00	pCi/g							
Uranium-238		1.55	+/-0.657	0.407	1.00	pCi/g							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid (Short List) "Dry Weight Corrected"													
Potassium-40		8.10	+/-0.456	0.207		pCi/g			MXR1	01/15/19	1156	1834687	2
Radium-226		1.09	+/-0.0743	0.0395		pCi/g							
Radium-228		1.16	+/-0.139	0.0774		pCi/g							
Thorium-228		1.28	+/-0.0515	0.0287		pCi/g							
Thorium-232		1.16	+/-0.139	0.0774		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MPK1	12/24/18	0813	1834682

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	DOE HASL 300, 4.5.2.3/Ga-01-R	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			87.1	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: January 21, 2019

Page 1 of 5

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 467581

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1835018										
QC1204187414	467581001	DUP									
Uranium-233/234		U	0.233	U	0.424	pCi/L	N/A		N/A	JJP2	12/28/18 08:20
Uranium-235/236		U	0.109	U	0.130	pCi/L	N/A		N/A		
Uranium-238		U	0.128		0.607	pCi/L	55.3	(0% - 100%)			
QC1204187415	LCS										
Uranium-233/234					25.1	pCi/L					12/28/18 08:20
Uranium-235/236					1.56	pCi/L					
Uranium-238	27.3				24.2	pCi/L	88.9	(75%-125%)			
QC1204187413	MB										
Uranium-233/234			U		0.339	pCi/L					12/28/18 08:20
Uranium-235/236			U		0.189	pCi/L					
Uranium-238			U		0.427	pCi/L					
Batch	1835021										
QC1204187428	467581003	DUP									
Uranium-233/234			0.988		1.09	pCi/g	9.61	(0% - 100%)	JJP2	12/28/18 08:56	
Uranium-235/236		U	0.00	U	0.148	pCi/g	N/A		N/A		
Uranium-238			1.55		1.16	pCi/g	29.3	(0% - 100%)			

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1835021										
QC1204187429	LCS										
Uranium-233/234				25.3	pCi/g				JJP2	12/28/18	08:56
Uranium-235/236				1.49	pCi/g						
Uranium-238	26.0			27.2	pCi/g		105	(75%-125%)			
QC1204187427	MB										
Uranium-233/234			U	-0.0443	pCi/g					12/28/18	08:56
Uranium-235/236			U	0.0642	pCi/g						
Uranium-238			U	-0.0492	pCi/g						
<b>Rad Gamma Spec</b>											
Batch	1834687										
QC1204186610	467581003	DUP									
Potassium-40			8.10	9.28	pCi/g	13.5		(0%-20%)	MXR1	01/16/19	11:40
Radium-226			1.09	1.03	pCi/g	5.49		(0%-20%)			
Radium-228			1.16	1.20	pCi/g	3.38		(0%-20%)			
Thorium-228			1.28	1.29	pCi/g	0.776		(0%-20%)			
Thorium-232			1.16	1.20	pCi/g	3.38		(0%-20%)			
QC1204186611	LCS										
Americium-241			487	518	pCi/g		106	(75%-125%)		01/15/19	05:43
Cesium-137	170			164	pCi/g		96.2	(75%-125%)			

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1834687										
Cobalt-60	120			111	pCi/g		92.8	(75%-125%)	MXR1	01/15/19	05:43
Potassium-40			U	0.196	pCi/g						
Radium-226			U	-0.444	pCi/g						
Radium-228			U	-0.889	pCi/g						
Thorium-228			U	-0.00688	pCi/g						
Thorium-232			U	-0.889	pCi/g						
QC1204186609 MB											
Potassium-40			U	0.0916	pCi/g					01/15/19	09:17
Radium-226			UI	0.00	pCi/g						
Radium-228			U	-0.0284	pCi/g						
Thorium-228			UI	0.00	pCi/g						
Thorium-232			U	-0.0284	pCi/g						
Batch 1835280											
QC1204187994 467581001 DUP											
Potassium-40		U	0.567	U	-21.2	pCi/L	N/A		N/A	MXR1	01/04/19 13:39
Radium-226		U	-16.9	U	16.8	pCi/L	N/A		N/A		
Radium-228		U	1.29	U	4.67	pCi/L	N/A		N/A		

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1835280										
Thorium-228	U	0.0586	UI	0.00	pCi/L	N/A		N/A	MXR1	01/04/19	13:39
Thorium-232	U	312	UI	0.00	pCi/L	N/A		N/A			
QC1204187995	LCS										
Americium-241	34200			36100	pCi/L		106	(75%-125%)		01/05/19	13:08
Cesium-137	12700			12800	pCi/L		101	(75%-125%)			
Cobalt-60	9690			10500	pCi/L		108	(75%-125%)			
Potassium-40			U	18.9	pCi/L						
Radium-226			U	-31.4	pCi/L						
Radium-228			U	-20	pCi/L						
Thorium-228			U	-48	pCi/L						
Thorium-232			U	7320	pCi/L						
QC1204187993	MB										
Potassium-40			U	-11.2	pCi/L					01/03/19	11:37
Radium-226			U	7.24	pCi/L						
Radium-228			U	1.54	pCi/L						
Thorium-228			U	-0.43	pCi/L						
Thorium-232			U	-771	pCi/L						

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 467581

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- UJ Gamma Spectroscopy--Uncertain identification
- UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.



## ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola  
3355 McLemore Drive  
Pensacola, FL 32514  
Tel: (850)474-1001

Laboratory Job ID: 400-170481-1  
Client Project/Site: Coal Ash Wastewater

For:  
Black Warrior Riverkeeper  
712 37th Street South  
Birmingham, Alabama 35222

Attn: Nelson Brooke



Authorized for release by:  
7/1/2019 12:21:34 PM

Taylor Bruzzio, Project Manager I  
(850)471-6226  
[taylor.bruzzio@testamericainc.com](mailto:taylor.bruzzio@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	14
QC Sample Results . . . . .	15
Chronicle . . . . .	41
Chain of Custody . . . . .	52

# Case Narrative

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Job ID: 400-170481-1**

**Laboratory: Eurofins TestAmerica, Pensacola**

## Narrative

### Job Narrative 400-170481-1

#### Comments

No additional comments.

#### Receipt

The sample was received on 5/21/2019 8:51 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6° C.

#### GC/MS VOA

Method(s) 8260C: The laboratory control sample (LCS) for analytical batch 400-442886 recovered outside control limits for the following analyte: 2-Hexanone. This analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 400-442886 recovered above the upper control limit for 1,1,2,2-Tetrachloroethane, 1,2-Dibromo-3-Chloropropane, 2-Hexanone, Bromoform, Chlorodibromomethane, Tetrachloroethene and trans-1,3-Dichloropropene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC/MS Semi VOA

Method(s) 8270D: Six surrogates are used for this analysis. The laboratory's SOP allows one of these surrogates to be outside acceptance criteria without performing re-extraction/re-analysis. The following sample contained an allowable number of surrogate compounds outside limits: (400-170513-G-2-B MS). These results have been reported and qualified.

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 400-442495 recovered above the upper control limit for Hexachlorobutadiene and 4-Nitrophenol. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 400-442495 recovered outside acceptance criteria, low biased, for Bis(2-chloroethoxy)methane, Bis(2-chloroethyl)ether, Carbazole and Phenol. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for this analyte, the data have been reported.

Method(s) 8270D LL: The following sample was re-prepared outside of preparation holding time due to QC failures : 1 (400-170481-1). Both sets of data are qualified and reported.

Method(s) 8270D LL: The continuing calibration verification (CCV) associated with batch 400-442564 recovered above the upper control limit for 2-Methylnaphthalene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method(s) 8270D: The laboratory control sample and/or the laboratory control sample duplicate (LCS/LCSD) for preparation batch 400-443149 and analytical batch 400-443830 recovered outside control limits for the following analyte: Hexachlorocyclopentadiene. Hexachlorocyclopentadiene has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. Batch precision also exceeded control limits for these analyte. These results have been reported and qualified.

Method(s) 8270D: The following analytes recovered outside control limits for the LCS associated with preparation batch 400-443149 and analytical batch 400-443830: Bis(2-chloroethyl)ether, Pyrene and Hexachlorobutadiene. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method(s) 8270D: The following sample was re-prepared outside of preparation holding time due to LCS/LCSD failures: 1 (400-170481-1). Both sets of data are reported.

## Case Narrative

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

### Job ID: 400-170481-1 (Continued)

#### Laboratory: Eurofins TestAmerica, Pensacola (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### HPLC/IC

Method(s) 300.0: The following sample was diluted to bring the concentration of target analytes within the calibration range: 1 (400-170481-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Dioxin

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

Method(s) 6010C: The low level check standard recovery associated with batch 400-442295 is outside the acceptance criteria for the following analyte(s): Aluminum and calcium. The CCVL recovered high and the sample listed is non-detect for the analytes aluminum and calcium. Data has been reported as qualified.

Method(s) 6010C: The initial calibration verification (ICV) result for batch 400-442601 was above the upper control limit for silicon. The sample is bracketed by a second source CCV standard that recovers within control limits. The low level continuing calibration verification standard (CCVL) also recovers within limits. The silicon results are reported as qualified.

Method(s) 6010C: The initial low level check standard recovery associated with batch 400-443584 is outside the acceptance criteria for the following analyte: Silicon. However, the metals laboratory analyzes the low level check standard (CCVL) after every ten samples. These CCVL standards pass acceptance criteria for aluminum and silicon.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

Method(s) 351.2: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 400-441704 and analytical batch 400-441975 were outside control limits for Nitrogen, Kjeldahl. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 353.2, SM 4500 NO3 F: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 400-442330 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 335.1, 335.2, 335.4, 9012A, SM 4500 CN G: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 400-442484 and analytical batch 400-442539 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### Organic Prep

Method(s) 3520C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 400-446131.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Sample Summary

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
400-170481-1	1	Water	05/20/19 13:45	05/21/19 08:51	

1

2

3

4

5

6

7

8

9

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<25		25		ug/L			06/01/19 09:36	1
Benzene	<1.0		1.0		ug/L			06/01/19 09:36	1
Bromoform	<5.0		5.0		ug/L			06/01/19 09:36	1
Bromomethane	<1.0		1.0		ug/L			06/01/19 09:36	1
2-Butanone (MEK)	<25		25		ug/L			06/01/19 09:36	1
Carbon disulfide	<1.0		1.0		ug/L			06/01/19 09:36	1
Carbon tetrachloride	<1.0		1.0		ug/L			06/01/19 09:36	1
Chlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
Chlorobromomethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Chlorodibromomethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Chloroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Chloroform	1.9		1.0		ug/L			06/01/19 09:36	1
Chloromethane	<1.0		1.0		ug/L			06/01/19 09:36	1
cis-1,2-Dichloroethene	<1.0		1.0		ug/L			06/01/19 09:36	1
cis-1,3-Dichloropropene	<5.0		5.0		ug/L			06/01/19 09:36	1
Cyclohexane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0		ug/L			06/01/19 09:36	1
1,2-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,3-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,4-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
Dichlorobromomethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Dichlorodifluoromethane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1-Dichloroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,2-Dichloroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1-Dichloroethene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,2-Dichloropropane	<1.0		1.0		ug/L			06/01/19 09:36	1
Ethylbenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
Ethylene Dibromide	<1.0		1.0		ug/L			06/01/19 09:36	1
2-Hexanone	<25 *		25		ug/L			06/01/19 09:36	1
Isopropylbenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
Methyl acetate	<5.0		5.0		ug/L			06/01/19 09:36	1
Methylcyclohexane	<1.0		1.0		ug/L			06/01/19 09:36	1
Methylene Chloride	<5.0		5.0		ug/L			06/01/19 09:36	1
4-Methyl-2-pentanone (MIBK)	<25		25		ug/L			06/01/19 09:36	1
Methyl tert-butyl ether	<1.0		1.0		ug/L			06/01/19 09:36	1
Styrene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1,2,2-Tetrachloroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Tetrachloroethene	<1.0		1.0		ug/L			06/01/19 09:36	1
Toluene	<1.0		1.0		ug/L			06/01/19 09:36	1
trans-1,2-Dichloroethene	<1.0		1.0		ug/L			06/01/19 09:36	1
trans-1,3-Dichloropropene	<5.0		5.0		ug/L			06/01/19 09:36	1
1,2,3-Trichlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,2,4-Trichlorobenzene	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1,1-Trichloroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1,2-Trichloroethane	<5.0		5.0		ug/L			06/01/19 09:36	1
Trichloroethene	<1.0		1.0		ug/L			06/01/19 09:36	1
Trichlorofluoromethane	<1.0		1.0		ug/L			06/01/19 09:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<1.0		1.0		ug/L			06/01/19 09:36	1
Vinyl chloride	<1.0		1.0		ug/L			06/01/19 09:36	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	<10		10		ug/L			06/01/19 09:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	102		78 - 118					06/01/19 09:36	1
Dibromofluoromethane	98		81 - 121					06/01/19 09:36	1
Toluene-d8 (Surr)	104		80 - 120					06/01/19 09:36	1

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Acenaphthylene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Anthracene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Benzo[a]pyrene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Benzo[b]fluoranthene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Benzo[g,h,i]perylene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Benzo[k]fluoranthene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Chrysene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Dibenz(a,h)anthracene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Fluoranthene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Fluorene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Indeno[1,2,3-cd]pyrene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
1-Methylnaphthalene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
2-Methylnaphthalene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Naphthalene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Phenanthrene	<0.23		0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Pyrene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Benzo[a]anthracene	<0.23	*	0.23		ug/L		05/25/19 09:39	05/29/19 20:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	50		15 - 122				05/25/19 09:39	05/29/19 20:43	1
Nitrobenzene-d5 (Surr)	46		19 - 130				05/25/19 09:39	05/29/19 20:43	1
Terphenyl-d14 (Surr)	60		33 - 138				05/25/19 09:39	05/29/19 20:43	1

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Acenaphthylene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Anthracene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[a]pyrene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[b]fluoranthene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[g,h,i]perylene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[k]fluoranthene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Chrysene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Dibenz(a,h)anthracene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Fluoranthene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Fluorene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Indeno[1,2,3-cd]pyrene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
1-Methylnaphthalene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Methylnaphthalene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Naphthalene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenanthrene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Pyrene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[a]anthracene	<0.22	H	0.22		ug/L		06/04/19 10:28	06/06/19 14:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	67		15 - 122				06/04/19 10:28	06/06/19 14:29	1
Nitrobenzene-d5 (Surr)	60		19 - 130				06/04/19 10:28	06/06/19 14:29	1
Terphenyl-d14 (Surr)	97		33 - 138				06/04/19 10:28	06/06/19 14:29	1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Chloro-3-methylphenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Chlorophenol	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4-Dichlorophenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4-Dimethylphenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4,6-Dinitro-2-methylphenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4-Dinitrophenol	<34		34		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Methylphenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
3 & 4 Methylphenol	<23		23		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Nitrophenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Nitrophenol	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Pentachlorophenol	<23		23		ug/L		05/25/19 09:39	05/29/19 21:11	1
Phenol	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4,5-Trichlorophenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4,6-Trichlorophenol	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Acenaphthene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Acenaphthylene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Acetophenone	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Anthracene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzaldehyde	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzo[a]anthracene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzo[a]pyrene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzo[b]fluoranthene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzo[k]fluoranthene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Bromophenyl phenyl ether	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Butyl benzyl phthalate	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Caprolactam	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Carbazole	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Chloroaniline	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Bis(2-chloroethoxy)methane	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Bis(2-chloroethyl)ether	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Chloronaphthalene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Chlorophenyl phenyl ether	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Chrysene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Dibenz(a,h)anthracene	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Dibenzofuran	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Di-n-butyl phthalate	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Di-n-octyl phthalate	<11	*	11		ug/L		05/25/19 09:39	05/29/19 21:11	1
3,3'-Dichlorobenzidine	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1

Eurofins TestAmerica, Pensacola



# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diethyl phthalate	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Dimethyl phthalate	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,4-Dinitrotoluene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,6-Dinitrotoluene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
1,1'-Biphenyl	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Bis(2-ethylhexyl) phthalate	16 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Fluoranthene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Fluorene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Hexachlorobenzene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Hexachlorobutadiene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Hexachlorocyclopentadiene	<23		23		ug/L		05/25/19 09:39	05/29/19 21:11	1
Hexachloroethane	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Indeno[1,2,3-cd]pyrene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Isophorone	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Naphthalene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Methylnaphthalene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
3-Nitroaniline	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
4-Nitroaniline	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Nitrobenzene	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
N-Nitrosodiphenylamine	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
N-Nitrosodi-n-propylamine	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Phenanthrene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Pyrene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2,2'-oxybis(1-chloropropane)	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
2-Nitroaniline	<11		11		ug/L		05/25/19 09:39	05/29/19 21:11	1
Benzo[g,h,i]perylene	<11 *		11		ug/L		05/25/19 09:39	05/29/19 21:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	67		26 - 150	05/25/19 09:39	05/29/19 21:11	1
2-Fluorobiphenyl	51		46 - 124	05/25/19 09:39	05/29/19 21:11	1
2-Fluorophenol (Surr)	35		13 - 113	05/25/19 09:39	05/29/19 21:11	1
Nitrobenzene-d5 (Surr)	51		36 - 126	05/25/19 09:39	05/29/19 21:11	1
Phenol-d5 (Surr)	39		17 - 127	05/25/19 09:39	05/29/19 21:11	1
Terphenyl-d14 (Surr)	69		44 - 149	05/25/19 09:39	05/29/19 21:11	1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Chloro-3-methylphenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Chlorophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,4-Dichlorophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,4-Dimethylphenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4,6-Dinitro-2-methylphenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,4-Dinitrophenol	<32	H	32		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Methylphenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
3 & 4 Methylphenol	<22	H	22		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Nitrophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Nitrophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Pentachlorophenol	<22	H	22		ug/L		06/04/19 10:28	06/06/19 16:58	1
Phenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,4,6-Trichlorophenol	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Acenaphthene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Acenaphthylene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Acetophenone	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Anthracene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzaldehyde	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzo[a]anthracene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzo[a]pyrene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzo[b]fluoranthene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzo[k]fluoranthene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Bromophenyl phenyl ether	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Butyl benzyl phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Caprolactam	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Carbazole	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Chloroaniline	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Bis(2-chloroethoxy)methane	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Bis(2-chloroethyl)ether	<11	H *	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Chloronaphthalene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Chlorophenyl phenyl ether	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Chrysene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Dibenz(a,h)anthracene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Dibenzofuran	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Di-n-butyl phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Di-n-octyl phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
3,3'-Dichlorobenzidine	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Diethyl phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Dimethyl phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,4-Dinitrotoluene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2,6-Dinitrotoluene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
1,1'-Biphenyl	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Bis(2-ethylhexyl) phthalate	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Fluoranthene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Fluorene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Hexachlorobenzene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Hexachlorobutadiene	<11	H *	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Hexachlorocyclopentadiene	<22	H *	22		ug/L		06/04/19 10:28	06/06/19 16:58	1
Hexachloroethane	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Indeno[1,2,3-cd]pyrene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Isophorone	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Naphthalene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Methylnaphthalene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
3-Nitroaniline	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
4-Nitroaniline	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Nitrobenzene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
N-Nitrosodiphenylamine	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
N-Nitrosodi-n-propylamine	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Phenanthrene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Pyrene	<11	H *	11		ug/L		06/04/19 10:28	06/06/19 16:58	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - RE (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,2'-oxybis(1-chloropropane)	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
2-Nitroaniline	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Benzo[g,h,i]perylene	<11	H	11		ug/L		06/04/19 10:28	06/06/19 16:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	53		26 - 150				06/04/19 10:28	06/06/19 16:58	1
2-Fluorobiphenyl	68		46 - 124				06/04/19 10:28	06/06/19 16:58	1
2-Fluorophenol (Surr)	36		13 - 113				06/04/19 10:28	06/06/19 16:58	1
Nitrobenzene-d5 (Surr)	60		36 - 126				06/04/19 10:28	06/06/19 16:58	1
Phenol-d5 (Surr)	57		17 - 127				06/04/19 10:28	06/06/19 16:58	1
Terphenyl-d14 (Surr)	77		44 - 149				06/04/19 10:28	06/06/19 16:58	1

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1221	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1232	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1242	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1248	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1254	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
PCB-1260	<0.51		0.51		ug/L		06/28/19 15:43	06/29/19 19:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	99		10 - 125				06/28/19 15:43	06/29/19 19:06	1
Tetrachloro-m-xylene	75		46 - 150				06/28/19 15:43	06/29/19 19:06	1

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			05/29/19 22:49	1

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16		1.0		mg/L			05/22/19 19:16	1
Fluoride	<0.20		0.20		mg/L			05/22/19 19:16	1

## Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	140		10		mg/L			05/29/19 02:25	10

## Method: 9056 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	47		10		mg/L			05/29/19 02:25	10

## Method: 8290A - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	<9.5		9.5		pg/L		06/11/19 07:58	06/21/19 15:53	1
2,3,7,8-TCDF	<9.5		9.5		pg/L		06/11/19 07:58	06/21/19 15:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	57		40 - 135				06/11/19 07:58	06/21/19 15:53	1
13C-2,3,7,8-TCDF	57		40 - 135				06/11/19 07:58	06/21/19 15:53	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.050		0.050		mg/L			05/24/19 14:04	1
Aluminum	<0.10	^	0.10		mg/L			05/24/19 14:04	1
Arsenic	<0.010		0.010		mg/L			05/24/19 14:04	1
Barium	0.19		0.010		mg/L			05/24/19 14:04	1
Beryllium	<0.0030		0.0030		mg/L			05/24/19 14:04	1
Boron	0.70		0.10		mg/L			05/24/19 14:04	1
Cadmium	<0.0050		0.0050		mg/L			05/24/19 14:04	1
Calcium	53		0.50		mg/L			05/24/19 14:04	1
Chromium	<0.010		0.010		mg/L			05/24/19 14:04	1
Cobalt	<0.010		0.010		mg/L			05/24/19 14:04	1
Copper	<0.020		0.020		mg/L			05/24/19 14:04	1
Iron	<0.10		0.10		mg/L			05/24/19 14:04	1
Lead	<0.010		0.010		mg/L			05/24/19 14:04	1
Lithium	0.21		0.050		mg/L			05/24/19 14:04	1
Magnesium	13		0.50		mg/L			05/24/19 14:04	1
Manganese	0.11		0.010		mg/L			05/24/19 14:04	1
Molybdenum	0.16		0.010		mg/L			05/24/19 14:04	1
Nickel	<0.0050		0.0050		mg/L			05/24/19 14:04	1
Potassium	6.3		1.0		mg/L			05/24/19 14:04	1
Selenium	<0.020		0.020		mg/L			05/24/19 14:04	1
Silver	<0.0050		0.0050		mg/L			05/24/19 14:04	1
Sodium	20		1.0		mg/L			05/24/19 14:04	1
Thallium	<0.010		0.010		mg/L			05/24/19 14:04	1
Strontium	0.90		0.0050		mg/L			05/24/19 14:04	1
Zinc	<0.020		0.020		mg/L			05/24/19 14:04	1
Titanium	<0.010		0.010		mg/L			05/29/19 15:28	1
Vanadium	<0.020		0.020		mg/L			05/24/19 14:04	1
Silicon	1.6	^	0.050		mg/L			05/29/19 15:28	1
Tin	<0.010		0.010		mg/L			05/24/19 14:04	1

## Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 22:47	1
Arsenic	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Boron	0.68		0.10		mg/L		06/04/19 12:45	06/04/19 22:47	1
Barium	0.18		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Beryllium	<0.0030		0.0030		mg/L		06/04/19 12:45	06/04/19 22:47	1
Calcium	48		0.50		mg/L		06/04/19 12:45	06/04/19 22:47	1
Cadmium	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 22:47	1
Cobalt	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Chromium	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Copper	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 22:47	1
Iron	<0.10		0.10		mg/L		06/04/19 12:45	06/04/19 22:47	1
Potassium	6.0		1.0		mg/L		06/04/19 12:45	06/04/19 22:47	1
Lithium	0.19		0.050		mg/L		06/04/19 12:45	06/04/19 22:47	1
Magnesium	11		0.50		mg/L		06/04/19 12:45	06/04/19 22:47	1
Manganese	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Molybdenum	0.14		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Nickel	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 22:47	1
Antimony	<0.050		0.050		mg/L		06/04/19 12:45	06/04/19 22:47	1

Eurofins TestAmerica, Pensacola

# Client Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

## Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 22:47	1
<b>Strontium</b>	<b>0.85</b>		0.0050		mg/L		06/04/19 12:45	06/04/19 22:47	1
Titanium	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Thallium	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 22:47	1
Vanadium	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 22:47	1
Zinc	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 22:47	1

## Method: 6010C - Metals (ICP) - Dissolved - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.10	^	0.10		mg/L		06/04/19 12:45	06/05/19 16:18	1
<b>Sodium</b>	<b>20</b>		1.0		mg/L		06/04/19 12:45	06/05/19 16:18	1
Lead	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 16:18	1
<b>Silicon</b>	<b>1.8</b>	^	0.050		mg/L		06/04/19 12:45	06/05/19 16:18	1
Tin	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 16:18	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/11/19 12:59	06/12/19 12:57	1

## Method: 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/04/19 14:39	06/06/19 13:16	1

## Method: SM 2340B - Total Hardness (as CaCO3) by calculation

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	<b>180</b>		3.3		mg/L			05/24/19 14:04	1
Calcium hardness as calcium carbonate	<b>130</b>		1.2		mg/L			05/24/19 14:04	1
Magnesium hardness as calcium carbonate	<b>52</b>		2.1		mg/L			05/24/19 14:04	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		05/29/19 10:05	05/29/19 15:11	1
<b>Ammonia</b>	<b>0.16</b>		0.050		mg/L			05/23/19 14:08	1
Nitrogen, Kjeldahl	<0.50		0.50		mg/L		05/21/19 20:17	05/23/19 14:07	1
Nitrate Nitrite as N	<0.050		0.050		mg/L			05/28/19 10:47	1
Phosphorus, Total	<0.10		0.10		mg/L		05/21/19 20:17	05/22/19 14:31	1
Acidity as CaCO3	<10		10		mg/L			05/23/19 11:12	1
<b>Alkalinity, Total</b>	<b>70</b>		1.0		mg/L			05/23/19 15:34	1
<b>Total Dissolved Solids</b>	<b>320</b>		5.0		mg/L			05/23/19 15:36	1
<b>Total Suspended Solids</b>	<b>6.0</b>		5.0		mg/L			05/22/19 09:09	1
<b>Total Organic Carbon</b>	<b>2.0</b>		1.0		mg/L			06/10/19 21:52	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Specific Conductance</b>	<b>490</b>		5.0		umhos/cm			05/22/19 12:30	1

## Definitions/Glossary

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

### Qualifiers

#### GC/MS VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.

#### GC/MS Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 400-442886/4

Matrix: Water

Analysis Batch: 442886

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<25		25		ug/L			06/01/19 08:46	1
Benzene	<1.0		1.0		ug/L			06/01/19 08:46	1
Bromoform	<5.0		5.0		ug/L			06/01/19 08:46	1
Bromomethane	<1.0		1.0		ug/L			06/01/19 08:46	1
2-Butanone (MEK)	<25		25		ug/L			06/01/19 08:46	1
Carbon disulfide	<1.0		1.0		ug/L			06/01/19 08:46	1
Carbon tetrachloride	<1.0		1.0		ug/L			06/01/19 08:46	1
Chlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
Chlorobromomethane	<1.0		1.0		ug/L			06/01/19 08:46	1
Chlorodibromomethane	<1.0		1.0		ug/L			06/01/19 08:46	1
Chloroethane	<1.0		1.0		ug/L			06/01/19 08:46	1
Chloroform	<1.0		1.0		ug/L			06/01/19 08:46	1
Chloromethane	<1.0		1.0		ug/L			06/01/19 08:46	1
cis-1,2-Dichloroethene	<1.0		1.0		ug/L			06/01/19 08:46	1
cis-1,3-Dichloropropene	<5.0		5.0		ug/L			06/01/19 08:46	1
Cyclohexane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,2-Dibromo-3-Chloropropane	<5.0		5.0		ug/L			06/01/19 08:46	1
1,2-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,3-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,4-Dichlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
Dichlorobromomethane	<1.0		1.0		ug/L			06/01/19 08:46	1
Dichlorodifluoromethane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1-Dichloroethane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,2-Dichloroethane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1-Dichloroethene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,2-Dichloropropane	<1.0		1.0		ug/L			06/01/19 08:46	1
Ethylbenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
Ethylene Dibromide	<1.0		1.0		ug/L			06/01/19 08:46	1
2-Hexanone	<25		25		ug/L			06/01/19 08:46	1
Isopropylbenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
Methyl acetate	<5.0		5.0		ug/L			06/01/19 08:46	1
Methylcyclohexane	<1.0		1.0		ug/L			06/01/19 08:46	1
Methylene Chloride	<5.0		5.0		ug/L			06/01/19 08:46	1
4-Methyl-2-pentanone (MIBK)	<25		25		ug/L			06/01/19 08:46	1
Methyl tert-butyl ether	<1.0		1.0		ug/L			06/01/19 08:46	1
Styrene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1,2,2-Tetrachloroethane	<1.0		1.0		ug/L			06/01/19 08:46	1
Tetrachloroethene	<1.0		1.0		ug/L			06/01/19 08:46	1
Toluene	<1.0		1.0		ug/L			06/01/19 08:46	1
trans-1,2-Dichloroethene	<1.0		1.0		ug/L			06/01/19 08:46	1
trans-1,3-Dichloropropene	<5.0		5.0		ug/L			06/01/19 08:46	1
1,2,3-Trichlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,2,4-Trichlorobenzene	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1,1-Trichloroethane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1,2-Trichloroethane	<5.0		5.0		ug/L			06/01/19 08:46	1
Trichloroethene	<1.0		1.0		ug/L			06/01/19 08:46	1
Trichlorofluoromethane	<1.0		1.0		ug/L			06/01/19 08:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<1.0		1.0		ug/L			06/01/19 08:46	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 400-442886/4

Matrix: Water

Analysis Batch: 442886

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	<1.0		1.0		ug/L			06/01/19 08:46	1
Xylenes, Total	<10		10		ug/L			06/01/19 08:46	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	102		78 - 118		06/01/19 08:46	1
Dibromofluoromethane	99		81 - 121		06/01/19 08:46	1
Toluene-d8 (Surr)	104		80 - 120		06/01/19 08:46	1

Lab Sample ID: LCS 400-442886/1002

Matrix: Water

Analysis Batch: 442886

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	200	278		ug/L		139	43 - 160
Benzene	50.0	52.1		ug/L		104	70 - 130
Bromoform	50.0	67.9		ug/L		136	57 - 140
Bromomethane	50.0	50.3		ug/L		101	10 - 160
2-Butanone (MEK)	200	278		ug/L		139	61 - 145
Carbon disulfide	50.0	54.9		ug/L		110	61 - 137
Carbon tetrachloride	50.0	57.7		ug/L		115	61 - 137
Chlorobenzene	50.0	56.2		ug/L		112	70 - 130
Chlorobromomethane	50.0	52.4		ug/L		105	70 - 130
Chlorodibromomethane	50.0	61.9		ug/L		124	67 - 135
Chloroethane	50.0	54.3		ug/L		109	55 - 141
Chloroform	50.0	52.8		ug/L		106	69 - 130
Chloromethane	50.0	52.8		ug/L		106	58 - 137
cis-1,2-Dichloroethene	50.0	55.0		ug/L		110	68 - 130
cis-1,3-Dichloropropene	50.0	55.8		ug/L		112	69 - 132
Cyclohexane	50.0	50.8		ug/L		102	70 - 130
1,2-Dibromo-3-Chloropropane	50.0	66.2		ug/L		132	54 - 135
1,2-Dichlorobenzene	50.0	57.6		ug/L		115	67 - 130
1,3-Dichlorobenzene	50.0	56.9		ug/L		114	70 - 130
1,4-Dichlorobenzene	50.0	56.8		ug/L		114	70 - 130
Dichlorobromomethane	50.0	55.7		ug/L		111	67 - 133
Dichlorodifluoromethane	50.0	50.4		ug/L		101	41 - 146
1,1-Dichloroethane	50.0	54.0		ug/L		108	70 - 130
1,2-Dichloroethane	50.0	53.2		ug/L		106	69 - 130
1,1-Dichloroethene	50.0	53.1		ug/L		106	63 - 134
1,2-Dichloropropane	50.0	51.8		ug/L		104	70 - 130
Ethylbenzene	50.0	56.7		ug/L		113	70 - 130
Ethylene Dibromide	50.0	58.4		ug/L		117	70 - 130
2-Hexanone	200	297 *		ug/L		149	65 - 137
Isopropylbenzene	50.0	57.2		ug/L		114	70 - 130
Methyl acetate	100	115		ug/L		115	45 - 159
Methylcyclohexane	50.0	53.1		ug/L		106	70 - 130
Methylene Chloride	50.0	53.1		ug/L		106	66 - 135
4-Methyl-2-pentanone (MIBK)	200	242		ug/L		121	69 - 138
Methyl tert-butyl ether	50.0	53.6		ug/L		107	66 - 130

Eurofins TestAmerica, Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 400-442886/1002

Matrix: Water

Analysis Batch: 442886

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
m-Xylene & p-Xylene	50.0	56.3		ug/L		113	70 - 130
o-Xylene	50.0	56.4		ug/L		113	70 - 130
Styrene	50.0	56.3		ug/L		113	70 - 130
1,1,2,2-Tetrachloroethane	50.0	60.5		ug/L		121	70 - 131
Tetrachloroethene	50.0	61.2		ug/L		122	65 - 130
Toluene	50.0	56.9		ug/L		114	70 - 130
trans-1,2-Dichloroethene	50.0	53.4		ug/L		107	70 - 130
trans-1,3-Dichloropropene	50.0	62.4		ug/L		125	63 - 130
1,2,3-Trichlorobenzene	50.0	58.4		ug/L		117	60 - 138
1,1,1-Trichloroethane	50.0	54.4		ug/L		109	68 - 130
1,1,2-Trichloroethane	50.0	58.9		ug/L		118	70 - 130
Trichloroethene	50.0	53.1		ug/L		106	70 - 130
Trichlorofluoromethane	50.0	51.0		ug/L		102	65 - 138
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	52.2		ug/L		104	60 - 139
Vinyl chloride	50.0	52.0		ug/L		104	59 - 136
Xylenes, Total	100	113		ug/L		113	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene	102		78 - 118
Dibromofluoromethane	100		81 - 121
Toluene-d8 (Surr)	104		80 - 120

Lab Sample ID: 400-170481-1 MS

Matrix: Water

Analysis Batch: 442886

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	<25		200	99.8		ug/L		50	43 - 150
Benzene	<1.0		50.0	47.4		ug/L		95	56 - 142
Bromoform	<5.0		50.0	57.2		ug/L		114	50 - 140
Bromomethane	<1.0		50.0	46.1		ug/L		92	10 - 150
2-Butanone (MEK)	<25		200	136		ug/L		68	55 - 150
Carbon disulfide	<1.0		50.0	49.5		ug/L		99	48 - 150
Carbon tetrachloride	<1.0		50.0	51.0		ug/L		102	55 - 145
Chlorobenzene	<1.0		50.0	50.4		ug/L		101	64 - 130
Chlorobromomethane	<1.0		50.0	46.9		ug/L		94	64 - 140
Chlorodibromomethane	<1.0		50.0	53.0		ug/L		106	56 - 143
Chloroethane	<1.0		50.0	49.1		ug/L		98	50 - 150
Chloroform	1.9		50.0	49.9		ug/L		96	60 - 141
Chloromethane	<1.0		50.0	48.0		ug/L		96	49 - 148
cis-1,2-Dichloroethene	<1.0		50.0	49.1		ug/L		98	59 - 143
cis-1,3-Dichloropropene	<5.0		50.0	49.3		ug/L		99	57 - 140
Cyclohexane	<1.0		50.0	48.1		ug/L		96	58 - 141
1,2-Dibromo-3-Chloropropane	<5.0		50.0	52.6		ug/L		105	45 - 135
1,2-Dichlorobenzene	<1.0		50.0	48.0		ug/L		96	52 - 137
1,3-Dichlorobenzene	<1.0		50.0	48.7		ug/L		97	54 - 135
1,4-Dichlorobenzene	<1.0		50.0	48.5		ug/L		97	53 - 135
Dichlorobromomethane	<1.0		50.0	50.5		ug/L		99	59 - 143

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-170481-1 MS

Matrix: Water

Analysis Batch: 442886

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	<1.0		50.0	47.6		ug/L		95	16 - 150
1,1-Dichloroethane	<1.0		50.0	49.6		ug/L		99	61 - 144
1,2-Dichloroethane	<1.0		50.0	48.0		ug/L		96	60 - 141
1,1-Dichloroethene	<1.0		50.0	48.7		ug/L		97	54 - 147
1,2-Dichloropropane	<1.0		50.0	48.3		ug/L		97	66 - 137
Ethylbenzene	<1.0		50.0	50.1		ug/L		100	58 - 131
Ethylene Dibromide	<1.0		50.0	50.0		ug/L		100	64 - 132
2-Hexanone	<25	*	200	148		ug/L		74	65 - 140
Isopropylbenzene	<1.0		50.0	48.8		ug/L		98	56 - 133
Methyl acetate	<5.0		100	96.0		ug/L		96	21 - 150
Methylcyclohexane	<1.0		50.0	47.8		ug/L		96	62 - 141
Methylene Chloride	<5.0		50.0	48.1		ug/L		96	60 - 146
4-Methyl-2-pentanone (MIBK)	<25		200	179		ug/L		89	63 - 146
Methyl tert-butyl ether	<1.0		50.0	46.9		ug/L		94	59 - 137
m-Xylene & p-Xylene	<5.0		50.0	48.9		ug/L		98	57 - 130
o-Xylene	<5.0		50.0	48.7		ug/L		97	61 - 130
Styrene	<1.0		50.0	48.9		ug/L		98	58 - 131
1,1,2,2-Tetrachloroethane	<1.0		50.0	53.7		ug/L		107	66 - 135
Tetrachloroethene	<1.0		50.0	48.3		ug/L		97	52 - 133
Toluene	<1.0		50.0	49.7		ug/L		99	65 - 130
trans-1,2-Dichloroethene	<1.0		50.0	48.9		ug/L		98	61 - 143
trans-1,3-Dichloropropene	<5.0		50.0	53.5		ug/L		107	53 - 133
1,2,3-Trichlorobenzene	<1.0		50.0	49.3		ug/L		99	43 - 145
1,1,1-Trichloroethane	<1.0		50.0	49.2		ug/L		98	57 - 142
1,1,2-Trichloroethane	<5.0		50.0	51.3		ug/L		103	66 - 131
Trichloroethene	<1.0		50.0	45.8		ug/L		92	64 - 136
Trichlorofluoromethane	<1.0		50.0	46.3		ug/L		93	54 - 150
1,1,2-Trichloro-1,2,2-trifluoroethane	<1.0		50.0	48.5		ug/L		97	55 - 150
Vinyl chloride	<1.0		50.0	48.3		ug/L		97	46 - 150
Xylenes, Total	<10		100	97.6		ug/L		98	59 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene	103		78 - 118
Dibromofluoromethane	99		81 - 121
Toluene-d8 (Surr)	103		80 - 120

Lab Sample ID: 400-170481-1 MSD

Matrix: Water

Analysis Batch: 442886

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Acetone	<25		200	102		ug/L		51	43 - 150	2	30
Benzene	<1.0		50.0	47.4		ug/L		95	56 - 142	0	30
Bromoform	<5.0		50.0	55.7		ug/L		111	50 - 140	3	30
Bromomethane	<1.0		50.0	51.7		ug/L		103	10 - 150	11	50
2-Butanone (MEK)	<25		200	133		ug/L		67	55 - 150	2	30
Carbon disulfide	<1.0		50.0	49.5		ug/L		99	48 - 150	0	30
Carbon tetrachloride	<1.0		50.0	52.7		ug/L		105	55 - 145	3	30

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-170481-1 MSD

Matrix: Water

Analysis Batch: 442886

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorobenzene	<1.0		50.0	47.7		ug/L		95	64 - 130	5	30
Chlorobromomethane	<1.0		50.0	46.2		ug/L		92	64 - 140	1	30
Chlorodibromomethane	<1.0		50.0	52.7		ug/L		105	56 - 143	1	30
Chloroethane	<1.0		50.0	53.6		ug/L		107	50 - 150	9	30
Chloroform	1.9		50.0	50.2		ug/L		96	60 - 141	0	30
Chloromethane	<1.0		50.0	54.3		ug/L		109	49 - 148	12	31
cis-1,2-Dichloroethene	<1.0		50.0	50.2		ug/L		100	59 - 143	2	30
cis-1,3-Dichloropropene	<5.0		50.0	50.1		ug/L		100	57 - 140	1	30
Cyclohexane	<1.0		50.0	49.5		ug/L		99	58 - 141	3	30
1,2-Dibromo-3-Chloropropane	<5.0		50.0	52.7		ug/L		105	45 - 135	0	30
1,2-Dichlorobenzene	<1.0		50.0	45.4		ug/L		91	52 - 137	6	30
1,3-Dichlorobenzene	<1.0		50.0	44.9		ug/L		90	54 - 135	8	30
1,4-Dichlorobenzene	<1.0		50.0	44.0		ug/L		88	53 - 135	10	30
Dichlorobromomethane	<1.0		50.0	51.5		ug/L		101	59 - 143	2	30
Dichlorodifluoromethane	<1.0		50.0	50.2		ug/L		100	16 - 150	5	31
1,1-Dichloroethane	<1.0		50.0	49.6		ug/L		99	61 - 144	0	30
1,2-Dichloroethane	<1.0		50.0	48.2		ug/L		96	60 - 141	0	30
1,1-Dichloroethene	<1.0		50.0	48.2		ug/L		96	54 - 147	1	30
1,2-Dichloropropane	<1.0		50.0	48.0		ug/L		96	66 - 137	1	30
Ethylbenzene	<1.0		50.0	48.4		ug/L		97	58 - 131	4	30
Ethylene Dibromide	<1.0		50.0	49.7		ug/L		99	64 - 132	1	30
2-Hexanone	<25 *		200	152		ug/L		76	65 - 140	3	30
Isopropylbenzene	<1.0		50.0	47.1		ug/L		94	56 - 133	4	30
Methyl acetate	<5.0		100	101		ug/L		101	21 - 150	5	30
Methylcyclohexane	<1.0		50.0	48.4		ug/L		97	62 - 141	1	30
Methylene Chloride	<5.0		50.0	48.8		ug/L		98	60 - 146	1	32
4-Methyl-2-pentanone (MIBK)	<25		200	186		ug/L		93	63 - 146	4	30
Methyl tert-butyl ether	<1.0		50.0	48.0		ug/L		96	59 - 137	2	30
m-Xylene & p-Xylene	<5.0		50.0	47.5		ug/L		95	57 - 130	3	30
o-Xylene	<5.0		50.0	47.3		ug/L		95	61 - 130	3	30
Styrene	<1.0		50.0	46.8		ug/L		94	58 - 131	4	30
1,1,1,2-Tetrachloroethane	<1.0		50.0	51.7		ug/L		103	66 - 135	4	30
Tetrachloroethene	<1.0		50.0	47.2		ug/L		94	52 - 133	2	30
Toluene	<1.0		50.0	49.8		ug/L		100	65 - 130	0	30
trans-1,2-Dichloroethene	<1.0		50.0	49.0		ug/L		98	61 - 143	0	30
trans-1,3-Dichloropropene	<5.0		50.0	52.7		ug/L		105	53 - 133	1	30
1,2,3-Trichlorobenzene	<1.0		50.0	44.8		ug/L		90	43 - 145	10	30
1,1,1-Trichloroethane	<1.0		50.0	50.4		ug/L		101	57 - 142	2	30
1,1,2-Trichloroethane	<5.0		50.0	50.6		ug/L		101	66 - 131	1	30
Trichloroethene	<1.0		50.0	45.4		ug/L		91	64 - 136	1	30
Trichlorofluoromethane	<1.0		50.0	51.2		ug/L		102	54 - 150	10	30
1,1,2-Trichloro-1,2,2-trifluoroethane	<1.0		50.0	47.9		ug/L		96	55 - 150	1	30
Vinyl chloride	<1.0		50.0	53.5		ug/L		107	46 - 150	10	30
Xylenes, Total	<10		100	94.8		ug/L		95	59 - 130	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene	101		78 - 118

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-170481-1 MSD

Matrix: Water

Analysis Batch: 442886

Client Sample ID: 1

Prep Type: Total/NA

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
Dibromofluoromethane	99		81 - 121
Toluene-d8 (Surr)	104		80 - 120

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 400-442208/1-A

Matrix: Water

Analysis Batch: 442495

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 442208

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Chloro-3-methylphenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Chlorophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4-Dichlorophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4-Dimethylphenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4,6-Dinitro-2-methylphenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4-Dinitrophenol	<30		30		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Methylphenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
3 & 4 Methylphenol	<20		20		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Nitrophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Nitrophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Pentachlorophenol	<20		20		ug/L		05/25/19 09:39	05/29/19 19:05	1
Phenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4,5-Trichlorophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4,6-Trichlorophenol	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Acenaphthene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Acenaphthylene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Acetophenone	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Anthracene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzaldehyde	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzo[a]anthracene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzo[a]pyrene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzo[b]fluoranthene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzo[k]fluoranthene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Bromophenyl phenyl ether	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Butyl benzyl phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Caprolactam	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Carbazole	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Chloroaniline	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Bis(2-chloroethoxy)methane	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Bis(2-chloroethyl)ether	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Chloronaphthalene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Chlorophenyl phenyl ether	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Chrysene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Dibenz(a,h)anthracene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Dibenzofuran	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Di-n-butyl phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Di-n-octyl phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
3,3'-Dichlorobenzidine	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 400-442208/1-A

Matrix: Water

Analysis Batch: 442495

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 442208

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diethyl phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Dimethyl phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,4-Dinitrotoluene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,6-Dinitrotoluene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
1,1'-Biphenyl	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Bis(2-ethylhexyl) phthalate	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Fluoranthene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Fluorene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Hexachlorobenzene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Hexachlorobutadiene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Hexachlorocyclopentadiene	<20		20		ug/L		05/25/19 09:39	05/29/19 19:05	1
Hexachloroethane	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Indeno[1,2,3-cd]pyrene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Isophorone	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Naphthalene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Methylnaphthalene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
3-Nitroaniline	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
4-Nitroaniline	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Nitrobenzene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
N-Nitrosodiphenylamine	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
N-Nitrosodi-n-propylamine	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Phenanthrene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Pyrene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2,2'-oxybis(1-chloropropane)	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
2-Nitroaniline	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1
Benzo[g,h,i]perylene	<10		10		ug/L		05/25/19 09:39	05/29/19 19:05	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	87		26 - 150	05/25/19 09:39	05/29/19 19:05	1
2-Fluorobiphenyl	60		46 - 124	05/25/19 09:39	05/29/19 19:05	1
2-Fluorophenol (Surr)	38		13 - 113	05/25/19 09:39	05/29/19 19:05	1
Nitrobenzene-d5 (Surr)	67		36 - 126	05/25/19 09:39	05/29/19 19:05	1
Phenol-d5 (Surr)	49		17 - 127	05/25/19 09:39	05/29/19 19:05	1
Terphenyl-d14 (Surr)	79		44 - 149	05/25/19 09:39	05/29/19 19:05	1

Lab Sample ID: LCS 400-442208/2-A

Matrix: Water

Analysis Batch: 442495

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 442208

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chloro-3-methylphenol	120	71.6		ug/L		60	48 - 131
2-Chlorophenol	120	46.3	*	ug/L		39	40 - 120
2,4-Dichlorophenol	120	75.0		ug/L		62	49 - 120
2,4-Dimethylphenol	120	83.9		ug/L		70	48 - 120
4,6-Dinitro-2-methylphenol	240	171		ug/L		71	23 - 148
2,4-Dinitrophenol	240	178		ug/L		74	10 - 150
2-Methylphenol	120	58.2		ug/L		49	46 - 124
3 & 4 Methylphenol	120	59.8		ug/L		50	45 - 120

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 400-442208/2-A

Matrix: Water

Analysis Batch: 442495

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 442208

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitrophenol	120	67.4		ug/L		56	40 - 124
4-Nitrophenol	240	194		ug/L		81	23 - 146
Pentachlorophenol	240	165		ug/L		69	31 - 130
Phenol	120	43.6	*	ug/L		36	40 - 120
2,4,5-Trichlorophenol	120	73.1		ug/L		61	51 - 136
2,4,6-Trichlorophenol	120	72.7		ug/L		61	50 - 127
Acenaphthene	120	56.8	*	ug/L		47	54 - 125
Acenaphthylene	120	61.5		ug/L		51	44 - 130
Anthracene	120	40.2	*	ug/L		33	61 - 120
Benzo[a]anthracene	120	18.4	*	ug/L		15	59 - 120
Benzo[a]pyrene	120	12.3	*	ug/L		10	52 - 126
Benzo[b]fluoranthene	120	12.9	*	ug/L		11	33 - 149
Benzo[k]fluoranthene	120	12.2	*	ug/L		10	51 - 130
4-Bromophenyl phenyl ether	120	56.1	*	ug/L		47	54 - 122
Butyl benzyl phthalate	120	43.2	*	ug/L		36	54 - 133
Carbazole	120	68.0		ug/L		57	54 - 142
4-Chloroaniline	120	58.8		ug/L		49	26 - 120
Bis(2-chloroethoxy)methane	120	55.4	*	ug/L		46	47 - 120
Bis(2-chloroethyl)ether	120	41.2	*	ug/L		34	44 - 120
2-Chloronaphthalene	120	54.5	*	ug/L		45	52 - 121
4-Chlorophenyl phenyl ether	120	58.5	*	ug/L		49	56 - 125
Chrysene	120	14.9	*	ug/L		12	61 - 121
Dibenz(a,h)anthracene	120	11.5	*	ug/L		10	40 - 150
Dibenzofuran	120	62.2	*	ug/L		52	56 - 122
Di-n-butyl phthalate	120	61.4	*	ug/L		51	58 - 126
Di-n-octyl phthalate	120	15.1	*	ug/L		13	57 - 138
Diethyl phthalate	120	79.6		ug/L		66	50 - 137
Dimethyl phthalate	120	71.3		ug/L		59	57 - 124
2,4-Dinitrotoluene	120	70.9		ug/L		59	54 - 142
2,6-Dinitrotoluene	120	66.0		ug/L		55	55 - 130
Bis(2-ethylhexyl) phthalate	120	16.2	*	ug/L		13	52 - 147
Fluoranthene	120	35.9	*	ug/L		30	56 - 128
Fluorene	120	64.7		ug/L		54	54 - 124
Hexachlorobenzene	120	22.1	*	ug/L		18	52 - 129
Hexachlorobutadiene	120	47.1	*	ug/L		39	45 - 120
Hexachlorocyclopentadiene	120	20.2		ug/L		17	10 - 134
Hexachloroethane	120	42.0	*	ug/L		35	41 - 120
Indeno[1,2,3-cd]pyrene	120	12.4	*	ug/L		10	41 - 150
Isophorone	120	69.1		ug/L		58	48 - 120
Naphthalene	120	51.8	*	ug/L		43	48 - 120
2-Methylnaphthalene	120	60.8		ug/L		51	50 - 121
3-Nitroaniline	120	53.1		ug/L		44	37 - 127
4-Nitroaniline	120	65.7		ug/L		55	36 - 137
Nitrobenzene	120	66.9		ug/L		56	45 - 120
N-Nitrosodiphenylamine	119	67.3		ug/L		57	54 - 120
N-Nitrosodi-n-propylamine	120	72.8		ug/L		61	45 - 120
Phenanthrene	120	52.1	*	ug/L		43	61 - 120
Pyrene	120	28.1	*	ug/L		23	53 - 128
2,2'-oxybis(1-chloropropane)	120	51.7		ug/L		43	33 - 121

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 400-442208/2-A

Matrix: Water

Analysis Batch: 442495

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 442208

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Nitroaniline	120	70.6		ug/L		59	51 - 145
Benzo[g,h,i]perylene	120	12.9	*	ug/L		11	38 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4,6-Tribromophenol (Surr)	82		26 - 150
2-Fluorobiphenyl	49		46 - 124
2-Fluorophenol (Surr)	25		13 - 113
Nitrobenzene-d5 (Surr)	59		36 - 126
Phenol-d5 (Surr)	39		17 - 127
Terphenyl-d14 (Surr)	53		44 - 149

Lab Sample ID: MB 400-443149/1-A

Matrix: Water

Analysis Batch: 443436

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 443149

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Atrazine	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4-Chloro-3-methylphenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Chlorophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4-Dichlorophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4-Dimethylphenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4,6-Dinitro-2-methylphenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4-Dinitrophenol	<30		30		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Methylphenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
3 & 4 Methylphenol	<20		20		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Nitrophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4-Nitrophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Pentachlorophenol	<20		20		ug/L		06/04/19 10:28	06/06/19 14:29	1
Phenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4,5-Trichlorophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4,6-Trichlorophenol	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Acenaphthene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Acenaphthylene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Acetophenone	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Anthracene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzaldehyde	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[a]anthracene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[a]pyrene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[b]fluoranthene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[k]fluoranthene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4-Bromophenyl phenyl ether	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Butyl benzyl phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Caprolactam	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Carbazole	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4-Chloroaniline	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Bis(2-chloroethoxy)methane	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Bis(2-chloroethyl)ether	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Chloronaphthalene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 400-443149/1-A

Matrix: Water

Analysis Batch: 443436

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 443149

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Chlorophenyl phenyl ether	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Chrysene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Dibenz(a,h)anthracene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Dibenzofuran	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Di-n-butyl phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Di-n-octyl phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
3,3'-Dichlorobenzidine	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Diethyl phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Dimethyl phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,4-Dinitrotoluene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,6-Dinitrotoluene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
1,1'-Biphenyl	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Bis(2-ethylhexyl) phthalate	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Fluoranthene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Fluorene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Hexachlorobenzene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Hexachlorobutadiene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Hexachlorocyclopentadiene	<20		20		ug/L		06/04/19 10:28	06/06/19 14:29	1
Hexachloroethane	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Indeno[1,2,3-cd]pyrene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Isophorone	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Naphthalene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Methylnaphthalene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
3-Nitroaniline	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
4-Nitroaniline	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Nitrobenzene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
N-Nitrosodiphenylamine	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
N-Nitrosodi-n-propylamine	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Phenanthrene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Pyrene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2,2'-oxybis(1-chloropropane)	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
2-Nitroaniline	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1
Benzo[g,h,i]perylene	<10		10		ug/L		06/04/19 10:28	06/06/19 14:29	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	62		26 - 150	06/04/19 10:28	06/06/19 14:29	1
2-Fluorobiphenyl	65		46 - 124	06/04/19 10:28	06/06/19 14:29	1
2-Fluorophenol (Surr)	16		13 - 113	06/04/19 10:28	06/06/19 14:29	1
Nitrobenzene-d5 (Surr)	61		36 - 126	06/04/19 10:28	06/06/19 14:29	1
Phenol-d5 (Surr)	38		17 - 127	06/04/19 10:28	06/06/19 14:29	1
Terphenyl-d14 (Surr)	83		44 - 149	06/04/19 10:28	06/06/19 14:29	1

Lab Sample ID: LCS 400-443149/2-A

Matrix: Water

Analysis Batch: 443830

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 443149

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Chloro-3-methylphenol	120	108		ug/L		90	48 - 131

Eurofins TestAmerica, Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 400-443149/2-A

Matrix: Water

Analysis Batch: 443830

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 443149

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chlorophenol	120	61.4		ug/L		51	40 - 120
2,4-Dichlorophenol	120	96.0		ug/L		80	49 - 120
2,4-Dimethylphenol	120	105		ug/L		88	48 - 120
4,6-Dinitro-2-methylphenol	240	193		ug/L		80	23 - 148
2,4-Dinitrophenol	240	153		ug/L		64	10 - 150
2-Methylphenol	120	93.7		ug/L		78	46 - 124
3 & 4 Methylphenol	120	89.8		ug/L		75	45 - 120
2-Nitrophenol	120	89.2		ug/L		74	40 - 124
4-Nitrophenol	240	231		ug/L		96	23 - 146
Pentachlorophenol	240	183		ug/L		76	31 - 130
Phenol	120	75.6		ug/L		63	40 - 120
2,4,5-Trichlorophenol	120	114		ug/L		95	51 - 136
2,4,6-Trichlorophenol	120	117		ug/L		98	50 - 127
Acenaphthene	120	86.3		ug/L		72	54 - 125
Acenaphthylene	120	91.4		ug/L		76	44 - 130
Anthracene	120	89.1		ug/L		74	61 - 120
Benzo[a]anthracene	120	84.5		ug/L		70	59 - 120
Benzo[a]pyrene	120	65.7		ug/L		55	52 - 126
Benzo[b]fluoranthene	120	68.6		ug/L		57	33 - 149
Benzo[k]fluoranthene	120	66.2		ug/L		55	51 - 130
4-Bromophenyl phenyl ether	120	74.1		ug/L		62	54 - 122
Butyl benzyl phthalate	120	79.9		ug/L		67	54 - 133
Carbazole	120	133		ug/L		110	54 - 142
4-Chloroaniline	120	79.3		ug/L		66	26 - 120
Bis(2-chloroethoxy)methane	120	99.6		ug/L		83	47 - 120
Bis(2-chloroethyl)ether	120	169	*	ug/L		141	44 - 120
2-Chloronaphthalene	120	80.5		ug/L		67	52 - 121
4-Chlorophenyl phenyl ether	120	79.6		ug/L		66	56 - 125
Chrysene	120	83.3		ug/L		69	61 - 121
Dibenz(a,h)anthracene	120	70.3		ug/L		59	40 - 150
Dibenzofuran	120	85.6		ug/L		71	56 - 122
Di-n-butyl phthalate	120	79.8		ug/L		66	58 - 126
Di-n-octyl phthalate	120	94.4		ug/L		79	57 - 138
Diethyl phthalate	120	115		ug/L		95	50 - 137
Dimethyl phthalate	120	109		ug/L		91	57 - 124
2,4-Dinitrotoluene	120	127		ug/L		105	54 - 142
2,6-Dinitrotoluene	120	115		ug/L		96	55 - 130
Bis(2-ethylhexyl) phthalate	120	86.0		ug/L		72	52 - 147
Fluoranthene	120	77.3		ug/L		64	56 - 128
Fluorene	120	82.2		ug/L		68	54 - 124
Hexachlorobenzene	120	68.1		ug/L		57	52 - 129
Hexachlorobutadiene	120	50.0	*	ug/L		42	45 - 120
Hexachlorocyclopentadiene	120	10.6	J *	ug/L		9	10 - 134
Hexachloroethane	120	51.2		ug/L		43	41 - 120
Indeno[1,2,3-cd]pyrene	120	70.9		ug/L		59	41 - 150
Isophorone	120	95.5		ug/L		80	48 - 120
Naphthalene	120	85.6		ug/L		71	48 - 120
2-Methylnaphthalene	120	79.5		ug/L		66	50 - 121
3-Nitroaniline	120	98.0		ug/L		82	37 - 127

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 400-443149/2-A

Matrix: Water

Analysis Batch: 443830

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 443149

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4-Nitroaniline	120	103		ug/L		86	36 - 137
Nitrobenzene	120	91.5		ug/L		76	45 - 120
N-Nitrosodiphenylamine	119	86.0		ug/L		72	54 - 120
N-Nitrosodi-n-propylamine	120	94.0		ug/L		78	45 - 120
Phenanthrene	120	88.9		ug/L		74	61 - 120
Pyrene	120	62.0	*	ug/L		52	53 - 128
2,2'-oxybis(1-chloropropane)	120	73.2		ug/L		61	33 - 121
2-Nitroaniline	120	120		ug/L		100	51 - 145
Benzo[g,h,i]perylene	120	67.0		ug/L		56	38 - 150

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4,6-Tribromophenol (Surr)	103		26 - 150
2-Fluorobiphenyl	89		46 - 124
2-Fluorophenol (Surr)	23		13 - 113
Nitrobenzene-d5 (Surr)	80		36 - 126
Phenol-d5 (Surr)	64		17 - 127
Terphenyl-d14 (Surr)	90		44 - 149

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level

Lab Sample ID: MB 400-442208/1-A

Matrix: Water

Analysis Batch: 442564

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 442208

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Acenaphthylene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Anthracene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Benzo[a]pyrene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Benzo[b]fluoranthene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Benzo[g,h,i]perylene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Benzo[k]fluoranthene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Chrysene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Dibenz[a,h]anthracene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Fluoranthene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Fluorene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Indeno[1,2,3-cd]pyrene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
1-Methylnaphthalene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
2-Methylnaphthalene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Naphthalene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Phenanthrene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Pyrene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1
Benzo[a]anthracene	<0.20		0.20		ug/L		05/25/19 09:39	05/29/19 19:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	85		15 - 122	05/25/19 09:39	05/29/19 19:07	1
Nitrobenzene-d5 (Surr)	76		19 - 130	05/25/19 09:39	05/29/19 19:07	1
Terphenyl-d14 (Surr)	98		33 - 138	05/25/19 09:39	05/29/19 19:07	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level (Continued)

Lab Sample ID: LCS 400-442208/2-A

Matrix: Water

Analysis Batch: 442564

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 442208

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	120	101		ug/L		84	41 - 120
Acenaphthylene	120	108		ug/L		90	44 - 120
Anthracene	120	65.9		ug/L		55	49 - 120
Benzo[a]pyrene	120	29.0	*	ug/L		24	52 - 120
Benzo[b]fluoranthene	120	27.1	*	ug/L		23	53 - 134
Benzo[g,h,i]perylene	120	30.6	*	ug/L		26	47 - 133
Benzo[k]fluoranthene	120	25.0	*	ug/L		21	57 - 134
Chrysene	120	27.2	*	ug/L		23	55 - 122
Dibenz(a,h)anthracene	120	30.2	*	ug/L		25	48 - 146
Fluoranthene	120	54.9	*	ug/L		46	54 - 128
Fluorene	120	105		ug/L		87	45 - 125
Indeno[1,2,3-cd]pyrene	120	29.6	*	ug/L		25	43 - 142
1-Methylnaphthalene	120	111		ug/L		92	41 - 120
2-Methylnaphthalene	120	112		ug/L		93	32 - 124
Naphthalene	120	95.5		ug/L		80	39 - 125
Phenanthrene	120	84.9		ug/L		71	48 - 120
Pyrene	120	52.3	*	ug/L		44	48 - 132
Benzo[a]anthracene	120	30.8	*	ug/L		26	61 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	79		15 - 122
Nitrobenzene-d5 (Surr)	78		19 - 130
Terphenyl-d14 (Surr)	88		33 - 138

Lab Sample ID: MB 400-443149/1-A

Matrix: Water

Analysis Batch: 443423

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 443149

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Acenaphthylene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Anthracene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Benzo[a]pyrene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Benzo[b]fluoranthene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Benzo[g,h,i]perylene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Benzo[k]fluoranthene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Chrysene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Dibenz(a,h)anthracene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Fluoranthene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Fluorene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Indeno[1,2,3-cd]pyrene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
1-Methylnaphthalene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
2-Methylnaphthalene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Naphthalene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Phenanthrene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Pyrene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1
Benzo[a]anthracene	<0.20		0.20		ug/L		06/04/19 10:28	06/06/19 12:00	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8270D LL - Semivolatile Organic Compounds by GC/MS - Low Level (Continued)

Lab Sample ID: MB 400-443149/1-A

Matrix: Water

Analysis Batch: 443423

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 443149

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	50		15 - 122	06/04/19 10:28	06/06/19 12:00	1
Nitrobenzene-d5 (Surr)	57		19 - 130	06/04/19 10:28	06/06/19 12:00	1
Terphenyl-d14 (Surr)	80		33 - 138	06/04/19 10:28	06/06/19 12:00	1

Lab Sample ID: LCS 400-443149/2-A

Matrix: Water

Analysis Batch: 443423

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 443149

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	120	79.3		ug/L		66	41 - 120
Acenaphthylene	120	89.2		ug/L		74	44 - 120
Anthracene	120	82.4		ug/L		69	49 - 120
Benzo[a]pyrene	120	73.0		ug/L		61	52 - 120
Benzo[b]fluoranthene	120	67.9		ug/L		57	53 - 134
Benzo[g,h,i]perylene	120	56.1		ug/L		47	47 - 133
Benzo[k]fluoranthene	120	78.7		ug/L		66	57 - 134
Chrysene	120	73.7		ug/L		61	55 - 122
Dibenz(a,h)anthracene	120	60.6		ug/L		51	48 - 146
Fluoranthene	120	77.2		ug/L		64	54 - 128
Fluorene	120	82.7		ug/L		69	45 - 125
Indeno[1,2,3-cd]pyrene	120	59.2		ug/L		49	43 - 142
1-Methylnaphthalene	120	82.8		ug/L		69	41 - 120
2-Methylnaphthalene	120	81.7		ug/L		68	32 - 124
Naphthalene	120	83.6		ug/L		70	39 - 125
Phenanthrene	120	76.7		ug/L		64	48 - 120
Pyrene	120	77.2		ug/L		64	48 - 132
Benzo[a]anthracene	120	73.4		ug/L		61	61 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl	78		15 - 122
Nitrobenzene-d5 (Surr)	94		19 - 130
Terphenyl-d14 (Surr)	98		33 - 138

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 400-446131/1-A

Matrix: Water

Analysis Batch: 446231

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 446131

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1221	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1232	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1242	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1248	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1254	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1
PCB-1260	<0.50		0.50		ug/L		06/28/19 15:43	06/29/19 12:29	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8082A - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: MB 400-446131/1-A

Matrix: Water

Analysis Batch: 446231

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 446131

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	80		10 - 125	06/28/19 15:43	06/29/19 12:29	1
Tetrachloro-m-xylene	85		46 - 150	06/28/19 15:43	06/29/19 12:29	1

Lab Sample ID: LCS 400-446131/2-A

Matrix: Water

Analysis Batch: 446231

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 446131

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	20.2	18.6		ug/L		92	54 - 126
PCB-1260	20.1	17.7		ug/L		88	56 - 139

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	51		10 - 125
Tetrachloro-m-xylene	82		46 - 150

Lab Sample ID: LCSD 400-446131/3-A

Matrix: Water

Analysis Batch: 446231

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 446131

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016	20.2	21.1		ug/L		105	54 - 126	13	40
PCB-1260	20.1	21.1		ug/L		105	56 - 139	17	40

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl	78		10 - 125
Tetrachloro-m-xylene	96		46 - 150

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Lab Sample ID: MB 400-442665/6

Matrix: Water

Analysis Batch: 442665

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	<0.0010		0.0010		mg/L			05/29/19 21:16	1

Lab Sample ID: LCS 400-442665/7

Matrix: Water

Analysis Batch: 442665

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.0100	0.0109		mg/L		109	85 - 115

Lab Sample ID: LCSD 400-442665/8

Matrix: Water

Analysis Batch: 442665

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	0.0100	0.0113		mg/L		113	85 - 115	3	15

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 218.7 - Chromium, Hexavalent (Ion Chromatography)

Lab Sample ID: MRL 400-442665/24

Matrix: Water

Analysis Batch: 442665

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.00100	0.00103		mg/L		103	50 - 150

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 400-441779/4

Matrix: Water

Analysis Batch: 441779

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.0		1.0		mg/L			05/22/19 12:02	1
Fluoride	<0.20		0.20		mg/L			05/22/19 12:02	1
Sulfate	<1.0		1.0		mg/L			05/22/19 12:02	1

Lab Sample ID: LCS 400-441779/5

Matrix: Water

Analysis Batch: 441779

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.92		mg/L		99	90 - 110
Fluoride	10.0	10.6		mg/L		106	90 - 110
Sulfate	10.0	10.5		mg/L		105	90 - 110

Lab Sample ID: LCSD 400-441779/6

Matrix: Water

Analysis Batch: 441779

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.95		mg/L		99	90 - 110	0	15
Fluoride	10.0	10.5		mg/L		105	90 - 110	0	15
Sulfate	10.0	10.7		mg/L		107	90 - 110	2	15

Lab Sample ID: MB 400-442370/4

Matrix: Water

Analysis Batch: 442370

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.0		1.0		mg/L			05/28/19 12:04	1
Fluoride	<0.20		0.20		mg/L			05/28/19 12:04	1
Sulfate	<1.0		1.0		mg/L			05/28/19 12:04	1

Lab Sample ID: LCS 400-442370/5

Matrix: Water

Analysis Batch: 442370

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.87		mg/L		99	90 - 110
Fluoride	10.0	10.6		mg/L		106	90 - 110
Sulfate	10.0	10.7		mg/L		107	90 - 110

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 400-442370/6

Matrix: Water

Analysis Batch: 442370

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	10.0		mg/L		100	90 - 110	2	15
Fluoride	10.0	10.7		mg/L		107	90 - 110	1	15
Sulfate	10.0	10.8		mg/L		108	90 - 110	1	15

## Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 400-442369/4

Matrix: Water

Analysis Batch: 442369

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfur	<1.0		1.0		mg/L			05/28/19 12:04	1

Lab Sample ID: LCS 400-442369/5

Matrix: Water

Analysis Batch: 442369

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Sulfur	3.33	3.56		mg/L		107	90 - 110		

Lab Sample ID: LCSD 400-442369/6

Matrix: Water

Analysis Batch: 442369

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Sulfur	3.33	3.58		mg/L		108	90 - 110	1	15

## Method: 8290A - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 140-30703/18-A

Matrix: Water

Analysis Batch: 30973

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 30703

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	<10		10		pg/L		06/11/19 07:58	06/20/19 13:18	1
2,3,7,8-TCDF	<10		10		pg/L		06/11/19 07:58	06/20/19 13:18	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C-2,3,7,8-TCDD	73		40 - 135				06/11/19 07:58	06/20/19 13:18	1
13C-2,3,7,8-TCDF	72		40 - 135				06/11/19 07:58	06/20/19 13:18	1

Lab Sample ID: LCS 140-30703/19-A

Matrix: Water

Analysis Batch: 30973

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 30703

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
2,3,7,8-TCDD	200	216		pg/L		108	77 - 127		
2,3,7,8-TCDF	200	220		pg/L		110	74 - 124		

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 8290A - Dioxins and Furans (HRGC/HRMS) (Continued)

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
13C-2,3,7,8-TCDD	56		40 - 135
13C-2,3,7,8-TCDF	60		40 - 135

## Method: 6010C - Metals (ICP)

Lab Sample ID: MB 400-441742/1-A

Matrix: Water

Analysis Batch: 442295

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 441742

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Aluminum	<0.10	^	0.10		mg/L		05/22/19 10:21	05/24/19 13:08	1
Arsenic	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Barium	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Beryllium	<0.0030		0.0030		mg/L		05/22/19 10:21	05/24/19 13:08	1
Boron	<0.10		0.10		mg/L		05/22/19 10:21	05/24/19 13:08	1
Cadmium	<0.0050		0.0050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Calcium	<0.50	^	0.50		mg/L		05/22/19 10:21	05/24/19 13:08	1
Chromium	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Cobalt	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Copper	<0.020		0.020		mg/L		05/22/19 10:21	05/24/19 13:08	1
Iron	<0.10		0.10		mg/L		05/22/19 10:21	05/24/19 13:08	1
Lithium	<0.050		0.050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Magnesium	<0.50		0.50		mg/L		05/22/19 10:21	05/24/19 13:08	1
Manganese	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Molybdenum	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Nickel	<0.0050		0.0050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Potassium	<1.0		1.0		mg/L		05/22/19 10:21	05/24/19 13:08	1
Lead	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Antimony	<0.050		0.050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Silver	<0.0050		0.0050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Selenium	<0.020		0.020		mg/L		05/22/19 10:21	05/24/19 13:08	1
Sodium	<1.0		1.0		mg/L		05/22/19 10:21	05/24/19 13:08	1
Strontium	<0.0050		0.0050		mg/L		05/22/19 10:21	05/24/19 13:08	1
Thallium	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1
Vanadium	<0.020		0.020		mg/L		05/22/19 10:21	05/24/19 13:08	1
Zinc	<0.020		0.020		mg/L		05/22/19 10:21	05/24/19 13:08	1
Tin	<0.010		0.010		mg/L		05/22/19 10:21	05/24/19 13:08	1

Lab Sample ID: LCS 400-441742/2-A

Matrix: Water

Analysis Batch: 442295

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 441742

Analyte	Spike Added	LCS		Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Aluminum	10.0	11.0	^	mg/L		110	80 - 120
Arsenic	1.00	1.04		mg/L		104	80 - 120
Barium	1.00	1.09		mg/L		109	80 - 120
Beryllium	0.500	0.541		mg/L		108	80 - 120
Boron	1.00	1.03		mg/L		103	80 - 120
Cadmium	0.500	0.528		mg/L		106	80 - 120
Calcium	10.0	10.9	^	mg/L		109	80 - 120
Chromium	1.00	1.09		mg/L		109	80 - 120
Cobalt	1.00	1.08		mg/L		108	80 - 120

Eurofins TestAmerica, Pensacola



# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 400-441742/2-A

Matrix: Water

Analysis Batch: 442295

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 441742

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Copper	1.00	1.09		mg/L		109	80 - 120
Iron	10.0	10.8		mg/L		108	80 - 120
Lithium	1.00	1.10		mg/L		110	80 - 120
Magnesium	10.0	11.1		mg/L		111	80 - 120
Manganese	1.00	1.08		mg/L		108	80 - 120
Molybdenum	1.00	1.08		mg/L		108	80 - 120
Nickel	1.00	1.07		mg/L		107	80 - 120
Potassium	10.0	10.8		mg/L		108	80 - 120
Lead	1.00	1.07		mg/L		107	80 - 120
Antimony	1.00	0.966		mg/L		97	80 - 120
Silver	0.500	0.525		mg/L		105	80 - 120
Selenium	1.00	0.975		mg/L		97	80 - 120
Sodium	10.0	11.2		mg/L		111	80 - 120
Strontium	1.00	1.08		mg/L		108	80 - 120
Thallium	1.00	1.08		mg/L		108	80 - 120
Vanadium	1.00	1.10		mg/L		110	80 - 120
Zinc	1.00	1.07		mg/L		107	80 - 120
Tin	1.00	1.08		mg/L		108	80 - 120

Lab Sample ID: MB 400-443164/1-B

Matrix: Water

Analysis Batch: 443253

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 443171

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 21:22	1
Barium	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 21:22	1
Beryllium	<0.0030		0.0030		mg/L		06/04/19 12:45	06/04/19 21:22	1
Boron	<0.10		0.10		mg/L		06/04/19 12:45	06/04/19 21:22	1
Cadmium	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 21:22	1
Calcium	<0.50		0.50		mg/L		06/04/19 12:45	06/04/19 21:22	1
Chromium	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 21:22	1
Copper	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 21:22	1
Iron	<0.10		0.10		mg/L		06/04/19 12:45	06/04/19 21:22	1
Lithium	<0.050		0.050		mg/L		06/04/19 12:45	06/04/19 21:22	1
Magnesium	<0.50		0.50		mg/L		06/04/19 12:45	06/04/19 21:22	1
Manganese	<0.010		0.010		mg/L		06/04/19 12:45	06/04/19 21:22	1
Potassium	<1.0		1.0		mg/L		06/04/19 12:45	06/04/19 21:22	1
Silver	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 21:22	1
Selenium	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 21:22	1
Sodium	<1.0		1.0		mg/L		06/04/19 12:45	06/04/19 21:22	1
Strontium	<0.0050		0.0050		mg/L		06/04/19 12:45	06/04/19 21:22	1
Vanadium	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 21:22	1
Zinc	<0.020		0.020		mg/L		06/04/19 12:45	06/04/19 21:22	1

Eurofins TestAmerica, Pensacola

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 400-443164/2-B

Matrix: Water

Analysis Batch: 443253

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 443171

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	0.990		mg/L		99	80 - 120
Barium	1.00	0.998		mg/L		100	80 - 120
Beryllium	0.500	0.491		mg/L		98	80 - 120
Boron	1.00	0.978		mg/L		98	80 - 120
Cadmium	0.500	0.499		mg/L		100	80 - 120
Calcium	10.0	9.71		mg/L		97	80 - 120
Chromium	1.00	0.983		mg/L		98	80 - 120
Copper	1.00	0.985		mg/L		99	80 - 120
Iron	10.0	9.59		mg/L		96	80 - 120
Lithium	1.00	0.973		mg/L		97	80 - 120
Magnesium	10.0	9.63		mg/L		96	80 - 120
Manganese	1.00	0.975		mg/L		98	80 - 120
Potassium	10.0	9.95		mg/L		99	80 - 120
Silver	0.500	0.485		mg/L		97	80 - 120
Selenium	1.00	0.960		mg/L		96	80 - 120
Sodium	10.0	10.1		mg/L		101	80 - 120
Strontium	1.00	0.993		mg/L		99	80 - 120
Vanadium	1.00	0.970		mg/L		97	80 - 120
Zinc	1.00	1.01		mg/L		101	80 - 120

## Method: 6010C - Metals (ICP) - RA

Lab Sample ID: MB 400-443164/1-B

Matrix: Water

Analysis Batch: 443584

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 443171

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum - RA	<0.10	^	0.10		mg/L		06/04/19 12:45	06/05/19 15:57	1
Arsenic - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Barium - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Beryllium - RA	<0.0030		0.0030		mg/L		06/04/19 12:45	06/05/19 15:57	1
Boron - RA	<0.10		0.10		mg/L		06/04/19 12:45	06/05/19 15:57	1
Cadmium - RA	<0.0050		0.0050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Calcium - RA	<0.50		0.50		mg/L		06/04/19 12:45	06/05/19 15:57	1
Chromium - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Cobalt - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Copper - RA	<0.020		0.020		mg/L		06/04/19 12:45	06/05/19 15:57	1
Iron - RA	<0.10		0.10		mg/L		06/04/19 12:45	06/05/19 15:57	1
Lithium - RA	<0.050		0.050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Magnesium - RA	<0.50		0.50		mg/L		06/04/19 12:45	06/05/19 15:57	1
Manganese - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Molybdenum - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Nickel - RA	<0.0050		0.0050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Potassium - RA	<1.0		1.0		mg/L		06/04/19 12:45	06/05/19 15:57	1
Lead - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1
Antimony - RA	<0.050		0.050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Silver - RA	<0.0050		0.0050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Selenium - RA	<0.020		0.020		mg/L		06/04/19 12:45	06/05/19 15:57	1
Sodium - RA	<1.0		1.0		mg/L		06/04/19 12:45	06/05/19 15:57	1

Eurofins TestAmerica, Pensacola

## QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

### Method: 6010C - Metals (ICP) - RA (Continued)

Lab Sample ID: MB 400-443164/1-B

Matrix: Water

Analysis Batch: 443584

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 443171

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Strontium - RA	<0.0050		0.0050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Zinc - RA	<0.020		0.020		mg/L		06/04/19 12:45	06/05/19 15:57	1
Silicon - RA	<0.050	^	0.050		mg/L		06/04/19 12:45	06/05/19 15:57	1
Tin - RA	<0.010		0.010		mg/L		06/04/19 12:45	06/05/19 15:57	1

Lab Sample ID: LCS 400-443164/2-B

Matrix: Water

Analysis Batch: 443584

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 443171

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum - RA	10.0	10.8	^	mg/L		108	80 - 120
Arsenic - RA	1.00	1.06		mg/L		106	80 - 120
Barium - RA	1.00	1.07		mg/L		107	80 - 120
Beryllium - RA	0.500	0.528		mg/L		106	80 - 120
Boron - RA	1.00	1.06		mg/L		106	80 - 120
Cadmium - RA	0.500	0.530		mg/L		106	80 - 120
Calcium - RA	10.0	10.5		mg/L		105	80 - 120
Chromium - RA	1.00	1.06		mg/L		106	80 - 120
Cobalt - RA	1.00	1.03		mg/L		103	80 - 120
Copper - RA	1.00	1.06		mg/L		106	80 - 120
Iron - RA	10.0	10.5		mg/L		105	80 - 120
Lithium - RA	1.00	1.05		mg/L		105	80 - 120
Magnesium - RA	10.0	10.5		mg/L		105	80 - 120
Manganese - RA	1.00	1.05		mg/L		105	80 - 120
Molybdenum - RA	1.00	1.04		mg/L		104	80 - 120
Nickel - RA	1.00	1.03		mg/L		103	80 - 120
Potassium - RA	10.0	10.6		mg/L		106	80 - 120
Lead - RA	1.00	1.02		mg/L		102	80 - 120
Antimony - RA	1.00	0.996		mg/L		100	80 - 120
Silver - RA	0.500	0.521		mg/L		104	80 - 120
Selenium - RA	1.00	1.04		mg/L		104	80 - 120
Sodium - RA	10.0	10.8		mg/L		107	80 - 120
Strontium - RA	1.00	1.06		mg/L		106	80 - 120
Zinc - RA	1.00	1.07		mg/L		107	80 - 120
Tin - RA	1.00	1.00		mg/L		100	80 - 120

### Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-444017/14-A

Matrix: Water

Analysis Batch: 444198

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 444017

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/11/19 12:08	06/12/19 11:55	1

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 400-444017/15-A  
Matrix: Water  
Analysis Batch: 444198

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 444017

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00106		mg/L		105	80 - 120

Lab Sample ID: MB 400-443164/1-C  
Matrix: Water  
Analysis Batch: 443529

Client Sample ID: Method Blank  
Prep Type: Dissolved  
Prep Batch: 443194

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		06/04/19 14:39	06/06/19 12:55	1

Lab Sample ID: LCS 400-443164/2-C  
Matrix: Water  
Analysis Batch: 443529

Client Sample ID: Lab Control Sample  
Prep Type: Dissolved  
Prep Batch: 443194

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000906		mg/L		90	80 - 120

## Method: 335.2 - Cyanide, Total

Lab Sample ID: MB 400-442484/1-A  
Matrix: Water  
Analysis Batch: 442539

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 442484

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.0050		0.0050		mg/L		05/29/19 10:05	05/29/19 15:05	1

Lab Sample ID: LCS 400-442484/3-A  
Matrix: Water  
Analysis Batch: 442539

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 442484

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.399	0.385		mg/L		97	75 - 125

## Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 400-441973/7  
Matrix: Water  
Analysis Batch: 441973

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	<0.050		0.050		mg/L			05/23/19 13:37	1

Lab Sample ID: LCS 400-441973/8  
Matrix: Water  
Analysis Batch: 441973

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	1.99		mg/L		100	90 - 110

## QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

### Method: 350.1 - Nitrogen, Ammonia (Continued)

Lab Sample ID: MRL 400-441973/5

Matrix: Water

Analysis Batch: 441973

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	0.0500	0.0630		mg/L		126	50 - 150

### Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 400-441704/1-A

Matrix: Water

Analysis Batch: 441975

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 441704

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	<0.50		0.50		mg/L		05/21/19 20:17	05/23/19 13:38	1

Lab Sample ID: LCS 400-441704/2-A

Matrix: Water

Analysis Batch: 441975

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 441704

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	10.0	10.4		mg/L		104	90 - 110

Lab Sample ID: MRL 400-441975/12

Matrix: Water

Analysis Batch: 441975

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	0.500	<0.50		mg/L		64	50 - 150

### Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 400-442330/15

Matrix: Water

Analysis Batch: 442330

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.050		0.050		mg/L			05/28/19 10:35	1

Lab Sample ID: LCS 400-442330/16

Matrix: Water

Analysis Batch: 442330

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.500	0.502		mg/L		100	90 - 110

Lab Sample ID: MRL 400-442330/13

Matrix: Water

Analysis Batch: 442330

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	0.0500	<0.050		mg/L		72	50 - 150

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 400-441705/1-A  
Matrix: Water  
Analysis Batch: 441828

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 441705

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<0.10		0.10		mg/L		05/21/19 20:17	05/22/19 14:02	1

Lab Sample ID: LCS 400-441705/2-A  
Matrix: Water  
Analysis Batch: 441828

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 441705

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	2.00	2.04		mg/L		102	75 - 113

Lab Sample ID: MRL 400-441828/13  
Matrix: Water  
Analysis Batch: 441828

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.100	<0.10		mg/L		66	50 - 150

## Method: SM 2310B - Acidity

Lab Sample ID: MB 400-444374/1  
Matrix: Water  
Analysis Batch: 444374

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acidity as CaCO3	<10		10		mg/L			05/23/19 11:26	1

Lab Sample ID: LCS 400-444374/2  
Matrix: Water  
Analysis Batch: 444374

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acidity as CaCO3	1020	952		mg/L		93	80 - 120

Lab Sample ID: 400-170481-1 DU  
Matrix: Water  
Analysis Batch: 444374

Client Sample ID: 1  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Acidity as CaCO3	<10		<10		mg/L		NC	

## Method: SM 2320B - Alkalinity

Lab Sample ID: MB 400-441987/4  
Matrix: Water  
Analysis Batch: 441987

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	<1.0		1.0		mg/L			05/23/19 13:05	1

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 400-441987/5

Matrix: Water

Analysis Batch: 441987

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	100	110		mg/L		110	80 - 120

## Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 400-441873/1

Matrix: Water

Analysis Batch: 441873

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	<5.0		5.0		umhos/cm			05/22/19 12:30	1

Lab Sample ID: LCS 400-441873/2

Matrix: Water

Analysis Batch: 441873

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	10.0	10.1		umhos/cm		101	98 - 102

Lab Sample ID: 400-170481-1 DU

Matrix: Water

Analysis Batch: 441873

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	490		487		umhos/cm		0.2	2

## Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 400-441979/1

Matrix: Water

Analysis Batch: 441979

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<5.0		5.0		mg/L			05/23/19 15:36	1

Lab Sample ID: LCS 400-441979/2

Matrix: Water

Analysis Batch: 441979

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	293	286		mg/L		98	78 - 122

Lab Sample ID: 400-170481-1 DU

Matrix: Water

Analysis Batch: 441979

Client Sample ID: 1

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	320		330		mg/L		3	5

# QC Sample Results

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

## Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 400-441728/1

Matrix: Water

Analysis Batch: 441728

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<5.0		5.0		mg/L			05/22/19 09:09	1

Lab Sample ID: LCS 400-441728/2

Matrix: Water

Analysis Batch: 441728

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	265	229		mg/L		86	82 - 118

## Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 400-444116/4

Matrix: Water

Analysis Batch: 444116

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<1.0		1.0		mg/L			06/10/19 21:52	1

Lab Sample ID: LCS 400-444116/17

Matrix: Water

Analysis Batch: 444116

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	10.0	8.95		mg/L		90	80 - 120

Lab Sample ID: MRL 400-444116/16

Matrix: Water

Analysis Batch: 444116

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	1.00	<1.0		mg/L		96	50 - 150



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

Client Sample ID: 1

Lab Sample ID: 400-170481-1

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	442886	06/01/19 09:36	WPD	TAL PEN
Total/NA	Prep	3520C	RE		232.4 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D	RE	1			443436	06/06/19 16:58	VC1	TAL PEN
Total/NA	Prep	3520C			218.2 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D		1			442495	05/29/19 21:11	S1B	TAL PEN
Total/NA	Prep	3520C			218.2 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D LL		1			442564	05/29/19 20:43	VC1	TAL PEN
Total/NA	Prep	3520C	RE		232.4 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D LL	RE	1			443423	06/06/19 14:29	VC1	TAL PEN
Total/NA	Prep	3520C			243.4 mL	5 mL	446131	06/28/19 15:43	CGM	TAL PEN
Total/NA	Analysis	8082A		1			446231	06/29/19 19:06	DS	TAL PEN
Total/NA	Analysis	218.7		1			442665	05/29/19 22:49	BAW	TAL PEN
Total/NA	Analysis	300.0		1			441779	05/22/19 19:16	BAW	TAL PEN
Total/NA	Analysis	300.0	DL	10	10 mL	1.0 mL	442370	05/29/19 02:25	BAW	TAL PEN
Total/NA	Analysis	9056		10	10 mL	1.0 mL	442369	05/29/19 02:25	BAW	TAL PEN
Total/NA	Prep	8290			1053.3 mL	20 uL	30703	06/11/19 07:58	BRS	TAL KNX
Total/NA	Analysis	8290A		1			31030	06/21/19 15:53	MSD	TAL KNX
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:42	KWN	TAL PEN
Dissolved	Prep	3005A			50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C		1			443253	06/04/19 22:47	GESP	TAL PEN
Dissolved	Filtration	FILTRATION	RA		1.0 mL	1.0 mL	443164	06/04/19 11:42	KWN	TAL PEN
Dissolved	Prep	3005A	RA		50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C	RA	1			443584	06/05/19 16:18	GESP	TAL PEN
Total/NA	Analysis	6010C		1			442295	05/24/19 14:04	GESP	TAL PEN
Total/NA	Analysis	6010C		1			442601	05/29/19 15:28	GESP	TAL PEN
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:42	KWN	TAL PEN
Dissolved	Prep	7470A			40 mL	40 mL	443194	06/04/19 14:39	JAP	TAL PEN
Dissolved	Analysis	7470A		1			443529	06/06/19 13:16	JAP	TAL PEN
Total/NA	Prep	7470A			40 mL	40 mL	444017	06/11/19 12:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1			444198	06/12/19 12:57	JAP	TAL PEN
Total/NA	Analysis	SM 2340B		1			442295	05/24/19 14:04	GESP	TAL PEN
Total/NA	Prep	Distill/CN			50 mL	50 mL	442484	05/29/19 10:05	BAB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	442539	05/29/19 15:11	BAB	TAL PEN
Total/NA	Analysis	350.1		1	10 mL	10 mL	441973	05/23/19 14:08	KJR	TAL PEN
Total/NA	Prep	351.2			25 mL	25 mL	441704	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	351.2		1			441975	05/23/19 14:07	JAT	TAL PEN
Total/NA	Analysis	353.2		1	10 mL	10 mL	442330	05/28/19 10:47	KJR	TAL PEN
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	441705	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	441828	05/22/19 14:31	JAT	TAL PEN
Total/NA	Analysis	SM 2310B		1			444374	05/23/19 11:12	BAB	TAL PEN
Total/NA	Analysis	SM 2320B		1			441987	05/23/19 15:34	BAB	TAL PEN
Total/NA	Analysis	SM 2510B		1			441873	05/22/19 12:30	DEK	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	441979	05/23/19 15:36	CLB	TAL PEN

Eurofins TestAmerica, Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: 1**

**Lab Sample ID: 400-170481-1**

**Date Collected: 05/20/19 13:45**

**Matrix: Water**

**Date Received: 05/21/19 08:51**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	441728	05/22/19 09:09	CLB	TAL PEN
Total/NA	Analysis	SM 5310B		1			444116	06/10/19 21:52	RRC	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-30703/18-A**

**Date Collected: N/A**

**Matrix: Water**

**Date Received: N/A**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			1000 mL	20 uL	30703	06/11/19 07:58	BRS	TAL KNX
Total/NA	Analysis	8290A		1			30973	06/20/19 13:18	MSD	TAL KNX

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441704/1-A**

**Date Collected: N/A**

**Matrix: Water**

**Date Received: N/A**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			25 mL	25 mL	441704	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	351.2		1			441975	05/23/19 13:38	JAT	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441705/1-A**

**Date Collected: N/A**

**Matrix: Water**

**Date Received: N/A**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	441705	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	441828	05/22/19 14:02	JAT	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441728/1**

**Date Collected: N/A**

**Matrix: Water**

**Date Received: N/A**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	441728	05/22/19 09:09	CLB	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441742/1-A**

**Date Collected: N/A**

**Matrix: Water**

**Date Received: N/A**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	441742	05/22/19 10:21	KWN	TAL PEN
Total/NA	Analysis	6010C		1			442295	05/24/19 13:08	GESP	TAL PEN

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441779/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			441779	05/22/19 12:02	BAW	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441873/1**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2510B		1			441873	05/22/19 12:30	DEK	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441973/7**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	441973	05/23/19 13:37	KJR	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441979/1**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	441979	05/23/19 15:36	CLB	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-441987/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			441987	05/23/19 13:05	BAB	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442208/1-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D		1			442495	05/29/19 19:05	S1B	TAL PEN
Total/NA	Prep	3520C			250 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D LL		1			442564	05/29/19 19:07	VC1	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442330/15**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	442330	05/28/19 10:35	KJR	TAL PEN

Eurofins TestAmerica, Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442369/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			442369	05/28/19 12:04	BAW	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442370/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			442370	05/28/19 12:04	BAW	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442484/1-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	442484	05/29/19 10:05	BAB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	442539	05/29/19 15:05	BAB	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442665/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			442665	05/29/19 21:16	BAW	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-442886/4**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	442886	06/01/19 08:46	WPD	TAL PEN

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 400-443149/1-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D		1			443436	06/06/19 14:29	VC1	TAL PEN
Total/NA	Prep	3520C			250 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D LL		1			443423	06/06/19 12:00	VC1	TAL PEN

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-443164/1-B**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	3005A			50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C		1			443253	06/04/19 21:22	GESP	TAL PEN
Dissolved	Filtration	FILTRATION	RA		1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	3005A	RA		50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C	RA	1			443584	06/05/19 15:57	GESP	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-443164/1-C**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	7470A			40 mL	40 mL	443194	06/04/19 14:39	JAP	TAL PEN
Dissolved	Analysis	7470A		1			443529	06/06/19 12:55	JAP	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-444017/14-A**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			40 mL	40 mL	444017	06/11/19 12:08	JAP	TAL PEN
Total/NA	Analysis	7470A		1			444198	06/12/19 11:55	JAP	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-444116/4**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 5310B		1			444116	06/10/19 21:52	RRC	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-444374/1**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			444374	05/23/19 11:26	BAB	TAL PEN

**Client Sample ID: Method Blank**

Date Collected: N/A

Date Received: N/A

**Lab Sample ID: MB 400-446131/1-A**

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	5 mL	446131	06/28/19 15:43	CGM	TAL PEN
Total/NA	Analysis	8082A		1			446231	06/29/19 12:29	DS	TAL PEN

Eurofins TestAmerica, Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-30703/19-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			1000 mL	20 uL	30703	06/11/19 07:58	BRS	TAL KNX
Total/NA	Analysis	8290A		1			30973	06/20/19 11:19	MSD	TAL KNX

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441704/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	351.2			25 mL	25 mL	441704	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	351.2		1			441975	05/23/19 14:58	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441705/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	441705	05/21/19 20:17	JAT	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	441828	05/22/19 14:05	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441728/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540D		1	100 mL	100 mL	441728	05/22/19 09:09	CLB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441742/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.7			50 mL	50 mL	441742	05/22/19 10:21	KWN	TAL PEN
Total/NA	Analysis	6010C		1			442295	05/24/19 13:12	GESP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441779/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			441779	05/22/19 12:25	BAW	TAL PEN

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441873/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2510B		1			441873	05/22/19 12:30	DEK	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441973/8**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	441973	05/23/19 13:38	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441979/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	441979	05/23/19 15:36	CLB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-441987/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			441987	05/23/19 13:13	BAB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442208/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D		1			442495	05/29/19 19:26	S1B	TAL PEN
Total/NA	Prep	3520C			250 mL	1 mL	442208	05/25/19 09:39	NTH	TAL PEN
Total/NA	Analysis	8270D LL		5			442564	05/29/19 19:24	VC1	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442330/16**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	442330	05/28/19 10:36	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442369/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			442369	05/28/19 12:27	BAW	TAL PEN

Eurofins TestAmerica, Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442370/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			442370	05/28/19 12:27	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442484/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/CN			50 mL	50 mL	442484	05/29/19 10:05	BAB	TAL PEN
Total/NA	Analysis	335.2		1	10 mL	10 mL	442539	05/29/19 15:05	BAB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442665/7**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			442665	05/29/19 21:31	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-442886/1002**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	442886	06/01/19 07:56	WPD	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-443149/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D		1			443830	06/09/19 10:44	VC1	TAL PEN
Total/NA	Prep	3520C			250 mL	1 mL	443149	06/04/19 10:28	CGM	TAL PEN
Total/NA	Analysis	8270D LL		5			443423	06/06/19 12:16	VC1	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-443164/2-B**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	3005A			50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C		1			443253	06/04/19 21:26	GESP	TAL PEN
Dissolved	Filtration	FILTRATION	RA		1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	3005A	RA		50 mL	50 mL	443171	06/04/19 12:45	KWN	TAL PEN
Dissolved	Analysis	6010C	RA	1			443584	06/05/19 16:00	GESP	TAL PEN

Eurofins TestAmerica, Pensacola



# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-443164/2-C**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	443164	06/04/19 11:40	KWN	TAL PEN
Dissolved	Prep	7470A			40 mL	40 mL	443194	06/04/19 14:39	JAP	TAL PEN
Dissolved	Analysis	7470A		1			443529	06/06/19 12:57	JAP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-444017/15-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			40 mL	40 mL	444017	06/11/19 12:08	JAP	TAL PEN
Total/NA	Analysis	7470A		1			444198	06/12/19 11:56	JAP	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-444116/17**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 5310B		1			444116	06/10/19 21:52	RRC	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-444374/2**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			444374	05/23/19 10:34	BAB	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 400-446131/2-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	5 mL	446131	06/28/19 15:43	CGM	TAL PEN
Total/NA	Analysis	8082A		1			446231	06/29/19 12:59	DS	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-441779/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			441779	05/22/19 12:48	BAW	TAL PEN

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-442369/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056		1			442369	05/28/19 12:50	BAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-442370/6**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			442370	05/28/19 12:50	BAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-442665/8**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			442665	05/29/19 21:47	BAW	TAL PEN

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 400-446131/3-A**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			250 mL	5 mL	446131	06/28/19 15:43	CGM	TAL PEN
Total/NA	Analysis	8082A		1			446231	06/29/19 13:30	DS	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-441828/13**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	365.4		1	10 mL	10 mL	441828	05/22/19 13:32	JAT	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-441973/5**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	350.1		1	10 mL	10 mL	441973	05/23/19 13:35	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-441975/12**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	351.2		1			441975	05/23/19 13:09	JAT	TAL PEN

Eurofins TestAmerica, Pensacola

# Lab Chronicle

Client: Black Warrior Riverkeeper  
Project/Site: Coal Ash Wastewater

Job ID: 400-170481-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-442330/13**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	353.2		1	10 mL	10 mL	442330	05/28/19 10:34	KJR	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-442665/24**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	218.7		1			442665	05/30/19 00:38	BAW	TAL PEN

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: MRL 400-444116/16**

Date Collected: N/A

Matrix: Water

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 5310B		1			444116	06/10/19 21:52	RRC	TAL PEN

**Client Sample ID: 1**

**Lab Sample ID: 400-170481-1 MS**

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	442886	06/01/19 11:15	WPD	TAL PEN

**Client Sample ID: 1**

**Lab Sample ID: 400-170481-1 MSD**

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	5 mL	5 mL	442886	06/01/19 11:40	WPD	TAL PEN

**Client Sample ID: 1**

**Lab Sample ID: 400-170481-1 DU**

Date Collected: 05/20/19 13:45

Matrix: Water

Date Received: 05/21/19 08:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2310B		1			444374	05/23/19 11:15	BAB	TAL PEN
Total/NA	Analysis	SM 2510B		1			441873	05/22/19 12:30	DEK	TAL PEN
Total/NA	Analysis	SM 2540C		1	50 mL	50 mL	441979	05/23/19 15:36	CLB	TAL PEN

## Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000  
TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins TestAmerica, Pensacola

## Chain of Custody Record



<b>Client Information</b> Client Contact: Nelson Brooke Phone: (205) 458-0095 Email: jason.wilson@testamericainc.com		Lab PM: Wilson, Jason A E-Mail: jason.wilson@testamericainc.com		Carrier Tracking No(s): 400-84176-31570.1 Page: 1 of 1 Job #:		COC No: 400-84176-31570.1																																	
Company: Black Warrior Riverkeeper Address: 712 37th Street South City: Birmingham State: AL, Zip: 35222 Phone: (205) 458-0095 Email: nbrooke@blackwarriorriver.org Project Name: Coal Ash Wastewater Site: Greene County Steam Plant		Due Date Requested: TAT Requested (days): PO #: Purchase Order not required WO #: Project #: 40010274 SSOW#:		<b>Analysis Requested</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Field Filtered Sample (Yes or No)</th> <th>Perform MS/MSD (Yes or No)</th> <th>8290A - Dioxin and Furans</th> <th>8082A, 8270D, 8270D_LL</th> <th>350.1, 351.2, 353.2_Pres, 355.4</th> <th>300_ORGFM_28D, 9056_ORGFM_28D</th> <th>6010C, 7470A</th> <th>2320B, 2510B, SM2310B</th> <th>6010C, 7470A, SM2340B</th> <th>8260C - TCL 8260 Volatiles List from CLP OLM 4.2</th> <th>SM5310B - TOC</th> <th>2540D - Solids, Total Suspended (TSS)</th> <th>2540C - Solids, Total Dissolved (TDS)</th> <th>335.2 - Cyanide, Total</th> <th>218.7 - Chromium, Hexavalent (Ion Chromatography)</th> <th>Total Number of Containers</th> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>				Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8290A - Dioxin and Furans	8082A, 8270D, 8270D_LL	350.1, 351.2, 353.2_Pres, 355.4	300_ORGFM_28D, 9056_ORGFM_28D	6010C, 7470A	2320B, 2510B, SM2310B	6010C, 7470A, SM2340B	8260C - TCL 8260 Volatiles List from CLP OLM 4.2	SM5310B - TOC	2540D - Solids, Total Suspended (TSS)	2540C - Solids, Total Dissolved (TDS)	335.2 - Cyanide, Total	218.7 - Chromium, Hexavalent (Ion Chromatography)	Total Number of Containers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8290A - Dioxin and Furans	8082A, 8270D, 8270D_LL	350.1, 351.2, 353.2_Pres, 355.4	300_ORGFM_28D, 9056_ORGFM_28D	6010C, 7470A	2320B, 2510B, SM2310B	6010C, 7470A, SM2340B	8260C - TCL 8260 Volatiles List from CLP OLM 4.2	SM5310B - TOC	2540D - Solids, Total Suspended (TSS)	2540C - Solids, Total Dissolved (TDS)	335.2 - Cyanide, Total	218.7 - Chromium, Hexavalent (Ion Chromatography)	Total Number of Containers																								
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																								
<b>Sample Identification</b> Sample Date: 5/20/19 Sample Time: 1:45pm Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, BT=Tissue, A=Air): Water		Preservation Code:		<b>Special Instructions/Note:</b>																																			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months																																			
Empty Kit Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke		Date: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm		Method of Shipment:																																			
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke Relinquished by: Nelson Brooke		Date: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm Date/Time: 5/20/19 6:25pm																																			



## Chain of Custody Record

Eurofins

Environment Testing  
TestAmerica

400-170481 Chain of Custody

Client Information (Sub Contract Lab)		Lab PM: Wilson, Jason A		No: 400-210978-1	
Client Contact: Shipping/Receiving		E-Mail: jason.wilson@testamericainc.com		Page: Page 1 of 1	
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 400-170481-1	
Address: 5815 Middlebrook Pike,		Due Date Requested: 6/17/2019		Analysis Requested	
City: Knoxville		TAT Requested (days):		Preservation Codes:	
State, Zip: TN, 37921		PO #:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO <sub>4</sub> F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Phone: 865-291-3000(Tel) 865-584-4315(Fax)		WO #:		M - Hexane N - None O - AsNaO <sub>2</sub> P - Na <sub>2</sub> OAS Q - Na <sub>2</sub> SO <sub>3</sub> R - Na <sub>2</sub> SO <sub>4</sub> S - H <sub>2</sub> SO <sub>4</sub> T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Email:		Project #:			
Project Name: Coal Ash Wastewater		40010274			
Site:		SSOW#:			
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time	
1 (400-170481-1)		5/20/19		13:45 Central	
Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, AS=Air)		Sample Type (C=Comp, G=grab)		Preservation Code	
Water					
Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		8290A/8290_P_Sep TCDD/TCDF Only	
X		X		X	
Total Number of Containers		2		Special Instructions/Note:	
RT: 3.0°C CT: 3.0°C, 1 cooler					
Fedex po, No Custody seal					
Fax # 455-0242 Q806					
KWS/22/19					
Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.					
Possible Hazard Identification					
Unconfirmed					
Deliverable Requested: I, II, III, IV, Other (specify)					
Primary Deliverable Rank: 2					
Empty Kit Relinquished by:					
Date:					
Relinquished by: Kathy L Avery					
Date/Time: 5-21-19 1600					
Relinquished by:					
Date/Time:					
Relinquished by:					
Date/Time:					
Custody Seals Intact: Δ Yes Δ No					
Custody Seal No.:					
Cooler Temperature(s) °C and Other Remarks:					
Received by: [Signature]					
Date/Time: 5/22/19 0930					
Company: TA-Gen					
Received by:					
Date/Time:					
Company:					
Received by:					
Date/Time:					
Company:					
Special Instructions/QC Requirements:					
Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)					
Method of Shipment:					

## TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Review Items	Yes	No	NA	If No, what was the problem?	Comments/Actions Taken
1. Are the shipping containers intact?	/			<input type="checkbox"/> Containers, Broken	
2. Were ambient air containers received intact?				<input type="checkbox"/> Checked in lab	
3. The coolers/containers custody seal if present, is it intact?				<input type="checkbox"/> Yes <input type="checkbox"/> NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6°C, VOST: 10°C) Thermometer ID: <u>SC 68</u> Correction factor: <u>to 0.0</u>	/			<input type="checkbox"/> Cooler Out of Temp, Client Contacted, Proceed/Cancel <input type="checkbox"/> Cooler Out of Temp, Same Day Receipt	
5. Were all of the sample containers received intact?	/			<input type="checkbox"/> Containers, Broken	
6. Were samples received in appropriate containers?	/			<input type="checkbox"/> Containers, Improper; Client Contacted; Proceed/Cancel	
7. Do sample container labels match COC? (IDs, Dates, Times)	/			<input type="checkbox"/> COC & Samples Do Not Match <input type="checkbox"/> COC Incorrect/Incomplete <input type="checkbox"/> COC Not Received	
8. Were all of the samples listed on the COC received?	/			<input type="checkbox"/> Sample Received, Not on COC <input type="checkbox"/> Sample on COC, Not Received	
9. Is the date/time of sample collection noted?	/			<input type="checkbox"/> COC; No Date/Time; Client Contacted	Labeling Verified by: _____ Date: _____
10. Was the sampler identified on the COC?			/	<input type="checkbox"/> Sampler Not Listed on COC	
11. Is the client and project name/# identified?	/			<input type="checkbox"/> COC Incorrect/Incomplete	
12. Are tests/parameters listed for each sample?	/			<input type="checkbox"/> COC No tests on COC	pH test strip lot number: _____
13. Is the matrix of the samples noted?	/			<input type="checkbox"/> COC Incorrect/Incomplete	
14. Was COC relinquished? (Signed/Dated/Timed)	/			<input type="checkbox"/> COC Incorrect/Incomplete	Box 16A: pH Preservation Box 18A: Residual Chlorine
15. Were samples received within holding time?	/			<input type="checkbox"/> Holding Time - Receipt	Preservative: _____
16. Were samples received with correct chemical preservative (excluding Encore)?				<input type="checkbox"/> pH Adjusted, pH Included (See box 16A) <input type="checkbox"/> Incorrect Preservative	Lot Number: _____
17. Were VOA samples received without headspace?			/	<input type="checkbox"/> Headspace (VOA only)	Exp Date: _____
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number: _____			/	<input type="checkbox"/> Residual Chlorine	Analyst: _____
19. For 1613B water samples is pH<9?			/	<input type="checkbox"/> If no, notify lab to adjust	Date: _____
20. For rad samples was sample activity info. Provided?			/	<input type="checkbox"/> Project missing info	Time: _____
Project #: _____ PM Instructions: _____					

Sample Receiving Associate: He WDate: 5/22/19

QA026R31.doc, 112618

June 07, 2019

Mr. Nelson Brooke  
Black Warrior Riverkeeper  
712 37th Street South  
Birmingham, Alabama 35222

Re: Routine Analytical  
Work Order: 479827

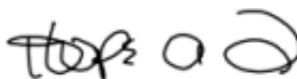
Dear Mr. Brooke:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 22, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,



Hope Taylor  
Project Manager

Enclosures

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

BWRK001 Black Warrior Riverkeeper

Client SDG: 479827 GEL Work Order: 479827

**The Qualifiers in this report are defined as follows:**

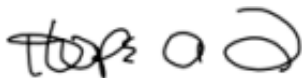
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.

Reviewed by





# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: June 7, 2019

Company : Black Warrior Riverkeeper  
Address : 712 37th Street South

Birmingham, Alabama 35222

Contact: Mr. Nelson Brooke  
Project: Routine Analytical

Client Sample ID:	1	Project:	BWRK00118
Sample ID:	479827001	Client ID:	BWRK001
Matrix:	Waste Water		
Collect Date:	20-MAY-19 13:45		
Receive Date:	22-MAY-19		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis													
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.286	+/-0.429	0.664	1.00	pCi/L			MP2	05/26/19	1001	1879643	1
Uranium-235/236	U	0.108	+/-0.304	0.324	1.00	pCi/L							
Uranium-238	U	0.220	+/-0.350	0.484	1.00	pCi/L							
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Liquid (Short List) "As Received"													
Potassium-40	U	3.89	+/-20.6	12.3		pCi/L			MXR1	05/29/19	1644	1881493	2
Radium-226	U	33.1	+/-42.1	35.6		pCi/L							
Radium-228	U	-7.44	+/-6.38	5.90		pCi/L							
Thorium-228	U	1.53	+/-3.73	2.20		pCi/L							
Thorium-232	UI	0.00	+/-998	679		pCi/L							

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE EML HASL-300, U-02-RC Modified	
2	EPA 901.1	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			75.4	(15%-125%)

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: June 7, 2019

Page 1 of 3

**Black Warrior Riverkeeper**  
**712 37th Street South**  
**Birmingham, Alabama**

**Contact:** Mr. Nelson Brooke

**Workorder:** 479827

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	1879643										
QC1204290441	479827001	DUP									
Uranium-233/234	U	0.286	U	0.459	pCi/L	N/A		N/A	MP2	05/26/19	10:01
	Uncertainty	+/-0.429		+/-0.471							
Uranium-235/236	U	0.108	U	-0.0248	pCi/L	N/A		N/A			
	Uncertainty	+/-0.304		+/-0.214							
Uranium-238	U	0.220	U	0.211	pCi/L	N/A		N/A			
	Uncertainty	+/-0.350		+/-0.335							
QC1204290442	LCS										
Uranium-233/234				27.4	pCi/L					05/26/19	10:01
	Uncertainty			+/-2.60							
Uranium-235/236				0.692	pCi/L						
	Uncertainty			+/-0.493							
Uranium-238	27.3			27.9	pCi/L		102	(75%-125%)			
	Uncertainty			+/-2.62							
QC1204290440	MB										
Uranium-233/234			U	0.0559	pCi/L					05/26/19	10:01
	Uncertainty			+/-0.241							
Uranium-235/236			U	0.00	pCi/L						
	Uncertainty			+/-0.173							
Uranium-238			U	-0.0167	pCi/L						
	Uncertainty			+/-0.144							
<b>Rad Gamma Spec</b>											
Batch	1881493										
QC1204295372	479827001	DUP									
Potassium-40	U	3.89	U	-7.79	pCi/L	N/A		N/A	MXR1	05/30/19	15:31
	Uncertainty	+/-20.6		+/-19.5							
Radium-226	U	33.1	U	-64.6	pCi/L	N/A		N/A			
	Uncertainty	+/-42.1		+/-44.3							
Radium-228	U	-7.44	U	-0.406	pCi/L	N/A		N/A			
	Uncertainty	+/-6.38		+/-7.25							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 479827

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1881493										
Thorium-228	U	1.53	U	1.09	pCi/L	N/A		N/A MXR1		05/30/19	15:31
	Uncertainty	+/-3.73		+/-3.82							
Thorium-232	UI	0.00	UI	0.00	pCi/L	N/A		N/A			
	Uncertainty	+/-998		+/-2550							
QC1204295373	LCS										
Americium-241	34200			35400	pCi/L		103	(75%-125%)		05/30/19	15:51
	Uncertainty			+/-885							
Cesium-137	12600			12700	pCi/L		101	(75%-125%)			
	Uncertainty			+/-273							
Cobalt-60	9190			9390	pCi/L		102	(75%-125%)			
	Uncertainty			+/-269							
Potassium-40			U	177	pCi/L						
	Uncertainty			+/-230							
Radium-226			U	375	pCi/L						
	Uncertainty			+/-944							
Radium-228			U	-163	pCi/L						
	Uncertainty			+/-225							
Thorium-228			U	9.87	pCi/L						
	Uncertainty			+/-75.7							
Thorium-232			U	-5640	pCi/L						
	Uncertainty			+/-19800							
QC1204295371	MB										
Potassium-40			U	4.07	pCi/L					05/29/19	16:44
	Uncertainty			+/-21.5							
Radium-226			U	20.1	pCi/L						
	Uncertainty			+/-42.7							
Radium-228			U	-3.4	pCi/L						
	Uncertainty			+/-6.43							
Thorium-228			U	0.676	pCi/L						
	Uncertainty			+/-3.31							
Thorium-232			U	-945	pCi/L						
	Uncertainty			+/-1380							

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 479827

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

### Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**Radiochemistry  
Technical Case Narrative  
Black Warrior Riverkeeper  
SDG #: 479827**

**Product:** Alphaspec U, Liquid

**Analytical Method:** DOE EML HASL-300, U-02-RC Modified

**Analytical Procedure:** GL-RAD-A-011 REV# 27

**Analytical Batch:** 1879643

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
479827001	1
1204290440	Method Blank (MB)
1204290441	479827001(1) Sample Duplicate (DUP)
1204290442	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Liquid (Short List)

**Analytical Method:** EPA 901.1

**Analytical Procedure:** GL-RAD-A-013 REV# 27

**Analytical Batch:** 1881493

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
479827001	1
1204295371	Method Blank (MB)
1204295372	479827001(1) Sample Duplicate (DUP)
1204295373	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high counting uncertainty.	Thorium-232	479827001	1
			1204295372	1(479827001DUP)

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Page: 1 of 1  
Project #  
Quote #  
CSC Number (1):  
POT Number:  
Client Name: Black Warrior Riverkeeper  
Project/Site Name: Greene County Stream Plant  
Address: 712 37th St. South Birmingham, AL 35222  
Collected By: Nelson Drake  
Send Results To: nbrooke@blackwarriorriverkeeper.org  
Phone # (205) 458-0095  
Fax #  
GEL Work Order Number: GEL Project Manager:  
GEL Laboratories LLC  
Chemistry / Radiochemistry / Radiobiology / Specialty Analytics  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

Sample Analysis Requested <sup>(5)</sup> (Fill in the number of containers for each test)										Preservative Type (6)		Comments  Note: extra sample is required for sample specific QC



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: <u>BWRK</u>		SDG/AR/COC/Work Order: <u>479827</u>	
Received By: <u>ZKW</u>		Date Received: <u>5/22/19</u>	
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other	
		<u>7873 7308 9205</u>	
Suspected Hazard Information	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
A) Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____ If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___	
B) Did the client designate the samples are to be received as radioactive?	<input checked="" type="checkbox"/>	COC notation or radioactive stickers on containers equal client designation.	
C) Did the RSO classify the samples as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM mR/Hr Classified as: Rad 1 Rad 2 Rad 3	
D) Did the client designate samples are hazardous?	<input checked="" type="checkbox"/>	COC notation or hazard labels on containers equal client designation.	
E) Did the RSO identify possible hazards?	<input checked="" type="checkbox"/>	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____	
Sample Receipt Criteria		Yes <input type="checkbox"/> NA <input checked="" type="checkbox"/> No <input type="checkbox"/>	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None <input type="checkbox"/> Other: *all temperatures are recorded in Celsius TEMP: <u>4°C</u>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	Temperature Device Serial #: <u>IR3-18</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	If Yes, are Encores or Soil Kits present for solids? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes ___ No ___ NA ___ Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	ID's and containers affected: <u>No ID's on sample</u>
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	Circle Applicable: Not relinquished Other (describe)
Comments (Use Continuation Form if needed):			

PM (or PMA) review: Initials JMC Date 5/23/19 Page 1 of 1

GL-CHL-SR-001 Rev 6



**List of current GEL Certifications as of 07 June 2019**

<b>State</b>	<b>Certification</b>
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018-27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

3300 Breckinridge Blvd  
Suite 400  
Duluth, GA 30096

770.662.8509  
FAX 770.662.8532  
www.mvainc.com

**Environmental Forensics Services**

Particle Characterization  
Dust Characterization  
Carbon Black Analysis  
Fly Ash Characterization  
Darkening Agents Identification  
Soot Analysis  
Asbestos Analysis & Exposure  
Evaluation  
Unknown Material Analysis  
Contamination Analysis  
Source Determination  
Expert Witness Services

**Techniques**

Light Microscopy  
Scanning Electron  
Microscopy  
Transmission Electron  
Microscopy  
Fourier Transform  
Infrared Spectroscopy  
Confocal Raman Microscopy  
White Light Interference  
Microscopy  
Energy Dispersive X-ray Spectrometry  
Fluorescence Microscopy  
Ion Milling & Ultramicrotomy

**Accreditations**

cGMP Compliant  
ISO/IEC 17025  
A2LA Certificate #2096.01  
FDA Registered

**Report of Results: MVA13207**

**Examination of Water Sample for Coal Combustion Waste**

**Prepared for:**

**Black Warrior Riverkeeper  
712 37<sup>th</sup> Street South  
Birmingham, AL 35222**

**Respectfully Submitted by:**



**EXECUTED BY  
ELECTRONIC  
SIGNATURE**

**Tim B. Vander Wood, Ph.D.  
Executive Director**

**6 June 2019**

## Report of Results: MVA13207

### Examination of Water Sample for Coal Combustion Waste

#### Introduction

This report includes the results of analysis of one water sample containing suspended particulate received from Nelson Brooke of Black Warrior Riverkeeper on 22 May 2019 via FedEx. It was requested that the sediment be characterized for the presence of coal combustion particulate. Upon receipt the sample was assigned a unique MVA sample number as provided in the following table. The analysis was conducted on 4 June 2019.

MVA Sample ID	Client Sample ID
13207AE0715	LOT0212401D "Micro"

#### Methods

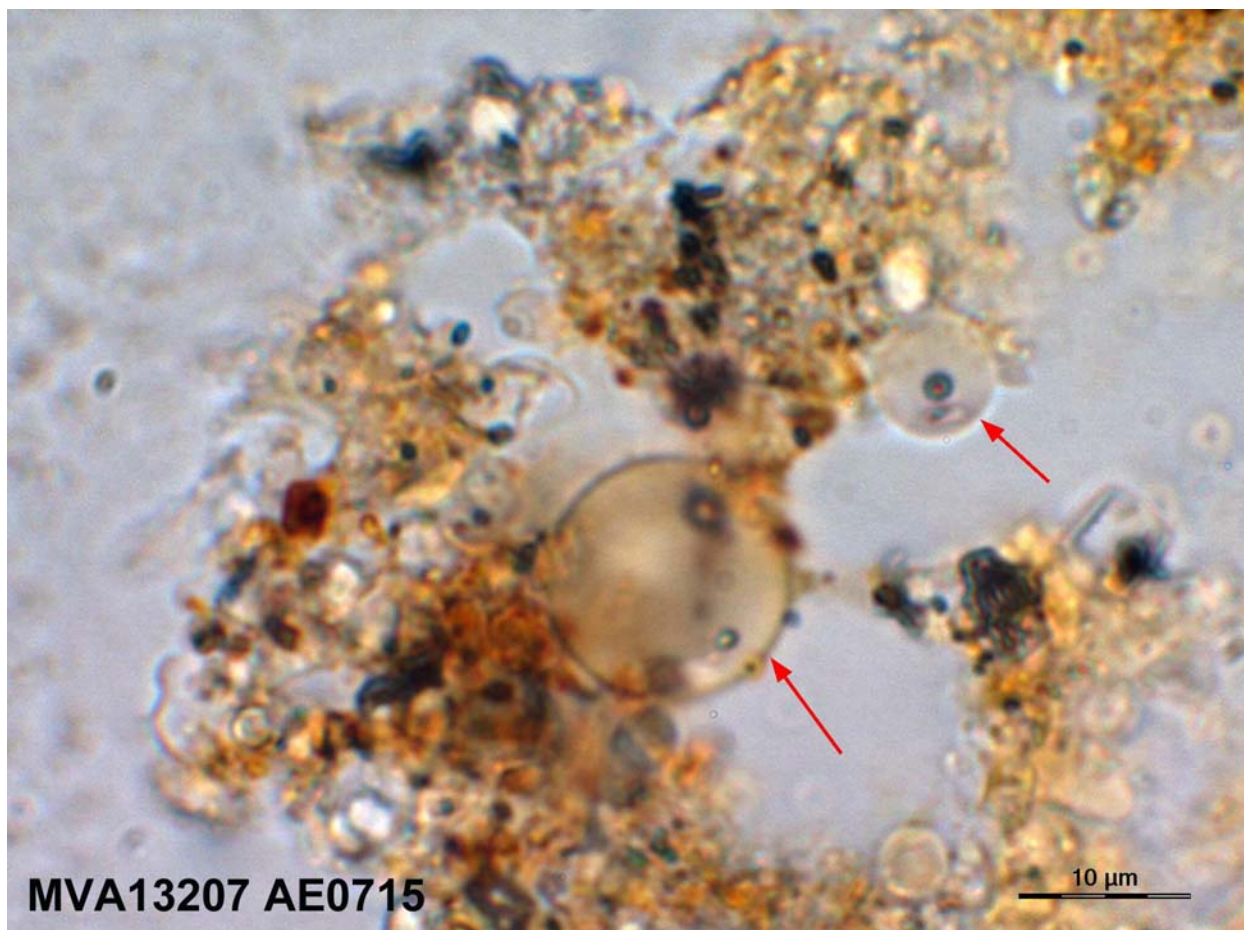
Representative portions of the sample were collected and dried on a clean microscope slide. The dried material was examined under a stereomicroscope and by polarized light microscopy (PLM) using an Olympus BHSP polarized light microscope.

#### Results and Discussion

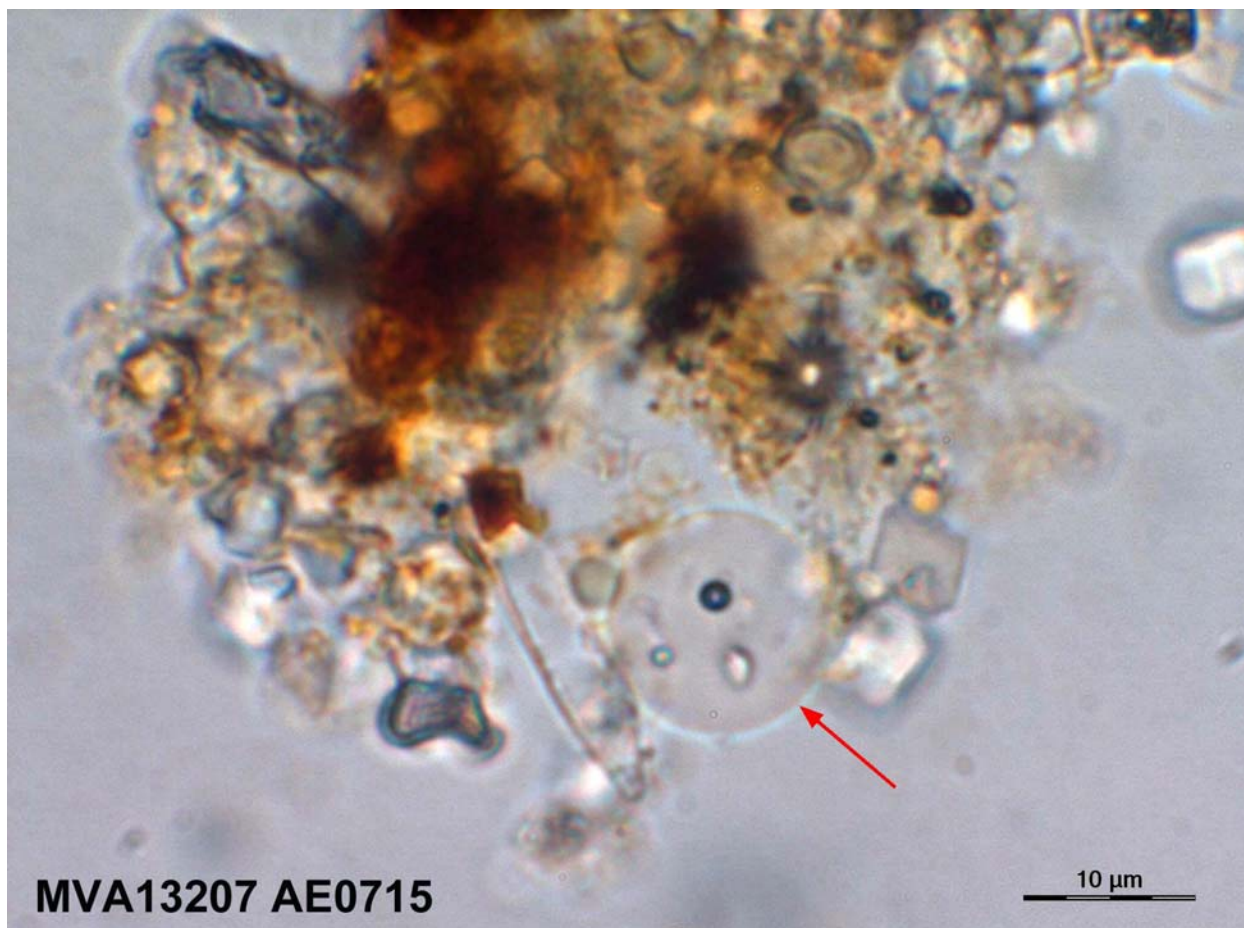
The solid material suspended in the water sample consists primarily (>80%) of organic material. Isotropic spheres consistent with fly ash cenospheres (Figures 1 and 2) are a minor (5-10%) component of the suspended solids, as are diatoms.

#### Conclusion

Particles consistent with coal ash combustion products are present in this sample.



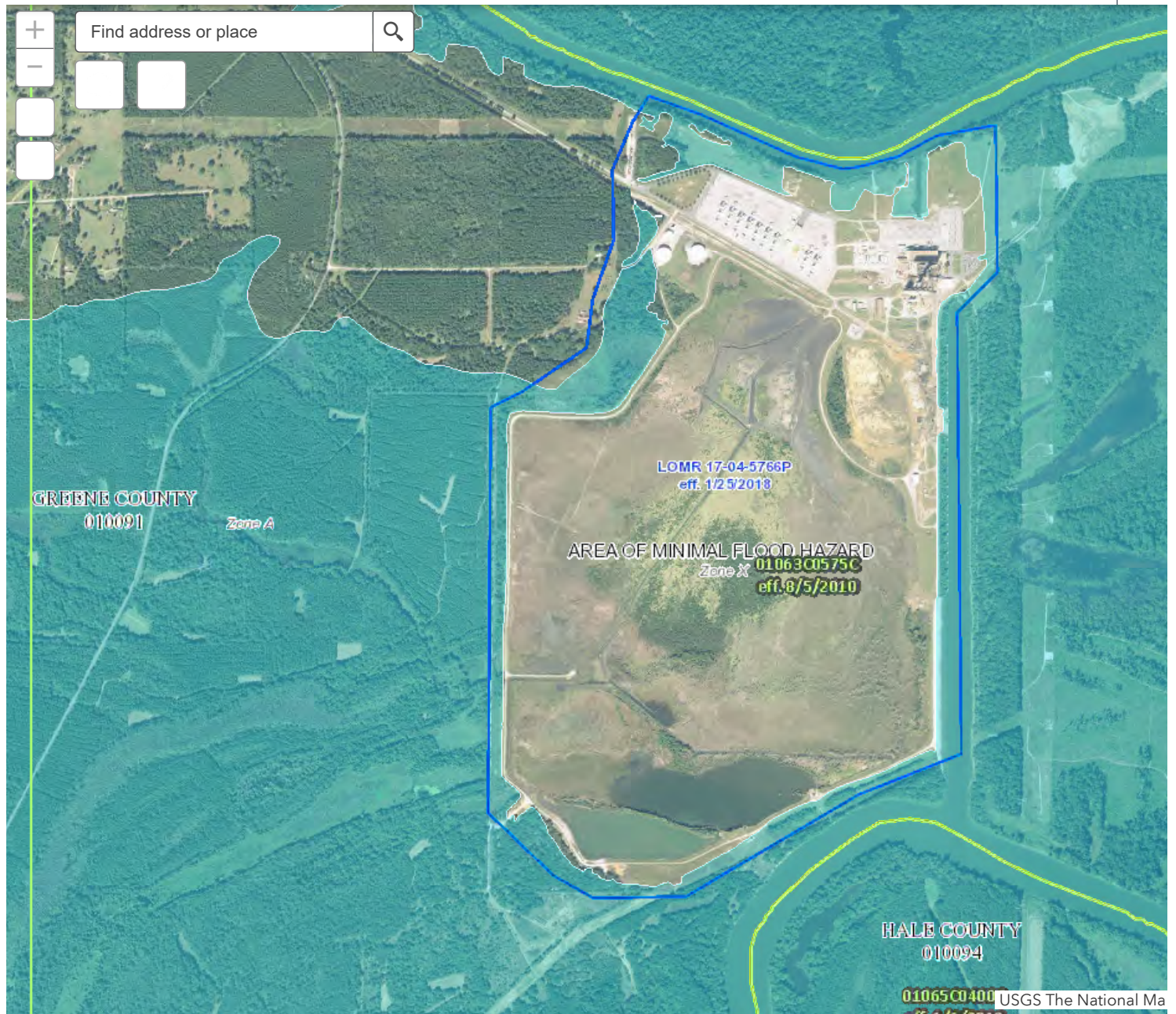
**Figure 1.** PLM image of fly ash cenospheres observed in sample 13207AE0715.  
Transmitted illumination.



**Figure 2.** PLM image of fly ash cenosphere observed in sample 13207AE0715.  
Transmitted illumination.

**Attachment 3 –  
FEMA 1% Annual Chance Flood Map**





**Attachment 4 –  
7/31/2003 Noncompliance Notification Form**



**Alabama Department of Environmental Management**  
**Water Division - Industrial Branch**  
**Noncompliance Notification Form**

**Permittee Name:** ALABAMA POWER COMPANY  
**Permit Number:** AL-0002917  
**Discharge Number:** 002 Q  
**Facility:** GREENE CO. STEAM PLANT

**1. Description of Discharge:**  
ASH POND DISCHARGE

**Noncompliance Parameter(s) and Period(s) of Noncompliance:**

5/29/2003      Solid, TS      165 mg/l


**Cause of Noncompliance:**

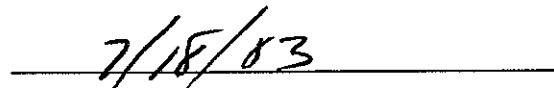
Excessive solids in the ash pond caused by excessive rains and flooding at the site. The river flooded and overflowed into the Ash Pond, depositing solids into the Ash Pond. As it was near the end of the month, samples had to be collected to prevent a lack of sampling per the NPDES permit.

**2. Description of Steps Taken and/or Being Taken to Reduce or Eliminate the Noncomplying Discharge and to Prevent its Recurrence:**

There are no steps which could have been taken to prevent the exceedance.



  
Signature of Responsible Official

  
Date Signed

**Attachment 5 –  
ClosureTurf® Brochure**

# ClosureTurf®

## A PREDICTABLE BENCHMARK OF PERFORMANCE



MADE WITH  
**agru**  
STRUCTURED MEMBRANES

  
**ClosureTurf®**  
ADVANCED FINAL COVER SYSTEM





## Soil Slopes Don't Work, Although They Keep You Working

Soil erosion continually plagues the ongoing management of landfills, industrial waste sites, CCR storage areas, and other environmental containment applications requiring constant rebuilding of slopes weakened by rain and wind. In addition to ongoing maintenance headaches, traditional systems utilizing soil as their main component are costly to maintain, slow to install and introduce unwanted slope stabilities. ClosureTurf® is the only solution that provides a predictable benchmark of performance.

A prescriptive cover is effectively an engineered structure reliant upon vegetation and weather to perform as designed. With this in mind, ClosureTurf was designed to provide an engineered solution to Subtitle D requirements that would perform under all conditions. It is quickly becoming the closure system of choice across the country for engineers, owners, government agencies and many others who are seeking the best solution for their containment challenges. The ClosureTurf system offers exceptional stability, long-term protection and natural aesthetics all for a comparable price to traditional designs.





*Berkeley County Landfill, SC*

## ClosureTurf® Makes Erosion Control Easy—It's Virtually Install and That's All.

ClosureTurf is a patented, three-component system comprised of a structured geomembrane, an engineered synthetic turf and a specified infill. The ClosureTurf system provides predictable performance over a vegetated Subtitle D landfill cover by:

- Reducing construction and long-term maintenance costs
- Exceeding technical performance factors
- Withstanding extreme weather conditions
- Lasting well beyond the post-closure care period
- Easily incorporating into existing gas collection systems
- Improving storm water quality
- Allowing for Incremental closures for quicker gas control, odor control and leachate reduction

With a footprint of over 1,200 acres, ClosureTurf has proven to be superior in performance when compared to other cover solutions. Because of its consistent ability to meet and/or exceed compliance and performance standards, ClosureTurf is the preferred method in landfill final cover designs for many.

# A PREDICTABLE PERFORMANCE CHECKLIST



*Crazy Horse Landfill, CA*



*Baldwin County Landfill, GA*



*Portola Landfill, CA*

## Construction Benefits

- Installs at least 50% faster than traditional soil caps
- Eliminates on average 550 truck trips of soil per acre from local roadways
- Allows for incremental closures
- Eliminates 2 feet of soil; no borrow soil
- Easily adapted during or after construction for solar field development

## Technical Performance

- Prevents common erosion, storm water and siltation problems—even during severe weather events
- Utilizes the highest interface friction geomembrane available in the market for greater stability on steeper grades and eliminates the need to rebuild slopes
- With a design life of 100+ years, the lifespan of the ClosureTurf system extends well beyond the post-closure maintenance period
- Protects against driving forces, severe weather conditions heat and wind uplift

## Cost Savings

- Reduces maintenance and post closure care by around 90% compared to a soil cap
- Reduces sediment loading clean out to surrounding channels and sedimentation/detention basins



## Environmental Impacts

- Provides clean runoff with very low turbidity
- No soil, chemicals or fertilizers to contaminate the water
- Obtain control over gas collection sooner than later (“close as you go”)
- Reduces overall surface emissions
- Lowers the production of leachate with incremental closures
- Durable system construction designed to safely convey internal gas pressures, reduce unwanted releases and avoid slope stability issues
- Requires no irrigation, fertilizing, seeding or mowing
- Reduces environmental carbon footprint by up to 80% during construction



11 NTU

371 NTU

*Runoff from a typical 1" rainfall  
(same site); ClosureTurf (left);  
traditional soil cover (right)*



Port Angeles Landfill, WA

## TAKE A CLOSER LOOK AT CLOSURETURF

ClosureTurf is a patented, three component system comprised of a structured geomembrane, an engineered synthetic turf and a specified infill. The foundation of the system is an impermeable, highly transmissive structured geomembrane. It provides for the highest interface friction values available in the market. The engineered synthetic turf component gives the system its natural look and feel of grass while protecting the geomembrane from extreme weather conditions for the long term. The specified infill component is placed between the blades of the engineered turf and allows the system to be trafficked while also providing additional protection from weathering. While ClosureTurf incorporates easily into existing gas collection systems, the patented gas relief valve protects against build-up/ballooning if the gas collection system malfunctions. ClosureTurf is fast and easy to install for an aesthetically pleasing, cost-effective landfill closure solution.

### STRUCTURED GEOMEMBRANE

- Studs on top provide quick drainage of high intensity rainfall events
- Spikes on bottom provide high friction to subgrade
- Exceeds most regulatory thickness requirements by 20 %

### ENGINEERED SYNTHETIC TURF

- Dimensional stability
- High interface friction
- Aesthetically pleasing
- Virtually maintenance free
- Superior resistance to:
  - Extreme weather
  - Long-term UV exposure
  - Heat

### SPECIFIED INFILL

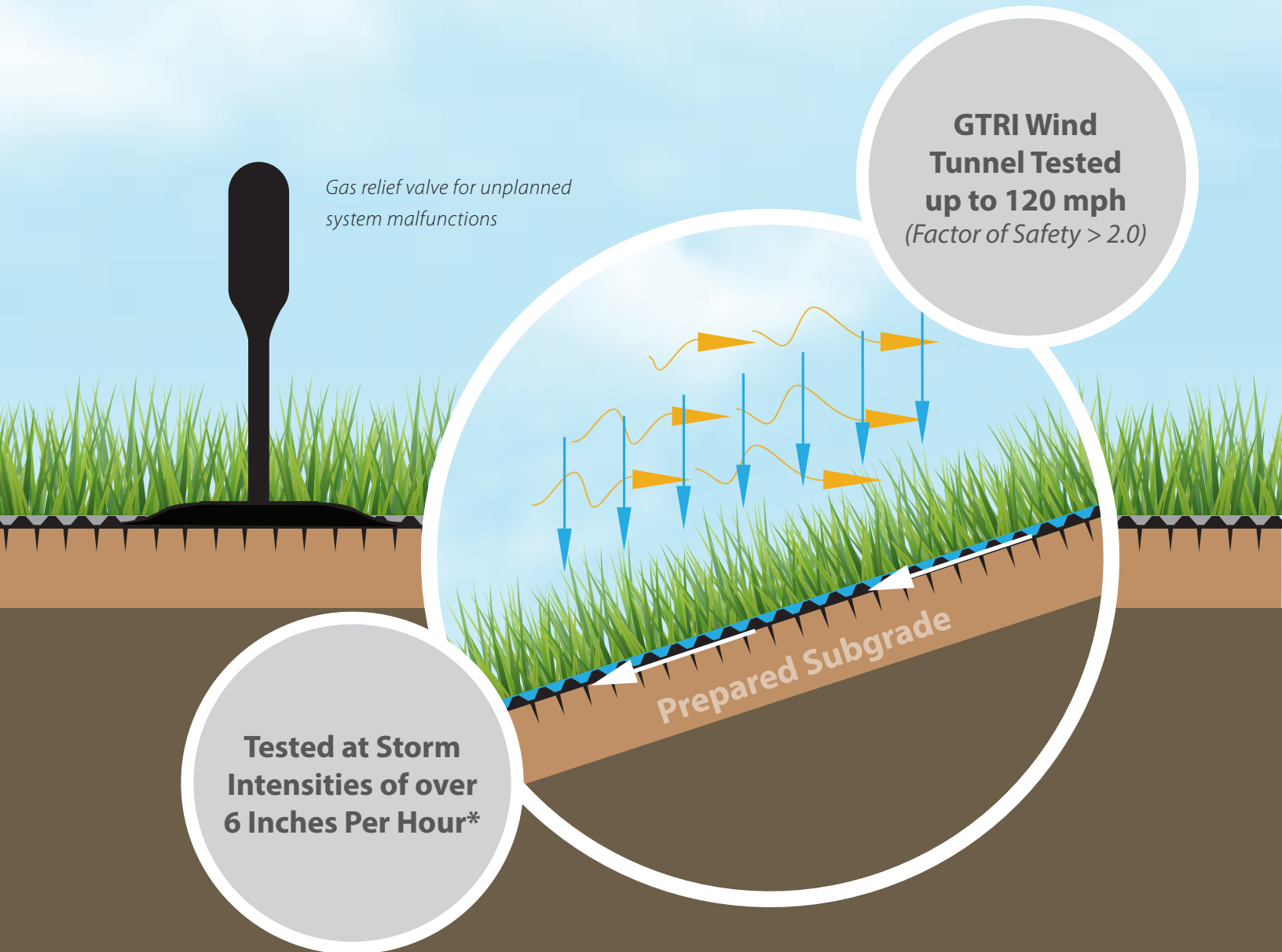
- Supports heavy traffic loads
- Provides additional UV protection
- Lab tested in high rainfall events
- Creates a non-exposed system
- Superior weathering protection
- Reduces heat absorption



WASTE



**ClosureTurf is specifically designed for long-term slope stability in the wake of severe weather events such as intense rainfall, hurricane force winds and earthquakes.**



*\* Most significant rainfall event to date is 22 inches over 24 hours with no damage to the ClosureTurf system.*

**WASTE**

# AN INNOVATIVE SOLAR SOLUTION FOR LANDFILLS AND IMPOUNDMENTS

Solatics® is a patented solar system that uses ClosureTurf® as its foundation to turn an environmental liability into an environmental asset. Installing solar generation on capped landfills has proven an effective way to deploy large systems on typically unused space. By combining the proven technology of ClosureTurf with the advanced science of Solatics, the system yields the highest producing, easiest to maintain solar solution available on the market. ClosureTurf's unique cover system enables solar panels to operate in a clean environment free of dust, grass clippings and potential damage from lawn mowing equipment. With a no penetration, friction-based attachment method, Solatics is able to operate and function with optimal performance.

## Why Siting Solar on Landfills is Superior to Other Sites, including Greenfields:

- Productive use – financially and environmentally – of land resource with minimal typical reuse
- Receives superior financial incentives in some jurisdictions
- Prevents clear-cutting and grading of forests and greenfields
- Makes use of existing access roads, storm water management and security perimeters

## Solatics is the only solar technology of its kind:

- Uses the latest dual glass panel proprietary technology
- Utilizes a low profile direct attachment system to protect against wind uplift and shear
- Does not use bulky racking material
- Does not penetrate the closure system
- Maximizes the landfill footprint with both top deck and slope positioning
- Simplifies wiring and increases the power per unit area by more than 35%







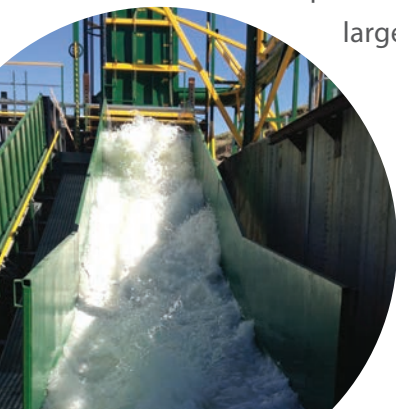


## OTHER ENGINEERED LANDFILL SOLUTIONS

### HydroTurf® Storm Water Revetment Technology



HydroTurf is an innovative, environmentally-friendly alternative revetment to rock and concrete hard armor linings for landfill storm water management system applications, including downchutes, perimeter channels, bench drains, outfall structures, slopes and basins. It is a patented, three-component system made up of a structured geomembrane, an engineered synthetic turf and a specialized cementitious infill called HydroBinder®. Created specifically for hydraulic applications on landfills, HydroTurf will flex and move with typical differential settlements without compromising performance. It provides superior hydraulic properties capable of handling large flows resulting in very high velocities.



*HydroTurf has been comprehensively tested at Colorado State University (CSU). CSU's laboratory has the largest flumes for hydraulic testing in the world. HydroTurf did not reach failure at a maximum steady state overtop velocity of 40 feet/second and for 13 hours in the wave overtop simulator being subjected to a five-hundred-year hurricane event for the New Orleans region.*

#### **Benefits Over Traditional Landfill Storm Water Management Systems:**

- Excellent hydraulic performance
- Less costly
- 50+ years of functional longevity
- Flexible solution for all settlement conditions
- Impermeable for superior erosion control
- Lightweight for rapid, low-impact and scalable construction
- Easy to install in difficult areas
- Minimal long-term maintenance
- Natural aesthetics to match surrounding environment



## VersaCap® Intermediate Cover



VersaCap is a wind and erosion resistant, intermediate engineered turf cover that reduces operational headaches and allows for increased gas collection efficiency before final closure. VersaCap prevents erosion, infiltration, runoff and gas emissions during the operational phases of the landfill, and is designed to have a 15+ year life span. It is fast and easy to install, and does not include tires or sandbags to keep it in place.

## ClosureTurf® Surficial Gas Landfill Management System

The ClosureTurf Surficial Gas Collection System is a cutting edge technology that outperforms conventional gas collection systems on every metric. It also integrates well with the latest vertical columns for collection and drainage. In many cases, you can reduce the reliance on deep gas wells. The system relies upon positive internal landfill pressures to push the gas to the surface below the geomembrane where collection strips guide the gas to collection points. Benefits include reduced condensate management and treatment, higher collection efficiencies, a potential elimination of landfill oxidation and higher compliance standards (surface scans). It also allows for quicker gas control.



**AFFILIATIONS:**

Geosynthetic Institute (Partner)  
Georgia Tech Research Institute (Partner)  
Industrial Fabrics Association International (Member)  
Colorado State University - Engineering Research Center (Partner)  
Florida Atlantic University (Partner)  
Iowa State University (Partner)

**CLOSURETURF IS TESTED IN ACCORDANCE WITH:**

GTRI-SSWT - Aerodynamic Shear & Uplift  
CSU USACE - Hydraulic Wave Overtopping  
ASTM D5261 - Mass per Unit Area  
ASTM D4632 - Grab Tensile Properties  
ASTM D4595 - Wide - Tensile  
ASTM D2256 - Tensile and Elongation  
ASTM D4716 - Hydraulic Transmissivity  
ASTM D5321 - Interface Shear  
ASTM D6460 - Large Scale Channel Hydraulics  
ASTM D6241 - CBR Puncture  
ASTM D6459 - InFill Stability  
ASTM D4884 - Seam Strength  
G147(02) & G145/G7 - UV Resistance & Stability  
UL94 Modifiers - Flammability  
ASTM D7277 - Steady State Hydraulic Overtopping  
ASTM E 108 - Burning Brand

**770.777.0386 • [watershedgeo.com](http://watershedgeo.com)**



CLOSURETURF®, HYDROTURF®, VERSACAP®, SOLATICS®, EASYFLOW™ AND SOLID-I-BAG™ are U.S. registered trademarks which designate a product from Watershed Geosynthetics, LLC. This product is the subject of issued U.S. and foreign patents and/or pending U.S. and foreign patent applications. All information, recommendations, and suggestions appearing in this literature concerning the use of our products are based upon tests and data believed to be reliable; however, this information should not be used or relied upon for any specific application without independent professional examination and verification of its accuracy, suitability and applicability. Since the actual use by others is beyond our control, no guarantee or warranty of any kind, expressed or implied, is made by Watershed Geosynthetics LLC as to the effects of such use or the results to be obtained, nor does Watershed Geosynthetics LLC assume any liability in connection herewith. Any statement made herein may not be absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations. Nothing herein is to be construed as permission or as a recommendation to infringe any patent.